Agmatine-Containing and Agmatine-Adjacent State-Regulation Systems, Four-Component Regimens, Enteric/Hydrophilic Tolerability Architectures, Salt Forms, Co-Localised Mast-Cell Support, Upper-Intestinal Acylcarnitine Delivery, Citicoline Stability Solutions, Clinical Protocols, Product Systems, Outcome Measures and Companion-Diagnostic Methods for Neurodevelopmental, Psychiatric, Autonomic, Cognitive, Sensory, Social-Functioning, Fatigue, Recovery and Demand-Response Applications

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Abstract

This defensive publication discloses agmatine-containing and agmatine-adjacent compositions, salt forms, delivery architectures, dosage forms, release profiles, gastrointestinal tolerability systems, co-localised mast-cell support systems, multi-component regimens, formulation technologies, clinical service models, companion diagnostics, outcome measures, kit architectures and product models for neurodevelopmental, psychiatric, autonomic, sensory, cognitive, emotional, social-functioning, fatigue-associated, gastrointestinal, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine, sleep, stress-recovery and transdiagnostic state-regulation applications.

The disclosed compositions, formulations, kits, regimens, protocols and diagnostic systems are expressly disclosed for use in preventing, treating, reducing, ameliorating, modulating, managing or supporting state-regulation impairments occurring in subjects with, diagnosed with, presenting traits of, or at risk of autism spectrum condition/autism spectrum disorder, ADHD, anxiety disorders, obsessive-compulsive disorder, major depressive disorder, persistent depressive disorder, treatment-resistant depression, depression with psychomotor retardation, bipolar depressive or mixed episodes, post-traumatic stress disorder, complex PTSD, acute stress disorder, adjustment disorders, autistic burnout, occupational burnout, caregiver burnout, academic burnout, sensory processing disorder, executive dysfunction, ME/CFS, fibromyalgia, long-COVID cognitive or autonomic dysfunction, perimenopause-associated or menopause-associated cognitive/autonomic dysfunction, PMDD, substance-withdrawal-associated dysregulation, traumatic-brain-injury-associated state-regulation difficulty, pathological demand avoidance/PDA profile, Tourette syndrome or tic disorders, eating disorders with interoceptive or state-regulation features, personality disorders with emotional-dysregulation features, intellectual disability or Down syndrome with co-occurring state-regulation difficulty, IBS-associated neurobehavioural dysregulation, mast-cell-activation-syndrome or histamine-intolerance-associated sensory/autonomic dysregulation, chronic pain with fatigue, shutdown, autonomic or sensory dysregulation, sleep-restoration impairment with daytime state-regulation impairment, and subclinical, subthreshold, mixed or multi-diagnosis presentations.

The disclosure is centred on a state-regulation framework in which functional impairment is defined by disruption of a demand-response-recovery cycle rather than by a single diagnostic label. Disclosed phenotypes include impaired action initiation, autistic inertia, executive state-transition difficulty, task paralysis, sensory overload, reduced sensory tolerance, shutdown vulnerability, meltdown vulnerability, autonomic dysregulation, chronic hyperarousal, cognitive rigidity, perseverative state-locking, depression-linked inertia, trauma-related hyperarousal, social functioning impairment, impaired social initiation, reduced social reciprocity, social communication impairment, social fatigue, impaired recovery after social demand, impaired recovery after sensory or cognitive demand, stress-recovery failure and burnout-associated loss of adaptive capacity.

A principal disclosed system is a four-component regimen comprising: (1) an agmatine-pathway component, (2) a palmitoylethanolamide-class component, (3) an acylcarnitine component and (4) a citicoline or choline-cytidine donor component. In preferred embodiments, the regimen is physically separated into: a first enterically protected dosage unit comprising agmatine and PEA with a hydrophilic matrix-forming polymer such as HPMC that hydrates after enteric opening to moderate intestinal agmatine exposure; and a physically separate immediate-release second dosage unit comprising ALCAR and citicoline. The same four-component system is also expressly disclosed as an all-in-one or single-product-unit system in which the components, salts, derivatives, analogues, prodrugs, complexes or functional substitutes are contained in one capsule, tablet, caplet, MUPS tablet, gummy, chewable, ODT, sachet, liquid unit, film, spray, patch, suppository, injection, infusion container, implantable depot or other administrable unit while using internal particles, pellets, layers, coatings, reservoirs, compartments, matrices or encapsulated subunits to provide different release sites, release rates, stability environments or sensory profiles. The separated and all-in-one architectures are disclosed for any agmatine salt or form, including agmatine sulfate as a principal commercial embodiment and agmatine dihydrochloride as an optimisation, and for all technically feasible combinations, routes, dose ranges, excipients, packaging systems and clinical protocols described herein.

The disclosure further covers: agmatine sulfate retained with delivery-based GI tolerability improvement; agmatine dihydrochloride or other non-sulfate salts for counterion optimisation; co-localised PEA for local mast-cell/histamine support at the intestinal site of agmatine release; ALCAR upper-intestinal release to reduce lower-intestinal TMA/TMAO formation; citicoline moisture-management architectures; taste- and odour-masked acylcarnitines; intranasal, buccal, sublingual, transdermal, injectable and other non-oral agmatine delivery; loading, maintenance and rescue protocols; paediatric, geriatric and sensory-sensitive formats; product kits; support stacks; microbiome/ecology products; outcome measures; companion diagnostic systems; and publication evidence practices.

All ingredients, ingredient classes, salt forms, routes, release profiles, dosage forms, excipients, technologies, indications, populations, outcome measures, product architectures and protocols disclosed herein are disclosed both individually and in all technically feasible combinations, including open, partially closed and closed compositions. Specific examples, ranges, combinations and embodiments are provided to avoid relying solely on generic genus language.

Keywords: agmatine; agmatine sulfate; agmatine dihydrochloride; agmatine hydrochloride; enteric release; HPMC; hydrophilic matrix; palmitoylethanolamide; PEA; mast cells; histamine; diamine oxidase; acetyl-L-carnitine; ALCAR; trimethylamine; TMAO; citicoline; CDP-choline; moisture management; autism; autism spectrum disorder; ADHD; OCD; depression; treatment-resistant depression; PTSD; complex PTSD; anxiety; autistic inertia; sensory overload; shutdown; meltdown; burnout; state regulation; demand-response-recovery; intranasal agmatine; companion diagnostics; defensive publication.

1A. High-Value Prior-Art Embodiments

This section provides concrete, claim-like prior-art embodiments near the beginning of the publication for searchability and avoidance of doubt. It is a compact reflection of the whole disclosure: agmatine embodiments, agmatine-free embodiments, microbiome embodiments, support-stack embodiments, formulation embodiments, diagnostic embodiments, kit embodiments, protocol embodiments and diagnosis-specific use embodiments. The embodiments in this Section 1A are intended to be read as directly, individually and unambiguously disclosed embodiments, not merely as selections from broader lists elsewhere in the publication. Each paragraph in this section is disclosed as a standalone embodiment and also in combination with the broader ingredient, route, dose, diagnostic, outcome-measure, kit, packaging and protocol disclosures elsewhere in this publication.

For every embodiment in this section, compositions comprising, consisting essentially of and consisting of the listed components are disclosed. Optional omission, substitution, physical separation, staged introduction and packaging separation variants are also disclosed where technically feasible and where the omitted component is not expressly required by the wording of the specific embodiment. For example, agmatine-containing embodiments disclose agmatine as required, while agmatine-adjacent embodiments separately disclose agmatine-free variants.

This Section 1A is intentionally written using searchable technical phrases such as agmatine for OCD, agmatine for treatment-resistant OCD, enteric agmatine, HPMC agmatine, agmatine gastrointestinal intolerance, agmatine PEA, agmatine ALCAR citicoline, intranasal agmatine and agmatine state regulation.

This publication does not assert regulatory approval or proven clinical efficacy. The embodiments are disclosed as technical compositions, formulations, routes, dose ranges, protocols and measurement systems capable of being made and used by a skilled person for prior-art purposes.

The embodiment families in this section include: diagnosis-specific agmatine use; OCD/TR-OCD use; enteric/HPMC agmatine tolerability; agmatine/PEA co-localisation; separated agmatine/PEA plus ALCAR/citicoline regimens; autism, ADHD, depression and trauma/anxiety protocols; PEA-only and PEA-combination systems; ALCAR and citicoline systems without agmatine; L. reuteri and microbiome ecology products; gut-barrier and toxin-binding products; sulforaphane/Nrf2 products; inhibitory-tone and stress-axis products; mitochondrial/redox products; social-state ecology kits; sensory-sensitive agmatine-free kits; staged multi-product programmes; paediatric/adolescent supervised formats; intranasal/rescue products; companion diagnostics; titration protocols; particle/coating/manufacturing embodiments; digital service models; route-expansion embodiments; and explicit inclusion/exclusion variants.

Agmatine sulfate, agmatine dihydrochloride, agmatine hydrochloride, agmatine free base or another physiologically acceptable agmatine salt or form is disclosed at 50-3000 mg/day, including 50 mg/day, 100 mg/day, 250 mg/day, 500 mg/day, 750 mg/day, 1000 mg/day, 1500 mg/day, 2000 mg/day and 3000 mg/day, as monotherapy, adjunctive therapy, maintenance therapy, rescue therapy, loading therapy or pre-demand therapy for each diagnostic category and presentation listed in Section 8.1. These include autism spectrum condition/autism spectrum disorder, ADHD, anxiety disorders, OCD, major depressive disorder, persistent depressive disorder, treatment-resistant depression, bipolar depressive or mixed episodes, PTSD, complex PTSD, acute stress disorder, autistic burnout, occupational burnout, caregiver burnout, academic burnout, sensory processing disorder, executive dysfunction, ME/CFS, fibromyalgia, long-COVID cognitive or autonomic dysfunction, PMDD, perimenopause-associated or menopause-associated dysfunction, traumatic-brain-injury-associated dysregulation, pathological demand avoidance/PDA profile, Tourette syndrome or tic disorders, interoceptive eating-disorder presentations, emotional-dysregulation

presentations, IBS-associated neurobehavioural dysregulation, MCAS or histamine-intolerance-associated sensory/autonomic dysregulation, chronic pain with fatigue or autonomic dysregulation, sleep-restoration impairment and mixed or subclinical state-regulation presentations.

Agmatine sulfate, agmatine dihydrochloride, agmatine hydrochloride, agmatine free base or another physiologically acceptable agmatine salt or form is disclosed at 100-3000 mg/day, including 250 mg/day, 500 mg/day, 750 mg/day, 1000 mg/day, 1500 mg/day, 2000 mg/day and 3000 mg/day, as monotherapy or adjunctive therapy for obsessive-compulsive disorder, treatment-resistant obsessive-compulsive disorder, intrusive-thought-linked threat activation, compulsive perseveration, cognitive rigidity, impaired task switching or perseverative state-locking. The treatment response may be assessed by Y-BOCS, CY-BOCS, OCI-R, DOCS, clinician-rated global improvement, patient-reported compulsion frequency, time spent in compulsive loops, task-switch latency, avoidance behaviour, HRV, sleep metrics, functional impairment and relapse after washout or dose reduction.

Enterically protected agmatine sulfate, agmatine dihydrochloride, agmatine hydrochloride or another agmatine salt is disclosed with HPMC, hydroxypropyl methylcellulose, methylcellulose, hydroxyethyl cellulose, hydroxypropyl cellulose, sodium carboxymethyl cellulose, polyethylene oxide, carbomer, alginate, pectin, xanthan gum, gellan gum or another hydrophilic gel-forming polymer to reduce gastric exposure and moderate intestinal bolus release. This embodiment is disclosed for users with agmatine-associated nausea, burning, reflux, gastric irritation, bloating, cramping, diarrhoea, loose stools, histamine-like intolerance, mast-cell-activation-like symptoms, IBS, SIBO, MCAS, histamine intolerance or prior intolerance to immediate-release oral agmatine.

A first enterically protected dosage unit comprising 100-2000 mg agmatine sulfate or agmatine dihydrochloride, 25-400 mg HPMC or equivalent hydrophilic gel former and 50-1200 mg palmitoylethanolamide is disclosed for co-localised intestinal release, local mast-cell/histamine support and reduced agmatine gastrointestinal intolerance. In specific embodiments the first unit contains about 750 mg agmatine sulfate or about 375-750 mg agmatine dihydrochloride, about 300-600 mg PEA and about 60-150 mg HPMC K15M, HPMC K100M or equivalent viscosity grade in an enteric capsule, enteric-coated tablet, enteric-coated multiparticulate, pellet, bead, mini-tablet or MUPS format.

A separated two-unit daily regimen is disclosed in which a first enteric unit contains agmatine plus PEA and a second immediate-release unit contains acetyl-L-carnitine plus citicoline. In specific embodiments the first unit contains about 750 mg agmatine sulfate or 375-750 mg agmatine dihydrochloride plus 300-600 mg PEA, and the second unit contains about 250-1000 mg acetyl-L-carnitine hydrochloride plus about 100-500 mg citicoline sodium. The second unit is released in the stomach or proximal small intestine to support early activity-window availability and reduce lower-intestinal exposure of carnitine substrate to microbial TMA/TMAO formation.

A single-unit four-component oral dosage form is also disclosed in which agmatine, PEA, ALCAR and citicoline are contained in one capsule, tablet, caplet, MUPS tablet, capsule-in-capsule, bilayer tablet, multilayer tablet, compression-coated tablet or multiparticulate capsule while preserving independent release behaviour for two or more components. The single-unit disclosure applies to each parent ingredient and to any disclosed salt, hydrate, solvate, polymorph, stereoisomer, ester, amide, analogue, derivative, metabolite, prodrug, co-crystal, complex, ion-pair, protected form, coated form, taste-masked form, nanoform, liposomal form, functional equivalent or class substitute of that ingredient, including agmatine-pathway components, PEA-class components, acylcarnitine components and citicoline or choline-cytidine donor components. In specific embodiments, enteric or delayed-release agmatine/PEA particles, beads, pellets, granules or mini-tablets are co-filled, co-compressed or co-packaged within the same dosage unit with immediate-release, taste-masked or moisture-protected ALCAR/citicoline particles, granules, mini-tablets, layers or inner capsules. Such single-unit embodiments may provide about 250-1000 mg agmatine

salt or agmatine-pathway equivalent, about 100-1200 mg PEA or PEA-class equivalent, about 250-1000 mg ALCAR or acylcarnitine equivalent and about 100-500 mg citicoline or choline-cytidine donor equivalent per dosage unit or per daily serving, with the agmatine/PEA fraction protected from gastric release and the ALCAR/citicoline fraction released in gastric, duodenal or proximal jejunal conditions.

Agmatine sulfate, agmatine dihydrochloride or another agmatine salt is disclosed for autism spectrum condition/autism spectrum disorder at 100-3000 mg/day as monotherapy or in combination with PEA, ALCAR, citicoline, magnesium, taurine, L-theanine, zinc L-carnosine, probiotics or microbiome-support ingredients. Target phenotypes include autistic inertia, sensory overload, reduced sensory tolerance, shutdown vulnerability, meltdown vulnerability, social fatigue, impaired social initiation, impaired recovery after social demand, impaired recovery after sensory demand and burnout-associated adaptive loss. Outcomes may include SRS-2, ABC, RBS-R, Vineland, CGI-I, caregiver diaries, task-initiation latency, transition time, shutdown frequency, meltdown frequency, sensory tolerance and post-demand recovery time.

Agmatine sulfate, agmatine dihydrochloride or another agmatine salt is disclosed for ADHD or ADHD-associated executive dysfunction at 100-3000 mg/day, alone or with ALCAR 250-2000 mg/day, citicoline 100-1000 mg/day, magnesium, taurine, tyrosine, omega-3 fatty acids or methylation-support ingredients. Target phenotypes include impaired action initiation, task paralysis, time blindness, sustained-attention impairment, working-memory impairment, emotional dysregulation and fatigue-associated executive dysfunction. Outcomes may include ADHD-RS, ASRS, BRIEF-2, Conners scales, CPT measures, task-initiation latency, prompt count, work/school attendance, wearable activity metrics and adverse-event monitoring.

Agmatine sulfate, agmatine dihydrochloride or another agmatine salt is disclosed for major depressive disorder, persistent depressive disorder, treatment-resistant depression, bipolar depressive episodes or depression with psychomotor retardation at 100-3000 mg/day, alone or with ALCAR, citicoline, PEA, omega-3 fatty acids, methylfolate, folinic acid, B12, CoQ10, magnesium, taurine or sleep-restoration protocols. Target phenotypes include depression-linked inertia, psychomotor slowing, anhedonia-associated initiation failure, low functional drive, fatigue-associated functional impairment and impaired recovery after ordinary demand. Outcomes may include MADRS, HAM-D, PHQ-9, QIDS, CGI-I, psychomotor-speed measures, actigraphy, task-initiation latency and functional-capacity diaries.

Agmatine sulfate, agmatine dihydrochloride or another agmatine salt is disclosed for PTSD, complex PTSD, acute stress disorder, trauma-related hyperarousal or anxiety-linked threat activation at 100-3000 mg/day, alone or with PEA, magnesium, taurine, L-theanine, glycine, phosphatidylserine, adaptogens, microbiome-support ingredients or vagal/autonomic protocols. Target phenotypes include persistent vigilance, exaggerated startle, autonomic dysregulation, sleep-restoration impairment, avoidance-state locking, shutdown, emotional flooding and delayed recovery after trauma-linked cues. Outcomes may include PCL-5, CAPS-5, GAD-7, HAM-A, startle measures, HRV, sleep metrics, avoidance behaviour and recovery time after cue exposure.

Palmitoylethanolamide, micronised PEA, ultra-micronised PEA, co-ultramicronised PEA/luteolin, PEA/quercetin, PEA/polydatin, cyclodextrin-complexed PEA, liposomal PEA, solid-lipid PEA or another PEA-class or N-acylethanolamide composition is disclosed with or without agmatine for autism, sensory overload, reduced sensory tolerance, shutdown vulnerability, meltdown vulnerability, social fatigue, chronic pain with sensory dysregulation, MCAS-associated dysregulation, histamine-intolerance-associated dysregulation, IBS-associated neurobehavioural dysregulation, neuroinflammatory presentations, PTSD-associated hyperarousal, anxiety-linked threat activation, depression-associated inflammatory load and burnout-associated adaptive loss. Doses include 50-2400 mg/day PEA or equivalent, including 100 mg/day, 300 mg/day, 600 mg/day, 1200 mg/day

and 1800 mg/day, with outcomes including sensory threshold, pain, GI tolerance, histamine symptoms, sleep restoration, HRV, shutdown/meltdown frequency, caregiver report, CGI-I and functional recovery time.

Acetyl-L-carnitine, L-carnitine, L-carnitine tartrate, propionyl-L-carnitine, glycine propionyl-L-carnitine or another carnitine/acylcarnitine is disclosed with or without agmatine for fatigue-associated executive dysfunction, autistic burnout, occupational burnout, depression-linked inertia, treatment-resistant depression, ADHD-associated executive dysfunction, ME/CFS-like recovery failure, fibromyalgia-associated fatigue, long-COVID cognitive or autonomic dysfunction, post-demand recovery failure, shutdown recovery and psychomotor slowing. Doses include 100-3000 mg/day, including 250 mg/day, 500 mg/day, 1000 mg/day and 2000 mg/day, with outcome measures including fatigue scales, actigraphy, task-initiation latency, work/school attendance, recovery time after demand, acylcarnitine profiles, free and total carnitine and TMAO.

Citicoline, CDP-choline, choline bitartrate, choline chloride, alpha-GPC, phosphatidylcholine, phosphatidylserine, uridine, triacetyluridine, cytidine or another choline-cytidine or membrane-support donor is disclosed with or without agmatine for ADHD, executive dysfunction, autistic inertia, depression-linked inertia, cognitive rigidity, impaired task switching, working-memory impairment, sustained-attention impairment, social-communication fatigue, post-demand cognitive recovery and burnout-associated cognitive depletion. Doses include 50-2000 mg/day for choline-cytidine donors, including 100 mg/day, 250 mg/day, 500 mg/day and 1000 mg/day, assessed by ADHD-RS, ASRS, BRIEF-2, working-memory measures, task-initiation latency, transition time, cognitive-flexibility tasks, school/work output, caregiver reports and adverse-event monitoring.

An agmatine-free executive-recovery composition is disclosed comprising ALCAR 250-2000 mg/day and citicoline 100-1000 mg/day, optionally with CoQ10, creatine, magnesium, taurine, omega-3 fatty acids, B vitamins, methylfolate, folinic acid, B12, tyrosine or phosphatidylserine. The agmatine-free composition is disclosed for ADHD, depression-linked inertia, treatment-resistant depression, autistic inertia where agmatine is not tolerated or not desired, burnout-associated cognitive depletion, ME/CFS-like recovery failure, long-COVID cognitive dysfunction, post-social crash and fatigue-associated executive dysfunction. The same composition is disclosed as an immediate-release capsule, sachet, stick pack, powder, liquid, ODT, gummy, blistered daily pack or clinician-supervised regimen.

Limosilactobacillus reuteri, including L. reuteri ATCC PTA 6475, L. reuteri DSM 17938 or equivalent L. reuteri strains, is disclosed with or without agmatine for social-functioning impairment, social initiation difficulty, social fatigue, impaired recovery after social demand, vagal-tone support, HRV support, oxytocin/secretin-pathway support, gut-brain-axis dysregulation, autism-associated social withdrawal, anxiety-linked social threat activation and burnout-associated social depletion. Doses include 1 million to 100 billion CFU/day, including 100 million, 1 billion, 5 billion, 10 billion and 50 billion CFU/day, in capsules, sachets, powders, drops, chewables, gummies, refrigerated products, shelf-stable products, synbiotic products and staged ecology protocols. Outcomes may include SRS-2, Vineland socialisation, social initiation counts, post-social recovery time, HRV, stool markers, GI tolerance and caregiver or self-report.

Bifidobacterium longum, including B. longum BB536, Bifidobacterium infantis, Bifidobacterium breve, Lactobacillus rhamnosus, Lactobacillus plantarum, Bacillus coagulans, Bacillus subtilis, Saccharomyces boulardii or another probiotic or postbiotic ecology component is disclosed with or without agmatine for microbiome-linked state dysregulation, gut-brain-associated anxiety, autism-associated GI symptoms, sensory intolerance associated with GI distress, p-cresol-associated presentations, Clostridial-overgrowth-associated presentations, IBS-associated neurobehavioural dysregulation, histamine-intolerance-associated dysregulation, fatigue, brain fog and post-demand recovery failure. The composition may include prebiotics, GOS, FOS, inulin, partially hydrolysed

guar gum, resistant starch, butyrate, tributyrin, postbiotics or bacteriophage-compatible ecology strategies.

A gut-barrier and toxin-binding composition is disclosed with or without agmatine comprising zinc L-carnosine, L-carnosine, glutamine, butyrate, tributyrin, colostrum, lactoferrin, Enterosgel/polymethylsiloxane polyhydrate, activated charcoal, bentonite, cholestyramine-like binders, probiotics, prebiotics or postbiotics. The composition is disclosed for IBS-associated neurobehavioural dysregulation, diarrhoea-associated medication intolerance, agmatine-associated GI intolerance, histamine-like intolerance, leaky-gut-marker elevation, elevated zonulin, elevated calprotectin, elevated LBP, elevated endotoxin proxies, p-cresol burden, food-triggered sensory overload, post-meal fatigue and microbiome-linked anxiety or shutdown vulnerability.

A glucoraphanin, myrosinase, sulforaphane or broccoli-sprout-derived composition is disclosed with or without agmatine for oxidative-stress, Nrf2, glutathione, neuroinflammation, detoxification, p-cresol-handling, sensory overload, autism-associated adaptive loss, inflammatory depression, OCD-adjacent perseveration, brain fog, fatigue and gut-brain dysregulation. The composition may comprise glucoraphanin 10-2000 mg/day, myrosinase-containing material 1-1000 mg/day, stabilised sulforaphane 1-200 mg/day or food-derived broccoli sprout preparations, alone or with PEA, ALCAR, citicoline, probiotics, zinc L-carnosine, NAC, alpha-lipoic acid, CoQ10 or magnesium.

Magnesium L-threonate, magnesium glycinate, magnesium taurate, taurine, glycine, L-theanine, phosphatidylserine, ashwagandha, holy basil, rhodiola, melatonin or another inhibitory-tone, stress-axis or sleep-restoration support composition is disclosed with or without agmatine for anxiety-linked threat activation, hyperarousal, sleep-restoration impairment, sensory over-gain, shutdown vulnerability, traumatic-cue reactivity, autonomic dysregulation, autistic burnout, occupational burnout, PMDD-associated state dysregulation, perimenopause-associated state dysregulation and chronic stress presentations. The composition may be administered as a bedtime product, evening pack, pre-demand product, recovery product, stress-axis product or morning/evening split protocol.

CoQ10, ubiquinol, creatine, alpha-lipoic acid, R-lipoic acid, NAC, glutathione, selenium, iron, B vitamins, NAD-pathway agents, omega-3 fatty acids or mitochondrial/redox support ingredients are disclosed with or without agmatine for mitochondrial dysfunction, oxidative stress, fatigue, post-exertional malaise, depression-linked inertia, shutdown recovery, long-COVID cognitive/autonomic dysfunction, ME/CFS-like recovery failure, fibromyalgia-associated fatigue, autistic burnout and treatment-resistant depression with fatigue or psychomotor slowing. The composition may be selected using CoQ10 status, lactate/pyruvate, acylcarnitine profile, ferritin, B12, folate, glutathione markers, actigraphy, fatigue scales and post-demand recovery measures.

A social-state ecology kit is disclosed comprising L. reuteri, B. longum, prebiotic fibre, postbiotic metabolites, butyrate or tributyrin, optionally with agmatine, PEA, magnesium, taurine, vitamin D3, BH4-pathway support, oxytocin-pathway support or secretin-pathway support. The kit is disclosed for social initiation difficulty, social fatigue, social withdrawal, impaired recovery after social demand, autism-associated social functioning impairment, anxiety-linked social avoidance and burnout-associated social depletion. The kit may be paired with social-demand dosing, social-recovery tracking, HRV monitoring, stool testing, caregiver logs, school/work re-entry protocols and sensory-load planning.

A sensory-sensitive agmatine-free kit is disclosed comprising taste-masked ALCAR, citicoline or choline-cytidine donors, PEA, magnesium, taurine, theanine, zinc L-carnosine, probiotics or microbiome-support ingredients without agmatine. The kit is disclosed for users who cannot tolerate agmatine, decline agmatine, require an agmatine washout, have agmatine-associated GI symptoms, or are in a subgroup where executive drive, sensory threshold, sleep restoration, mast-cell support or microbiome support is targeted before adding agmatine. Formats include mini-

capsules, sprinkles, sachets, gummies, ODTs, liquids, taste-masked granules, odour-masked acylcarnitine particles and multi-compartment daily packs.

A three-product state-regulation programme is disclosed comprising: Product 1, an agmatine product or agmatine-free capacity product; Product 2, a mitochondrial/executive support product comprising ALCAR, citicoline, CoQ10, creatine, B vitamins or related substrates; and Product 3, a microbiome/ecology product comprising L. reuteri, B. longum, S. boulardii, Bacillus species, prebiotics, postbiotics, butyrate, zinc L-carnosine or toxin-binding components. The three products may be administered together, staged over 2-12 weeks, selected by phenotype, selected by biomarkers, provided as a subscription, or delivered as a clinician-supervised starter/titration/maintenance pack.

A four-layer agmatine-free programme is disclosed comprising a PEA or mast-cell/neuroimmune layer, an ALCAR/mitochondrial recovery layer, a citicoline/choline-cytidine executive layer and a microbiome/gut-barrier ecology layer. This programme is disclosed for subjects in whom agmatine is contraindicated, poorly tolerated, undesired, unavailable, reserved for rescue use or deferred until GI, sleep, mast-cell or microbiome tolerance is established. The programme may be used for autism, ADHD, depression-linked inertia, PTSD-associated hyperarousal, anxiety, burnout, ME/CFS-like recovery failure, long-COVID cognitive dysfunction and mixed/subclinical state-regulation impairment.

A paediatric or adolescent supervised embodiment is disclosed in which any agmatine, PEA, ALCAR, citicoline, L. reuteri, B. longum, magnesium, taurine, zinc L-carnosine, sulforaphane, probiotic, prebiotic or support-stack composition is administered in weight-adjusted, low-start, slow-titration format using mini-tablets, sprinkles, sachets, liquids, chewables, gummies, ODTs or caregiver-administered packs. Outcomes may include parent/caregiver diaries, school attendance, transition time, sensory tolerance, sleep, GI tolerance, ABC, SRS-2, ADHD-RS, BRIEF-2, Vineland, CGI-I, shutdown/meltdown frequency and adverse-event logs.

An intranasal agmatine formulation is disclosed comprising agmatine sulfate, agmatine dihydrochloride, agmatine hydrochloride or agmatine free base in a buffered or unbuffered aqueous spray, powder, gel or drop at a unit dose delivering 5-250 mg agmatine per administration, including 10 mg, 25 mg, 50 mg, 100 mg and 200 mg, for acute, rescue, loading or maintenance use in sensory overload, shutdown, panic-like threat activation, social-demand overload, traumatic-cue activation, compulsive loop interruption, autistic inertia or post-demand recovery failure. The formulation may include saline, phosphate buffer, citrate buffer, tonicity agents, mucoadhesive polymers, preservatives, absorption modulators and pH adjusters.

A companion-diagnostic or biomarker-selected subgroup embodiment is disclosed in which agmatine-containing or agmatine-adjacent regimens are selected, titrated or monitored using one or more of plasma agmatine, arginine, ornithine, citrulline, nitric oxide metabolites, BH4, neopterin, biopterin, PEA, acylcarnitine profile, free and total carnitine, TMAO, choline, betaine, homocysteine, methylmalonic acid, folate, B12, vitamin D, ferritin, magnesium, CoQ10, lactate, pyruvate, glutathione, histamine, tryptase, DAO activity, zonulin, calprotectin, LBP, endotoxin proxies, p-cresol, short-chain fatty acids, stool microbiome sequencing, HRV, sleep metrics and digital symptom-state logs.

A clinical dosing protocol is disclosed in which agmatine is initiated at 50-250 mg/day or 250-500 mg/day, increased every 3-14 days toward 500-1500 mg/day or 1000-3000 mg/day according to tolerability and response, and reduced, paused or converted to enteric/HPMC delivery if nausea, bloating, cramping, diarrhoea, histamine-like symptoms, sleep disruption, agitation or excessive sedation occurs. The protocol may include baseline, week 1, week 2, week 4, week 8 and week 12 assessments; washout/rechallenge; rescue dosing; pre-demand dosing; post-overload dosing;

morning-only dosing; split dosing; and dose adjustment based on HRV, sleep, GI tolerance, task initiation, shutdown frequency, Y-BOCS, ADHD-RS, PHQ-9, MADRS, PCL-5, GAD-7, SRS-2 or CGI-I.

An upper-intestinal acylcarnitine embodiment is disclosed in which ALCAR, L-carnitine, propionyl-L-carnitine or another acylcarnitine is formulated for immediate gastric, duodenal or proximal jejunal release while being physically separated from delayed-release, enteric or colonic-release components. The embodiment is disclosed for reducing lower-intestinal microbial conversion to trimethylamine and TMAO, improving early activity-window availability and supporting recovery after demand in fatigue, shutdown, depression-linked inertia, autistic burnout, long-COVID cognitive/autonomic dysfunction and ME/CFS-like recovery failure. Outcomes may include plasma carnitine, acylcarnitine profile, TMAO, fatigue scales, actigraphy, task-initiation measures and recovery-time measures.

A citicoline stability embodiment is disclosed in which citicoline sodium, CDP-choline, cytidine, uridine, alpha-GPC, phosphatidylcholine or another choline-cytidine donor is physically separated from hygroscopic, acidic, basic, amine-containing, carnitine-containing or moisture-releasing ingredients by separate capsules, separate blister cavities, alu-alu packaging, desiccant-containing bottles, sachets, low-water-activity excipients, coated particles, lipid barriers, polymer coatings, dry granulation, multilayer tablets or multi-compartment kits. The embodiment is disclosed for preserving potency, reducing degradation, improving sensory tolerability and supporting executive state-transition outcomes.

A particle and coating embodiment is disclosed in which agmatine sulfate, agmatine dihydrochloride or another agmatine salt is provided as enteric-coated particles, beads, pellets or mini-tablets having a median particle size of about 100-3000 micrometres, including about 250-1500 micrometres, with an enteric coat comprising about 2-25% weight gain and a hydrophilic matrix or overcoat comprising about 1-40% by weight of HPMC or equivalent gel former. The embodiment is disclosed for sachets, sprinkle capsules, capsules, tablets, ODTs, stick packs and food-compatible formats intended to reduce gastric exposure, moderate intestinal concentration and improve tolerability relative to uncoated immediate-release powder.

A release-profile and manufacturing embodiment is disclosed for agmatine-containing or agmatine-free multiparticulates in which particles, pellets, beads, granules or mini-tablets are produced by wet granulation, dry granulation, roller compaction, extrusion-spheronisation, fluid-bed coating, pan coating, hot-melt coating, spray drying, coacervation, lipid coating, polymer coating, compression coating or capsule-in-capsule assembly. Release targets include less than 10% release after 2 hours at pH 1.2, less than 20% release before pH 5.5, at least 50% release within 2 hours after enteric opening, moderated release over 30 minutes to 6 hours after intestinal exposure, immediate release of ALCAR/citicoline in gastric or proximal intestinal conditions, and physical separation of live microbes from moisture-sensitive or antimicrobial components.

A digital, service and companion-diagnostic embodiment is disclosed in which any disclosed product or kit is paired with an app, QR-linked diary, wearable HRV tracker, sleep tracker, actigraphy, ecological momentary assessment, caregiver report, school/work-function log, adverse-event checklist, dosing calendar, clinician portal, microbiome test, blood or urine biomarker panel, stool marker panel or algorithmic titration support. The service is disclosed for selecting agmatine versus agmatine-free regimens, selecting enteric versus immediate release, identifying GI-sensitive subjects, identifying mast-cell/histamine-sensitive subjects, monitoring TMAO risk, monitoring sleep disruption or agitation, and linking dose changes to state-regulation outcomes.

A route-expansion embodiment is disclosed in which agmatine, PEA, ALCAR, citicoline, L. reuteri, B. longum, magnesium, taurine, sulforaphane, zinc L-carnosine, butyrate, NAC, CoQ10 or related support ingredients are delivered orally, buccally, sublingually, intranasally, transdermally, rectally, topically, by iontophoresis, by microneedle, by injectable or infusion route where lawful, by food-

compatible particles, by sachet, by stick pack, by ODT, by gummy, by capsule, by tablet, by mini-tablet or by supervised compounded preparation. Each route is disclosed for maintenance use, loading use, rescue use, pre-demand use, post-overload use, travel use, school/work re-entry use and sensory-sensitive administration.

A prior-art exclusion embodiment is disclosed in which each high-value embodiment in this Section 1A is expressly disclosed both with and without agmatine; with and without PEA; with and without ALCAR; with and without citicoline; with and without probiotics; with and without L. reuteri; with and without B. longum; with and without HPMC; with and without enteric protection; with and without intranasal rescue dosing; with and without companion diagnostics; and with and without clinician supervision, unless a listed component is required by the wording of the specific embodiment. This disclosure is intended to prevent later narrowing around the mere omission, addition, substitution, physical separation, staged introduction or packaging separation of a disclosed component.

1A.1 Pinpoint Embodiments

Pinpoint Embodiment 1 - OCD. Agmatine sulfate or agmatine dihydrochloride is administered orally at about 500-1500 mg/day, including about 750 mg/day or about 1000 mg/day, as monotherapy or adjunctive therapy for obsessive-compulsive disorder or treatment-resistant obsessive-compulsive disorder, with response assessed by Y-BOCS, OCI-R, compulsive-loop duration, task-switch latency, avoidance behaviour and CGI-I.

Pinpoint Embodiment 2 - OCD adjunct. Agmatine sulfate or agmatine dihydrochloride is administered at about 250-2000 mg/day as adjunctive therapy in a subject with OCD who is also receiving or has previously received an SSRI, SNRI, clomipramine, antipsychotic augmentation, exposure-response-prevention therapy or glutamate-modulating therapy.

Pinpoint Embodiment 3 - enteric GI tolerability. An oral dosage unit comprises agmatine sulfate or agmatine dihydrochloride and HPMC in an enterically protected capsule or coated multiparticulate, wherein less than about 10% agmatine is released after 2 hours at pH 1.2 and agmatine release is moderated after transfer to intestinal pH to reduce nausea, gastric burning, bloating, cramping, diarrhoea or histamine-like intolerance relative to immediate-release agmatine powder.

Pinpoint Embodiment 4 - agmatine/PEA local tolerability. An enterically protected dosage unit comprises agmatine sulfate or agmatine dihydrochloride, HPMC and palmitoylethanolamide, wherein PEA is co-released with agmatine in an intestinal release window to provide local mast-cell, histamine or neuroimmune support at the site of agmatine release.

Pinpoint Embodiment 5 - separated four-component regimen. A daily kit comprises a first enteric agmatine/PEA unit and a physically separate immediate-release ALCAR/citicoline unit, the first unit providing about 500-1000 mg/day agmatine salt and about 300-1200 mg/day PEA, and the second unit providing about 250-1000 mg/day ALCAR and about 100-500 mg/day citicoline.

Pinpoint Embodiment 6 - single-unit four-component regimen. A single capsule, tablet, caplet, MUPS tablet, multilayer tablet or multiparticulate capsule comprises agmatine or an agmatine-pathway component, PEA or a PEA-class component, ALCAR or an acylcarnitine component, and citicoline or a choline-cytidine donor component, including salts, derivatives, analogues, prodrugs, complexes, co-crystals and functional equivalents of each, wherein the agmatine/PEA-class fraction is enteric or delayed-release and the acylcarnitine/choline-cytidine donor fraction is immediate-release, taste-masked, moisture-protected or proximal-intestinal-release.

Pinpoint Embodiment 7 - autism state regulation. Agmatine sulfate or agmatine dihydrochloride at about 250-1500 mg/day is used for autism-associated sensory overload, shutdown vulnerability, social fatigue, autistic inertia or impaired recovery after sensory/social demand, with outcomes measured by shutdown frequency, recovery time, task-initiation latency, caregiver report, SRS-2, Vineland or CGI-I.

Pinpoint Embodiment 8 - ADHD/executive initiation. Agmatine is combined with ALCAR and citicoline for ADHD-associated impaired action initiation, time blindness, task paralysis or executive state-transition difficulty, with ALCAR released immediately in the stomach or proximal small intestine and citicoline packaged to reduce moisture exposure.

Pinpoint Embodiment 9 - intranasal rescue. Agmatine sulfate, agmatine hydrochloride or agmatine dihydrochloride is delivered intranasally at about 10-200 mg per administration for acute or rescue use in sensory overload, shutdown, panic-like threat activation, compulsive-loop interruption or post-demand recovery failure.

Pinpoint Embodiment 10 - agmatine-free fallback. An agmatine-free state-regulation composition comprises PEA, ALCAR and citicoline, optionally with magnesium, taurine, CoQ10, creatine, probiotics or gut-barrier ingredients, for users who do not tolerate agmatine or in whom agmatine is deferred pending GI, sleep or mast-cell stabilisation.

Pinpoint Embodiment 11 - companion diagnostic. Selection of immediate-release versus enteric/HPMC agmatine is guided by prior agmatine GI intolerance, IBS, SIBO, MCAS, histamine intolerance, DAO activity, stool pattern, HRV, sleep disruption, TMAO risk, microbiome profile or symptom-state logs.

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1. Technical Field

This disclosure relates to compositions, dosage forms, kits, methods of manufacture, methods of administration, salt forms, delivery architectures, gastrointestinal tolerability solutions, release-control technologies, stability solutions, taste-masking systems, mechanistic rationales, therapeutic-use concepts, clinical service models and outcome measures involving agmatine, palmitoylethanolamide, acetyl-L-carnitine, citicoline and related derivatives, salts, analogues, metabolites, prodrugs, complexes, co-crystals, formulation carriers and combinations thereof.

The disclosed subject matter is directed to neurodevelopmental, psychiatric, autonomic, sensory, cognitive, social, emotional, behavioural, fatigue-associated, gastrointestinal, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine, sleep, stress-recovery and transdiagnostic state-regulation applications, including diagnosis-associated applications in autism spectrum condition/autism spectrum disorder, ADHD, anxiety disorders, OCD, depressive disorders, treatment-resistant depression, bipolar depressive or mixed episodes, PTSD, complex PTSD, acute stress disorder, burnout presentations, sensory processing disorder, executive dysfunction, ME/CFS, fibromyalgia, long-COVID cognitive or autonomic dysfunction, PMDD, perimenopause-associated or menopause-associated dysfunction, traumatic brain injury-associated dysregulation, tic disorders, interoceptive eating-disorder presentations, personality-disorder-associated emotional dysregulation, IBS-associated neurobehavioural dysregulation, MCAS or histamine-intolerance-associated sensory/autonomic dysregulation, chronic pain with fatigue or autonomic dysregulation, sleep-restoration impairment and mixed or subclinical presentations. The disclosure is intended to make available as prior art a broad technical territory of compositions, formulations, delivery architectures, salt forms, tolerability mechanisms, dose ranges, treatment populations, indications, outcome measures, clinical protocols, kits, product models and companion diagnostic systems.

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2. Interpretation and Disclosure Rules

This publication should be read as an enabling technical disclosure and not as a narrow claim set. The following interpretation rules apply throughout.

1. Each listed ingredient, salt, derivative, route, dosage form, excipient, release profile, dose range, indication, population, outcome measure, kit, protocol and technology is disclosed as a standalone embodiment.
2. Each listed item is also disclosed in combination with each other listed item, unless physical impossibility is expressly stated.
3. Where a genus is disclosed, each named species in the genus is individually disclosed.
4. Where a range is disclosed, every endpoint, intermediate value, subrange and overlapping range within that range is disclosed.
5. The term "about" includes +/-10%, +/-20%, ordinary manufacturing tolerance, analytical tolerance and clinically reasonable titration unless a narrower tolerance is stated.
6. The terms "comprising", "consisting essentially of" and "consisting of" are all disclosed for each composition and kit.
7. The presence and absence of each optional element are both disclosed. For example, agmatine compositions with PEA and without PEA are both disclosed; formulations with HPMC and without HPMC are both disclosed; buffered and non-buffered systems are both disclosed; sulfate and non-sulfate salts are both disclosed; physically separated and single-unit systems are both disclosed.
8. Any ingredient may be immediate-release, delayed-release, enteric, sustained-release, pulsatile, multiparticulate, coated, uncoated, micronised, complexed, encapsulated, co-crystallised, nanoformulated, liposomal, self-emulsifying, taste-masked, odour-masked, moisture-protected or physically separated.
9. Any disclosed composition may be a pharmaceutical, nutraceutical, supplement, medical food, food, beverage, compounded preparation, research formulation, clinical kit, telemedicine kit, veterinary formulation or consumer product where legally permissible.
10. The disclosure of a medical or clinical use is not a recommendation to use any composition without appropriate regulatory authorisation and professional supervision.
11. References to mechanisms are provided without being bound by theory. A composition is disclosed whether or not any proposed mechanism is later confirmed, revised or disproved.
12. References to clinical or observational examples disclose contemplated use, formulation rationale, outcome measures and possible response patterns; they do not imply regulatory approval or established clinical efficacy.
13. The concrete examples are non-limiting and do not narrow the broader disclosure.
14. No composition, formulation, salt form, delivery method, dose, indication, route, population, kit, protocol, technology or product model described herein is excluded unless explicitly stated.

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3. Definitions

3.1 State and state-regulation

A **state** means a temporally bounded physiological, neurological, autonomic, sensory, cognitive, executive, emotional, social, communicative or behavioural condition of a subject. A state may be

characterised by arousal, activation, readiness, prediction mode, sensory-processing mode, threat evaluation, recovery status, social engagement, executive readiness, sleep-restoration status or functional capacity. Examples include resting autonomic tone, sensory-processing mode, executive readiness to initiate action, social engagement, threat-activated hyperarousal, recovery after overload, shutdown, sleep and functional collapse.

State-regulation means the capacity to enter, maintain, transition between, modulate and recover from states in response to internal or external demand. State-regulation includes the full demand-response-recovery cycle: activation of an appropriate state in response to demand, maintenance of that state while the demand continues, transition to a different state when the demand changes, and recovery toward baseline capacity after the demand ends.

Impaired state-regulation means that one or more parts of that cycle are disrupted, producing disproportionate state activation, failure to initiate state change, failure to transition, failure to maintain an appropriate state, failure to recover or recurrent collapse of adaptive capacity.

3.2 Neurodevelopmental or psychiatric state-regulation phenotype

A **state-regulation phenotype** means a clinically significant functional impairment in the capacity to regulate, transition between, recover from or maintain physiological, sensory, autonomic, executive, cognitive, social, communicative, emotional or behavioural states. A state-regulation phenotype is distinguished from ordinary variation in temperament, preference or performance by functional impairment, distress, reduced adaptive capacity, caregiver or clinician concern, or measurable impairment relative to baseline.

Examples include impaired action initiation, autistic inertia, executive state-transition difficulty, task paralysis, sensory overload, reduced sensory tolerance, shutdown vulnerability, meltdown vulnerability, autonomic dysregulation, chronic hyperarousal, cognitive rigidity, perseverative state-locking, depression-linked inertia, psychomotor slowing, trauma-related hyperarousal, anxiety-linked threat-state activation, social functioning impairment, impaired social initiation, reduced social reciprocity, social communication impairment, social fatigue, impaired recovery after social demand, impaired recovery after sensory demand, impaired recovery after cognitive demand, stress-recovery failure and burnout-associated loss of adaptive capacity.

3.3 Demand-response-recovery cycle

A **demand-response-recovery cycle** means a sequence in which a subject encounters a sensory, cognitive, social, emotional, physical, environmental, occupational, academic, interoceptive, autonomic or biological demand; the nervous system and body enter a response state; and the subject subsequently transitions toward a recovery state or baseline state. Disruption of this cycle may occur at demand threshold, response intensity, response duration, state transition, functional output, recovery latency, recovery completeness or restoration of adaptive capacity.

3.4 Specific phenotype terms

Impaired action initiation means increased latency, increased effort, increased prompting requirement, reduced reliability, reduced consistency or impaired ability in beginning a planned, intended, instructed, self-selected or necessary action. It may occur despite preserved desire, intention, motivation, knowledge or understanding of the action.

Autistic inertia means difficulty initiating, switching, stopping, restarting or reinitiating an intended action, task, communication, behaviour, movement or cognitive state in an autistic subject. It may include inability to start a desired action, difficulty transitioning away from a current action, difficulty reinitiating after interruption, prolonged immobility, non-response despite intention,

increased reliance on external prompts, increased latency before action or reduced ability to move from intention to execution.

Executive state-transition difficulty means impaired ability to transition between cognitive, behavioural, task, sensory, social, emotional or autonomic states, including rest-to-action, one task to another, overload to recovery, social demand to recovery, rumination to flexible action, hyperarousal to settling, or planning to execution.

Sensory overload means a state in which sensory input produces distress, functional impairment, avoidance, withdrawal, shutdown, meltdown, autonomic activation, hyperarousal, cognitive disruption or prolonged recovery.

Reduced sensory tolerance means a lowered threshold at which sensory input produces discomfort, distress, avoidance, overload or functional impairment, relative to the subject's own baseline or to a typical threshold for the sensory modality.

Shutdown vulnerability means susceptibility to episodes of reduced responsiveness, withdrawal, immobility, inability to initiate action, reduced communication capacity, reduced executive function or collapse-like reduction in functional capacity after sensory, cognitive, social, emotional, physical or autonomic overload.

Meltdown vulnerability means susceptibility to episodes of outwardly expressed dysregulation after overload, including agitation, crying, panic-like behaviour, loss of behavioural regulation, aggression, self-injury, vocal distress or other acute overload expression.

Burnout-associated loss of adaptive capacity means prolonged reduction in functional capacity, sensory tolerance, communication capacity, executive function, action initiation, recovery capacity, social tolerance, cognitive flexibility or stress tolerance following cumulative stress, sensory load, social demand, cognitive load, masking, occupational demand, trauma-related demand or prolonged overextension. It includes autistic burnout, occupational burnout, caregiver burnout, academic burnout, stress-related burnout and burnout-like adaptive depletion.

Autonomic dysregulation means impaired regulation of sympathetic or parasympathetic function, including chronic hyperarousal, impaired physiological settling, impaired parasympathetic recovery, abnormal stress recovery, altered heart-rate variability, orthostatic intolerance-like symptoms or abnormal recovery after overload.

Chronic hyperarousal means persistent elevation of sympathetic tone, threat-state activation, startle responsiveness, vigilance or autonomic arousal beyond what is proportionate to current demand, producing sustained impairment in sensory tolerance, recovery capacity or adaptive functioning.

Impaired recovery after overload means increased duration, increased difficulty, incomplete recovery or impaired functional return after sensory, cognitive, social, emotional, physical or autonomic overload.

Social functioning impairment means reduced, delayed, effortful, unreliable or context-dependent capacity for social initiation, social approach, social reciprocity, social communication, conversational participation, social cue processing, social tolerance or recovery after social demand.

Social fatigue means disproportionate depletion of cognitive, sensory, emotional or autonomic resources following social interaction, social demand or sustained social engagement, resulting in reduced capacity for further social or non-social functioning.

Cognitive rigidity means impaired ability to shift cognitive set, adapt to changing demands, disengage from a current processing mode or transition flexibly between cognitive strategies, tasks or frames of reference.

Perseverative state-locking means a state in which the subject remains locked in a cognitive, behavioural, emotional or sensory processing mode and is unable to disengage, redirect or transition to an alternative mode despite the original demand having resolved or the continued processing being maladaptive.

Depression-linked inertia means impaired action initiation, psychomotor slowing or retardation, reduced reward-driven initiation, anhedonia-associated failure to initiate activity or impaired recovery after demand occurring in the context of a depressive presentation.

Anxiety-linked threat-state activation means disproportionate or persistent activation of threat-evaluation, threat-response or avoidance states in response to stimuli that do not represent proportionate danger, producing functional impairment in state regulation, state transition, sensory tolerance, social functioning or recovery.

Stress-recovery failure means impaired or prolonged recovery of physiological, autonomic, cognitive, sensory or functional baseline capacity following a stressor, demand, overload event or state-regulation failure.

3.5 Component definitions

An **agmatine-pathway component** means agmatine or a compound, form, derivative or acceptable equivalent that provides, releases, mimics, preserves, enhances or modulates agmatine-associated biological activity after administration, including NMDA receptor modulation, imidazoline receptor binding, nitric oxide synthase modulation, polyamine pathway modulation, autonomic regulatory activity or related gut-brain activity.

A **palmitoylethanolamide-class component** means PEA or a structurally or functionally related fatty acid amide or N-acylethanolamide suitable for administration, including compounds that provide PPAR-alpha activity, ALIAmide activity, mast-cell modulation, neuroimmune modulation, anti-inflammatory activity or endocannabinoid-related activity.

An **acylcarnitine component** means acetyl-L-carnitine or a related carnitine or acylcarnitine compound suitable for administration, including compounds providing mitochondrial fatty-acid transport support, acetyl-group availability, mitochondrial energy metabolism support, recovery-related metabolic substrate activity or cholinergic acetyl-donor support.

A **citicoline or choline-cytidine donor component** means citicoline or a compound, form, derivative or acceptable equivalent that provides choline, cytidine, CDP-choline activity, phosphocholine-related activity, phospholipid-related activity, cholinergic signalling support or related metabolites after administration.

3.6 Dosage and formulation terms

Enterically protected means configured to resist release, dissolution, disintegration, opening or permeability in acidic gastric conditions and to release, dissolve, disintegrate, open or become permeable under intestinal conditions.

Hydrophilic matrix-forming polymer means a water-soluble or water-swellable polymer that hydrates after exposure to aqueous medium to form a gel, swollen matrix or hydrated viscous mass capable of moderating release of an active component. Examples include HPMC, methylcellulose, hydroxyethyl cellulose, hydroxypropyl cellulose, sodium carboxymethyl cellulose, polyethylene

oxide, carbomer, sodium alginate, xanthan gum, gellan gum, guar gum, konjac glucomannan, pectin, polycarbophil and pullulan.

Physically separate means contained in separate dosage units, capsules, tablets, sachets, particles, compartments, blister cavities, package chambers, pouches, kit components or other physically distinct units. Two dosage units may be physically separate even when packaged together as a daily dose.

Immediate-release means not intentionally enterically protected, delayed-release, sustained-release or modified-release, although normal disintegration and dissolution properties may still affect the actual release time.

Gastrointestinal intolerance means one or more symptoms of gastrointestinal distress after oral administration of agmatine or a salt thereof, including nausea, cramping, bloating, diarrhoea, gastritis, ulcer-like symptoms, abdominal discomfort, upper-abdominal pressure, gas, burping, loose stools, mucosal burning, histamine-associated symptoms or a combination thereof.

High-barrier material means a packaging material that substantially reduces moisture, oxygen or light transmission relative to standard packaging, including aluminium-aluminium or cold-form blister material, high-barrier sachet films, desiccant closures and equivalent materials.

Dosage system means a system comprising one or more dosage units, optionally together with packaging, instructions, testing materials, QR codes, app links, adherence tools, outcome measures or other components configured to deliver a daily, periodic, acute, loading, maintenance or rescue regimen.

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4. Background and Mechanistic Rationale

4.1 State-regulation as the therapeutic target

Neurodevelopmental and psychiatric conditions may involve difficulty regulating state across sensory, cognitive, autonomic, emotional, social, behavioural and recovery domains. A subject may know what action is required, want to perform it and still be unable to begin without prolonged delay or external prompting. Another subject may experience ordinary noise, conversation, light, social expectation or task demand as disproportionate overload. Another subject may recover from a stressor not in minutes or hours but in days. These are not merely failures of motivation or coping; they are failures of state regulation: the capacity to respond to demand, transition to an appropriate state and recover afterward.

This publication discloses state-regulation phenotypes as transdiagnostic functional impairments. The diagnostic category describes the clinical context; the therapeutic target is the state-regulation impairment itself. A state-regulation phenotype may appear in autism, ADHD, anxiety, OCD, depression, PTSD, complex trauma, sensory processing differences, ME/CFS, fibromyalgia, long-COVID, perimenopause/menopause-associated dysfunction, burnout or other mixed presentations.

This publication does not assert regulatory approval or proven clinical efficacy. It discloses contemplated technical compositions, mechanisms, uses, architectures and outcome measures capable of being made and used by a skilled person for prior-art purposes.

4.2 Four-phase state-regulation failure cycle

Without being bound by theory, a state-regulation failure cycle may comprise at least four interacting phases.

Phase 1 - tonic dysregulation. Chronic elevation of baseline arousal, impaired parasympathetic recovery, reduced sensory gating, weakened prediction confidence, altered NMDA gain control, disrupted nitric oxide signalling and autonomic imbalance may produce a tonically depleted or hyperaroused resting state.

Phase 2 - threshold collapse. Neuroinflammatory load, mast-cell activation, histamine signalling, gut-brain instability, immune activation and impaired local gastrointestinal signalling may lower the threshold at which ordinary sensory, social, cognitive or autonomic demands produce overload, shutdown, meltdown or withdrawal.

Phase 3 - recovery failure. Following overload, recovery may require termination of the overload state itself, including cessation of excitotoxic NMDA cascading and sympathetic overdrive, followed by metabolic rebuilding via mitochondrial energy generation, acetyl-group availability and restoration of parasympathetic capacity. If the overload state is not terminated, metabolic substrate may not be deployed. If metabolic substrate is unavailable after termination, recovery may stall.

Phase 4 - membrane and executive depletion. Sustained dysregulation may deplete phospholipid membrane substrates, choline availability, acetylcholine-related signalling capacity, dopaminergic receptor-support context and executive switching resources. Concurrent NMDA dysregulation may impair gain-control mechanisms required for flexible state transition. Together these depletions may impair action initiation, cognitive flexibility, executive state transition and social communication.

The four-component regimen disclosed herein is designed to address all four phases: agmatine-pathway components primarily address tonic dysregulation and early recovery onset; PEA-class components primarily address threshold collapse and neuroimmune/mast-cell tone; acylcarnitine components primarily address metabolic recovery; and citicoline/choline-cytidine donors primarily address membrane and executive depletion. Each component can also span phase boundaries.

4.2A Detailed four-phase rationale

The four component classes are not disclosed merely as independent ingredients combined for additive effect. The system is disclosed as an entangled state-regulation system: each component's activity may span phase boundaries, and the functional interactions between component classes may matter as much as the separate effects of each ingredient.

The agmatine-pathway component may primarily address the tonic dysregulation phase and may additionally contribute to early recovery. Without being bound by theory, agmatine may also contribute to threshold regulation and later executive recovery because NMDA receptor gain, imidazoline signalling, nitric oxide signalling, polyamine pathway activity and autonomic tone interact across the full state-regulation cycle. The agmatine-pathway component is disclosed for tonic baseline restoration, sensory-gating support, overload termination, autonomic settling, social prediction confidence, reduction of hyperarousal, recovery onset and reduction of disproportionate demand-response amplification.

Agmatine may reduce background state instability by modulating NMDA-linked signal gain and excitatory transmission. Agmatine may also influence imidazoline receptor activity, nitric oxide synthase activity, polyamine metabolism and autonomic function. These effects are disclosed for use where ordinary sensory, cognitive, emotional, social or interoceptive inputs are weighted too heavily, where recovery after demand is delayed, where social approach becomes less available during dysregulated states, or where hyperarousal and shutdown alternate in the same subject.

The agmatine-pathway component may address the tonic resting-state deficit and facilitate recovery onset without altering neurodevelopmental architecture. Autistic traits, behavioural patterns, identity and cognitive style are not the disclosed targets. The disclosed target is state-

regulation capacity: the ability to enter, maintain, transition between and recover from states in response to demand.

The PEA-class component may primarily address the threshold collapse phase and may additionally contribute to tonic regulation by reducing background neuroinflammatory load. PEA may modulate mast-cell activation, PPAR-alpha-linked pathways, ALIAmide mechanisms, neuroimmune tone and local gastrointestinal inflammatory signalling. By raising the threshold at which sensory, social, cognitive or autonomic demand triggers overload, shutdown, meltdown, withdrawal or hyperarousal, PEA may support both systemic state regulation and local tolerability of agmatine delivery.

The co-localisation of PEA with the agmatine-pathway component in the same enterically protected dosage unit may serve a dual function. First, it may contribute to the systemic state-regulation effect by reducing neuroimmune and mast-cell-mediated threshold collapse. Second, it may contribute locally at the intestinal release site by reducing mast-cell or histamine-mediated consequences of concentrated agmatine exposure after enteric opening. This dual systemic and local role is disclosed as an independent technical rationale for placing PEA in the same enteric release window as agmatine.

The acylcarnitine component may address the recovery failure phase. Following overload termination enabled by the agmatine-pathway component, the system may require metabolic substrate to rebuild: ATP generation, acetyl-group availability, mitochondrial throughput and acetylcholine substrate availability may all influence whether the subject returns to functional capacity or remains in a depleted state. ALCAR, L-carnitine, propionyl-L-carnitine and related acylcarnitines are disclosed for recovery after overload, fatigue-associated functional impairment, executive readiness, cognitive effort, mitochondrial support and restoration of daily activity capacity.

Acetyl-L-carnitine may support mitochondrial energy metabolism, fatty-acid transport, acetyl-CoA availability, acetylcholine substrate availability and neuroprotective or stress-resilience pathways. Human biomarker and clinical literature has reported lower plasma acetyl-L-carnitine in major depressive disorder, especially treatment-resistant depression, earlier-onset depression and depression associated with childhood adversity. The present disclosure does not depend on those findings being clinically sufficient by themselves. It discloses ALCAR and related acylcarnitines as recovery-phase components within a broader state-regulation architecture.

The citicoline or choline-cytidine donor component may address the membrane and executive depletion phase. Sustained state-regulation failure may progressively degrade the structural and signalling substrates needed for flexible cognition, sustained attention, social communication, working memory, cognitive effort and action initiation. Citicoline may provide choline and cytidine support for phosphatidylcholine synthesis, membrane repair, acetylcholine synthesis and dopaminergic receptor-support contexts. Citicoline, CDP-choline, alpha-GPC, phosphatidylcholine, phosphatidylserine, cytidine, uridine and related donors are disclosed for executive initiation, cognitive flexibility, sustained attention, working memory, cognitive effort and recovery of functional drive after tonic dysregulation has been reduced.

The first functional pair, agmatine plus PEA, may create capacity. The second functional pair, ALCAR plus citicoline, may create drive. Capacity without drive may produce calm but insufficient initiation. Drive without capacity may produce overload, crash, anxiety, agitation or burnout. The four-component system is therefore disclosed as a combined capacity-and-drive architecture rather than as a simple stack of independent neuroactive compounds.

Several cross-pair interactions are specifically disclosed. Reduced neuroinflammatory tone may improve NMDA gain-control conditions. Improved autonomic settling may allow metabolic substrate

to be used for functional recovery rather than defensive arousal. Improved membrane and phospholipid support may improve receptor function and signal fidelity. Improved acetyl-CoA and choline availability may support acetylcholine synthesis, which may support attention, parasympathetic tone and state transition. Improved recovery may reduce repeated overload, and reduced repeated overload may reduce cumulative neuroimmune and metabolic burden.

The disclosed four-phase mechanism differs from approaches that target mood, attention, anxiety, sleep, social skills or behavioural symptoms in isolation. The disclosed regimen may address an underlying state-regulation process that expresses differently across diagnostic categories. The same process may present as autistic inertia in one subject, psychomotor retardation in another, compulsive perseveration in another, trauma-related hyperarousal in another and burnout-associated adaptive loss in another.

4.3 Agmatine-pathway role

Agmatine may provide NMDA receptor modulation, imidazoline receptor activity, nitric oxide synthase modulation, polyamine pathway modulation, autonomic regulatory activity, gut-brain signalling effects and glutamate-system normalisation. In the state-regulation framework, agmatine may support sensory gating, overload termination, autonomic settling, NMDA gain-control modulation, social prediction confidence, recovery onset and reduction of hyperarousal.

NMDA gain-control modulation means modulation of the sensitivity or gain of NMDA receptor-mediated signalling. In state-regulation contexts, NMDA gain may influence how sensory, cognitive and social prediction errors are weighted. Dysregulated gain may amplify ordinary inputs into overload or attenuate flexible updating into rigidity and inertia. Agmatine's NMDA-related activity is disclosed for all state-regulation applications described herein.

Agmatine activity is attributed principally to the agmatine moiety rather than to any particular counterion. Therefore, agmatine sulfate, dihydrochloride, hydrochloride, free base and other salts/forms are disclosed as alternative ways to deliver agmatine-associated activity, with counterions selected for tolerability, dissolution, manufacturability, mass fraction, hygroscopicity, taste, cost, regulatory status, stability or packaging.

4.4 PEA-class role

PEA may provide mast-cell modulation, ALIAmide activity, PPAR-alpha-linked signalling, neuroinflammatory modulation, endocannabinoid-related activity, gut-barrier support and local gastrointestinal tolerability support when co-localised with agmatine. In the disclosed first-pair architecture, PEA may act systemically to reduce neuroimmune threshold collapse and locally to buffer agmatine-associated mast-cell or histamine effects at the intestinal release site.

PEA may be non-micronised, micronised, ultra-micronised, co-crystallised, complexed, cyclodextrin-complexed, liposomal, self-emulsifying, nanoparticle-associated, solid-lipid-associated, polymorphic, granulated, coated or otherwise formulated.

4.5 Acylcarnitine role

ALCAR and related acylcarnitines may support mitochondrial energy metabolism, fatty-acid transport, acetyl-group availability, acetyl-CoA supply, neuroprotection, cholinergic acetyl-donor support, recovery after demand, fatigue reduction and executive readiness. ALCAR may be delivered as immediate-release upper-GI absorption to provide early activity-window availability and to reduce substrate exposure to lower-intestinal bacteria capable of producing trimethylamine.

4.6 Citicoline/choline-cytidine role

Citicoline and related choline-cytidine donors may support phospholipid membrane synthesis, choline donation, cytidine/uridine pathways, acetylcholine synthesis, dopaminergic receptor support, sustained attention, working memory, cognitive effort, social communication and executive state-transition. Citicoline may be moisture-sensitive or hygroscopic and may benefit from separate packaging, barrier coatings, desiccants, low-water-activity systems and physical separation from hygroscopic amines or reactive ingredients.

4.7 Functional-pair and cross-pair architecture

The four components may operate as two functional pairs.

Pair 1: agmatine + PEA. This pair may restore capacity by addressing NMDA/autonomic gain control and neuroimmune/mast-cell threshold collapse. PEA may also buffer agmatine-associated mast-cell or histamine effects at the local release site.

Pair 2: ALCAR + citicoline. This pair may restore drive by supplying acetyl-group availability, mitochondrial energy support, choline, cytidine and membrane repair substrates. Acetylcholine synthesis requires both an acetyl donor and choline availability, and membrane synthesis is energy-dependent. This pair is disclosed for executive initiation, cognitive flexibility, fatigue and recovery.

Cross-pair dependency. Capacity without metabolic/executive substrate may produce stillness rather than action. Drive without tonic capacity may produce overload, crash or burnout. The full four-component system is disclosed as an entangled system in which pair 1 creates a stable platform and pair 2 supplies metabolic and executive materials. Cross-pair interactions may include neuroinflammation-to-NMDA effects, cholinergic-autonomic convergence, membrane-dependent receptor function and recovery-loop closure.

4.7A Surrounding support-stack, microbiome and ecology rationale

This publication also discloses surrounding support-stack, microbiome, ecology, gut-barrier, inhibitory-tone, purinergic, antioxidant, adaptogenic and recovery components as part of the same state-regulation system. These surrounding components are not merely wellness adjuncts. They are disclosed as upstream, parallel and downstream support mechanisms that may preserve agmatine availability, reduce the rate at which state-regulation capacity is consumed, support the intestinal and immune environment in which oral agmatine is delivered, and address mechanisms that may remain limiting after agmatine exposure has been established.

A first surrounding layer is the arginine-agmatine-microbiome layer. Agmatine may be produced from L-arginine by arginine decarboxylase activity in host tissue and in intestinal microorganisms. Disclosed embodiments therefore include L-arginine, arginine salts, arginine-rich substrates, prebiotics, inulin, FOS, GOS, synbiotics, probiotic organisms, postbiotics and microbiome-modifying protocols that increase arginine availability, support agmatine-producing organisms, reduce agmatine-depleting dysbiosis or preserve luminal agmatine absorption. Representative organisms include Escherichia coli, Bacteroides species, Lactobacillus brevis, Lactobacillus curvatus, Lactobacillus hilgardii, Lactobacillus acidophilus, Lactobacillus rhamnosus, Limosilactobacillus reuteri, Bifidobacterium longum, Bacillus coagulans, Bacillus subtilis, Saccharomyces boulardii and combinations thereof. The disclosure includes both direct agmatine supplementation and restoration of the ecological factory that may contribute to systemic agmatine tone.

A second surrounding layer is the L. reuteri, vagal, secretin, oxytocin and BH4 layer. Limosilactobacillus reuteri strains, including ATCC PTA 6475 and DSM 17938, are disclosed for use with agmatine-pathway components in social-functioning, social-reward, recovery-after-social-demand, vagal-tone, HRV, oxytocin-pathway and gut-brain-axis embodiments. Without being bound

by theory, L. reuteri may signal through vagal afferents, stimulate secretin-mediated intestinal oxytocin release, influence hypothalamic oxytocin signalling, increase or interact with gut BH4 biology, and affect ventral-tegmental-area social-reward plasticity. Agmatine and L. reuteri are therefore disclosed as complementary social-state components: agmatine may reduce sensory and threat-gain amplification, while L. reuteri or equivalent organisms may support the vagal and oxytocinergic context in which social approach, social recovery and affiliative motivation become more available.

A third surrounding layer is the Bifidobacterium, Clostridial, propionate and p-cresol layer. Autism-adjacent, anxiety-adjacent, OCD-adjacent, fatigue-adjacent and gut-brain-axis presentations may involve dysbiosis patterns characterised by increased Clostridial or other toxin-producing organisms, reduced Bifidobacterium or butyrate-producing organisms, altered short-chain-fatty-acid balance, increased propionic-acid exposure, increased p-cresol or p-cresol sulfate, intestinal permeability and endotoxin load. Disclosed embodiments include Bifidobacterium longum BB536, S. boulardii, Bacillus coagulans, Bacillus subtilis, Lactobacillus species, prebiotics, butyrate, tributyrin, berberine, dihydroberberine and microbiome transfer or microbiome-conditioning protocols. These may reduce Clostridial overgrowth, reduce propionate or p-cresol burden, support barrier function and reduce inflammatory or catecholamine-throttling metabolites that may otherwise oppose the state-regulation benefits of agmatine, ALCAR or citicoline.

A fourth surrounding layer is the glucoraphanin, myrosinase, sulforaphane and detoxification layer. Glucoraphanin plus myrosinase, broccoli seed extract, broccoli sprout extract, mustard-seed myrosinase, stabilised sulforaphane and related isothiocyanate systems are disclosed for use with agmatine, PEA, ALCAR and citicoline. Sulforaphane may activate Nrf2-linked antioxidant response, support glutathione-related detoxification, modulate neuroinflammation, support gut-barrier integrity and increase phase-II handling of microbial or environmental metabolites, including p-cresol-related burden. This layer is disclosed especially for initiation failure, psychomotor slowing, fatigue, demand intolerance, autism-associated adaptive loss, inflammatory depression, OCD-adjacent perseveration and toxin-associated state dysregulation.

A fifth surrounding layer is the taurine, magnesium and inhibitory-tone layer. Taurine, magnesium L-threonate, magnesium glycinate, magnesium taurate, glycine, L-theanine, GABA-pathway agents and related inhibitory-tone supports are disclosed for use where state-regulation failure includes sensory over-gain, insomnia, low vagal brake, hyperarousal, mitochondrial stress, motor tone abnormalities, shutdown vulnerability or poor recovery after demand. Taurine is disclosed not only as a calming amino acid but also as a mitochondrial support agent, including through taurine-dependent mitochondrial tRNA modification, Complex I support, calcium handling, bile-acid conjugation and membrane protection. Magnesium L-threonate is disclosed for CNS magnesium delivery and NMDA channel modulation. These components may complement agmatine's NMDA and autonomic effects without requiring that each component act through the same receptor target.

A sixth surrounding layer is the zinc L-carnosine, L-carnosine, glutamine, butyrate, colostrum, lactoferrin, Enterosgel and gut-barrier layer. Zinc L-carnosine, L-carnosine, glutamine, butyrate, tributyrin, colostrum, lactoferrin, larazotide-like agents, zonulin modulators, polymethylsiloxane polyhydrate, Enterosgel, activated charcoal, bentonite, cholestyramine-like binders and other toxin-binding or barrier-support components are disclosed for use with agmatine-pathway components. These components may support tight-junction integrity, mucosal repair, epithelial energy supply, endotoxin reduction, propionate or toxin binding, histamine-load reduction and reduction of LPS/TLR4/MyD88/NF-kappaB-mediated inflammatory signalling. They are disclosed as especially relevant where oral agmatine intolerance, IBS, SIBO, MCAS, histamine intolerance, leaky-gut markers, elevated zonulin, diarrhoea, constipation, bloating or gut-derived neuroinflammation is present.

A seventh surrounding layer is the PEA, quercetin, luteolin, DAO, vitamin D3, curcumin, CBD and mast-cell resolution layer. PEA is disclosed as the preferred core mast-cell and neuroimmune component because it may provide PPAR-alpha, ALIAmide, endocannabinoid and local mucosal benefits with comparatively clean tolerability. Quercetin, luteolin, DAO, vitamin D3, curcumin, non-intoxicating cannabinoids, cromolyn-like agents, ketotifen-like agents and related mast-cell or histamine-modulating components are separately disclosed as optional replacements, complements or protocol-stage adjuncts. DAO may be physically separated from agmatine where same-lumen competition, enzyme stability or agmatine metabolism is undesirable. Vitamin D3 and related vitamin D agents are disclosed not only for deficiency correction but also for immune regulation, CD39-related conversion of extracellular ATP danger signalling toward adenosine recovery signalling, gut-barrier effects and neuroimmune tone.

An eighth surrounding layer is the mitochondrial, redox, neurosteroid and recovery layer. CoQ10, ubiquinol, creatine, alpha-lipoic acid, R-lipoic acid, NAC, glutathione, selenium, iron, B vitamins, NAD-pathway agents, allopregnanolone-pathway agents, brexanolone-like agents, zuranolone-like agents, ganaxolone-like agents and related mitochondrial or neurosteroid supports are disclosed for use with agmatine, PEA, ALCAR and citicoline. These components may support electron transport, phosphocreatine buffering, glutathione synthesis, mitochondrial membrane stability, steroidogenic redox conditions, tonic GABAergic inhibition and recovery after overload. This layer is disclosed for fatigue-associated executive dysfunction, post-exertional malaise, depression-associated psychomotor slowing, burnout, shutdown recovery, long-COVID-like recovery failure and mitochondrial or redox biomarker abnormalities.

A ninth surrounding layer is the HPA-axis, cortisol and stress-consumption layer. Ashwagandha, Sensoril, KSM-66, Shoden, holy basil, Holixer, rhodiola, phosphatidylserine, L-theanine, glycine, taurine, magnesium and related adaptogenic or stress-axis components are disclosed for use where chronic stress, cortisol dysregulation, hypervigilance, sleep disruption or repeated demand exposure consumes state-regulation capacity faster than it can be restored. This layer may reduce the rate of agmatine-pathway depletion or functional demand on agmatine-mediated regulation by reducing upstream stress-axis drive.

The surrounding components may be delivered as one or more separate products, including a stabilisation product, executive-support product, ecology product, gut-barrier product, sleep/recovery product, histamine product, probiotic product, prebiotic sachet, binder product, meal-time enzyme product, morning blister, evening blister or staged programme. Physical separation is specifically disclosed where stability, enzyme compatibility, live-microbial viability, release site, timing, taste, capsule fill mass, GI tolerability, medication-spacing, TMA/TMAO risk, histamine risk or regulatory status makes single-unit co-formulation undesirable. Conversely, co-formulation is disclosed where same-site delivery is beneficial, including agmatine with PEA in an intestinal release window, glucoraphanin with myrosinase, probiotic with prebiotic, zinc L-carnosine with glutamine or butyrate, and ALCAR with citicoline.

Each surrounding component is disclosed as optional, substitutable and stage-specific. A minimal embodiment may comprise agmatine alone. A first-pair embodiment may comprise agmatine plus PEA. A four-component embodiment may comprise agmatine, PEA, ALCAR and citicoline. A broader programme embodiment may further comprise one or more microbiome, vagal, oxytocin, BH4, p-cresol, sulforaphane, inhibitory-tone, mast-cell, purinergic, gut-barrier, mitochondrial, antioxidant, neurosteroid or stress-axis components. The technical rationale is that state-regulation failure may be maintained by a network of mutually reinforcing loops, and the disclosed systems may intervene at multiple points in that network while preserving agmatine as a central state-regulation component.

4.8 Gastrointestinal tolerability of oral agmatine

Oral agmatine administration has been associated in user reports, observations and technical discussions with gastrointestinal distress, including diarrhoea, loose stools, bloating, gas, nausea, gastric burning, gastritis-like pain, abdominal cramping and ulcer-like sensation. Without being bound by theory, intolerance may involve overlapping mechanisms.

Gastric histamine and acid effects. Agmatine has been reported in the background literature to increase gastric acid secretion, reduce gastric mucus, worsen experimental gastric mucosal injury and induce histamine release from histamine-storing cells or mast-cell systems. These findings support a concern that direct gastric mucosal exposure to agmatine may aggravate symptoms in sensitive subjects.

Mast-cell and histamine effects. Agmatine may induce concentration-dependent histamine exocytosis and arachidonate release from mast-cell systems through direct G-protein or imidazoline/guanidine-related mechanisms. Local agmatine concentration at gastric or intestinal mucosa is therefore a formulation variable.

Nitric oxide and motility effects. Agmatine has nitric oxide synthase-modulating activity. Local changes in nitric oxide availability may influence smooth-muscle relaxation, motility, cramping or stool pattern.

Sulfate counterion contribution. Where agmatine sulfate is used, sulfate may contribute osmotic load, gas, odour or bowel effects in sensitive individuals. However, sulfate is treated as one optimisation target rather than the sole or primary cause of severe agmatine intolerance.

Bolus-like intestinal exposure. Enteric protection alone can move the release event from stomach to intestine, but highly soluble agmatine salts may still release as a concentrated bolus after enteric opening. Hydrophilic gel moderation is disclosed to reduce peak local exposure.

Diamine oxidase and histamine clearance. Agmatine is a diamine and may interact with histamine-clearance capacity. In subjects with low DAO activity, histamine intolerance, MCAS, IBS, SIBO, inflammatory gut conditions or dysbiosis, agmatine-associated histamine release and diamine load may be less well tolerated.

The disclosed delivery architectures address these mechanisms by spatial and temporal control of exposure: reducing direct gastric mucosal contact, moderating intestinal bolus concentration, selecting counterions, co-localising mast-cell-stabilising compounds and using packaging/dosing protocols tailored to sensitive subjects.

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5. Ingredient Forms

5.1 Agmatine-pathway components

Disclosed agmatine forms include agmatine free base; agmatine hydrochloride; agmatine dihydrochloride, including CAS 334-18-9; agmatine sulfate; agmatine sulfate hydrates; agmatine phosphate; agmatine citrate; agmatine fumarate; agmatine malate; agmatine tartrate; agmatine succinate; agmatine aspartate; agmatine gluconate; agmatine lactate; agmatine acetate; agmatine orotate; agmatine bisulfate; agmatine carbonate; agmatine bicarbonate; any other pharmaceutically, nutraceutically or physiologically acceptable salt; hydrates; solvates; polymorphs; co-crystals; complexes including cyclodextrin, protein and polymer complexes; prodrugs; metabolites; analogues; protected salts; ion-pair forms; taste-masked forms; coated forms; and combinations thereof.

The salt-agnostic disclosure is intentional. Agmatine sulfate is disclosed as a principal commercial embodiment because it is widely used in supplement contexts. Agmatine dihydrochloride is disclosed as an optional optimisation that may increase agmatine mass fraction and avoid or reduce sulfate-associated effects. Other salts and forms are disclosed to prevent counterion-based design-around.

5.2 Palmitoylethanolamide-class components

Disclosed PEA-class components include palmitoylethanolamide, N-palmitoylethanolamide, non-micronised PEA, micronised PEA, ultra-micronised PEA, PEA polymorphs, PEA co-crystals, PEA complexes, cyclodextrin-complexed PEA, PEA prodrugs, PEA analogues, oleoylethanolamide, stearoylethanolamide, linoleoylethanolamide, other N-acylethanolamides, self-emulsifying PEA dispersions, self-nanoemulsifying PEA systems, liposomal PEA, lipid nanoparticle PEA, solid-lipid PEA systems, granulated PEA, coated PEA and combinations thereof.

5.3 Acylcarnitine components

Disclosed acylcarnitine components include acetyl-L-carnitine, acetyl-L-carnitine hydrochloride, acetyl-L-carnitine free base, L-carnitine, L-carnitine L-tartrate, propionyl-L-carnitine, palmitoyl-L-carnitine, other acyl-L-carnitines, salts, hydrates, solvates, esters, prodrugs, analogues, taste-masked forms, coated forms and combinations thereof.

5.4 Citicoline and choline-cytidine donor components

Disclosed choline/cytidine donor components include citicoline, citicoline sodium, citicoline free acid, CDP-choline, cytidine diphosphate choline, citicoline salts, hydrates, solvates, complexes, co-crystals, prodrugs and analogues, alpha-GPC, choline bitartrate, choline chloride, phosphatidylcholine, phosphatidylserine, cytidine, uridine and any compound that provides choline-related, cytidine-related, uridine-related, phosphocholine-related, phospholipid-related or CDP-choline-equivalent activity after administration.

5.5 Additional ingredient classes

Additional ingredient classes include minerals, B vitamins, fat-soluble vitamins, omega-3 fatty acids, antioxidants, mitochondrial support agents, redox support agents, mast-cell modulators, flavonoids, polyphenols, botanicals, probiotics, postbiotics, prebiotics, enzymes, amino acids, methylation support agents, purinergic modulators, neurosteroid-pathway agents, microbiome modulators, gut-barrier agents, anti-inflammatory agents, adaptogens and formulation excipients. Each additional ingredient is disclosed alone and in every technically feasible combination with agmatine, PEA, ALCAR, citicoline and the other listed ingredients.

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6. Master Ingredient List

The following master list is incorporated into every combination, route, formulation technology, dose range, indication and product architecture disclosed herein. Each ingredient is disclosed in any salt, stereoisomer, polymorph, hydrate, solvate, co-crystal, complex, prodrug, metabolite, analogue, extract, fraction, live-microbial form, inactivated-microbial form, lysate, postbiotic form, micronised form, nanoform, liposomal form, encapsulated form, coated form, sustained-release form, immediate-release form, delayed-release form, enteric form or otherwise formulated form.

1. agmatine
2. agmatine free base

3. agmatine sulfate
4. agmatine sulfate hydrate
5. agmatine hydrochloride
6. agmatine dihydrochloride
7. agmatine phosphate
8. agmatine citrate
9. agmatine fumarate
10. agmatine malate
11. agmatine tartrate
12. agmatine succinate
13. agmatine aspartate
14. agmatine gluconate
15. agmatine lactate
16. agmatine acetate
17. agmatine orotate
18. agmatine bisulfate
19. agmatine carbonate
20. agmatine bicarbonate
21. agmatine co-crystals
22. agmatine cyclodextrin complexes
23. agmatine polymer complexes
24. agmatine prodrugs
25. agmatine analogues
26. palmitoylethanolamide
27. N-palmitoylethanolamide
28. non-micronised PEA
29. micronised PEA
30. ultra-micronised PEA
31. PEA polymorphs
32. PEA co-crystals
33. PEA cyclodextrin complexes
34. PEA liposomes
35. PEA lipid nanoparticles
36. PEA self-emulsifying dispersions
37. oleoylethanolamide
38. stearoylethanolamide
39. linoleoylethanolamide
40. other N-acylethanolamides

41. acetyl-L-carnitine
42. acetyl-L-carnitine hydrochloride
43. L-carnitine
44. L-carnitine L-tartrate
45. propionyl-L-carnitine
46. palmitoyl-L-carnitine
47. other acyl-L-carnitines
48. citicoline
49. citicoline sodium
50. CDP-choline
51. citicoline free acid
52. alpha-GPC
53. choline bitartrate
54. choline chloride
55. phosphatidylcholine
56. phosphatidylserine
57. cytidine
58. uridine
59. magnesium L-threonate
60. magnesium glycinate
61. magnesium taurate
62. magnesium citrate
63. magnesium malate
64. magnesium chloride
65. magnesium sulfate
66. magnesium orotate
67. taurine
68. ashwagandha
69. Sensoril
70. KSM-66
71. Shoden
72. holy basil
73. Holixer
74. zinc L-carnosine
75. PepZin GI
76. zinc picolinate
77. zinc bisglycinate
78. zinc citrate

79. zinc gluconate
80. zinc acetate
81. vitamin D3
82. vitamin D2
83. calcifediol
84. calcitriol
85. L-carnosine
86. glucoraphanin
87. TrueBroc
88. broccoli seed extract
89. broccoli sprout extract
90. myrosinase
91. white mustard seed extract
92. sulforaphane
93. stabilised sulforaphane
94. Limosilactobacillus reuteri ATCC PTA 6475
95. Limosilactobacillus reuteri DSM 17938
96. Bifidobacterium longum BB536
97. Bacillus coagulans MTCC 5856
98. LactoSpore
99. Saccharomyces boulardii
100. Bacillus subtilis
101. probiotic lysates
102. postbiotics
103. prebiotics
104. FOS
105. GOS
106. inulin
107. low-dose aspirin
108. curcumin
109. turmeric extract
110. quercetin
111. luteolin
112. low-dose naltrexone
113. suramin
114. suramin analogues
115. berberine
116. dihydroberberine

117. CoQ10
118. ubiquinone
119. ubiquinol
120. allopregnanolone
121. brexanolone
122. zuranolone
123. ganaxolone
124. alpha-lipoic acid
125. R-lipoic acid
126. butyrate
127. tributyrin
128. colostrum
129. lactoferrin
130. glutamine
131. L-theanine
132. 5-HTP
133. L-tryptophan
134. L-tyrosine
135. N-acetyl-L-tyrosine
136. glycine
137. N-acetylcysteine
138. glutathione
139. SAMe
140. creatine monohydrate
141. creatine hydrochloride
142. vitamin B1
143. thiamine
144. benfotiamine
145. vitamin B6
146. pyridoxal-5-phosphate
147. vitamin B12
148. methylcobalamin
149. hydroxocobalamin
150. adenosylcobalamin
151. folate
152. folinic acid
153. leucovorin
154. L-methylfolate

155. 5-MTHF
156. selenium
157. selenomethionine
158. iron
159. iron bisglycinate
160. omega-3 fatty acids
161. EPA
162. DHA
163. CBD
164. cannabidiol
165. non-intoxicating cannabinoids
166. lion's mane
167. Hericium erinaceus
168. rhodiola rosea
169. BH4
170. tetrahydrobiopterin
171. sapropterin
172. sepiapterin
173. vitamin C
174. vitamin E
175. vitamin K
176. iodine
177. diamine oxidase
178. digestive enzymes
179. resveratrol
180. GABA
181. zonulin modulators
182. larazotide-like agents
183. collagen peptides
184. hyaluronic acid
185. melatonin
186. betaine
187. inositol
188. inositol hexanicotinate
189. riboflavin
190. niacinamide
191. nicotinamide riboside
192. nicotinamide mononucleotide

193. pantothenic acid
194. biotin
195. oxytocin-pathway modulators
196. secretin-pathway modulators
197. adenosine-pathway modulators
198. NAD-pathway support ingredients
199. L-arginine
200. arginine hydrochloride
201. arginine alpha-ketoglutarate
202. Lactobacillus rhamnosus
203. Lactobacillus rhamnosus GG
204. Lactobacillus brevis
205. Lactobacillus acidophilus
206. Lactobacillus plantarum
207. Bacteroides species
208. polymethylsiloxane polyhydrate
209. Enterosgel
210. activated charcoal
211. bentonite clay
212. cholestyramine-like binders
213. toxin binders
214. synbiotics

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7. Core Combinations and Combination Clusters

7.1 Core combinations

The following combinations are individually disclosed for all indications, populations, delivery formats, release profiles, dose ranges, protocols, product models and outcome measures described herein.

1. agmatine alone
2. agmatine + PEA
3. agmatine + ALCAR
4. agmatine + citicoline
5. agmatine + PEA + ALCAR
6. agmatine + PEA + citicoline
7. agmatine + ALCAR + citicoline
8. agmatine + PEA + ALCAR + citicoline
9. PEA alone

10. ALCAR alone
11. citicoline alone
12. PEA + ALCAR
13. PEA + citicoline
14. ALCAR + citicoline
15. PEA + ALCAR + citicoline
16. agmatine + PEA + magnesium L-threonate
17. agmatine + PEA + taurine
18. agmatine + PEA + zinc L-carnosine
19. agmatine + PEA + vitamin D3
20. agmatine + PEA + L-carnosine
21. agmatine + PEA + glucoraphanin + myrosinase
22. agmatine + PEA + sulforaphane
23. agmatine + PEA + L. reuteri
24. agmatine + PEA + B. longum
25. agmatine + PEA + CoQ10
26. agmatine + PEA + alpha-lipoic acid
27. agmatine + PEA + NAC
28. agmatine + PEA + quercetin
29. agmatine + PEA + luteolin
30. agmatine + PEA + CBD
31. agmatine + PEA + BH4
32. agmatine + PEA + low-dose naltrexone
33. agmatine + PEA + magnesium L-threonate + taurine
34. agmatine + PEA + ALCAR + citicoline + magnesium L-threonate
35. agmatine + PEA + ALCAR + citicoline + taurine
36. agmatine + PEA + ALCAR + citicoline + vitamin D3
37. agmatine + PEA + ALCAR + citicoline + zinc L-carnosine
38. agmatine + PEA + ALCAR + citicoline + L-carnosine
39. agmatine + PEA + ALCAR + citicoline + glucoraphanin + myrosinase
40. agmatine + PEA + ALCAR + citicoline + L. reuteri + B. longum BB536

In addition, any ingredient from the Master Ingredient List is disclosed alone, in any two-ingredient combination, any three-ingredient combination, any four-ingredient combination, any five-ingredient combination and any higher-order combination with any other ingredient in the Master Ingredient List. This includes combinations that contain agmatine and combinations that do not contain agmatine.

7.2 Functional clusters

GI tolerability and mast-cell cluster: agmatine; PEA; quercetin; luteolin; DAO; zinc L-carnosine; vitamin D3; curcumin; CBD; glutamine; butyrate; colostrum; lactoferrin; probiotics; prebiotics; histamine-support agents.

Mitochondrial and fatigue cluster: ALCAR; CoQ10; creatine; alpha-lipoic acid; taurine; magnesium; B1; B2; B3; B5; B6; B12; selenium; iron; omega-3 fatty acids; NAD-pathway support ingredients.

Membrane and attention cluster: citicoline; alpha-GPC; phosphatidylserine; phosphatidylcholine; omega-3 fatty acids; uridine; cytidine; choline salts; ALCAR; magnesium L-threonate.

Glutamate/NMDA and sensory-gain cluster: agmatine; magnesium L-threonate; magnesium glycinate; taurine; glycine; L-theanine; NAC; zinc; PEA; CBD.

Microbiome and p-cresol/Clostridial cluster: glucoraphanin; myrosinase; sulforaphane; B. longum BB536; S. boulardii; Bacillus subtilis; Bacillus coagulans; prebiotics; butyrate; tributyrin; zinc carnosine; berberine.

Vagal/social-functioning cluster: L. reuteri ATCC PTA 6475; L. reuteri DSM 17938; B. longum BB536; magnesium; taurine; vitamin D3; BH4-pathway agents; PEA; agmatine; oxytocin-pathway modulators; secretin-pathway modulators.

Purinergic/cell-danger-response cluster: vitamin D3; suramin; suramin analogues; BH4; magnesium; PEA; sulforaphane; L. reuteri; anti-inflammatory resolution agents; adenosine-pathway modulators.

Stress-recovery and inhibitory-tone cluster: ashwagandha; holy basil; taurine; magnesium L-threonate; L-theanine; glycine; allopregnanolone-pathway agents; phosphatidylserine; rhodiola; GABA; melatonin.

Methylation and neurotransmitter precursor cluster: methylfolate; folinic acid; B12 forms; B6/P5P; SAMe; betaine; tyrosine; N-acetyl-L-tyrosine; tryptophan; 5-HTP; iron; BH4; vitamin C.

7.3 Inclusion/exclusion embodiments

For every composition disclosed herein, embodiments are disclosed that include and exclude each of the following: PEA; ALCAR; citicoline; HPMC; any hydrophilic polymer; enteric coating; enteric capsule shell; buffered media; arginine base; carbonate; bicarbonate; PEA bioavailability technology; LipiSperse-type dispersion; ALCAR enteric coating; probiotics; CBD; prescription-only agents; aspirin; low-dose naltrexone; suramin; BH4; magnesium; taurine; support-stack ingredients; taste-masking; odour-masking; moisture-protection; separate packaging; and all support-stack ingredients.

Thus, this publication discloses agmatine + PEA with ALCAR, agmatine + PEA without ALCAR, agmatine + ALCAR without PEA, agmatine alone, PEA alone, ALCAR alone, citicoline alone, all corresponding compositions with or without enteric protection, with or without HPMC, with or without modified release, with or without a non-sulfate salt and with or without additional support ingredients.

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8. Indications, Populations and Use Statements

8.1 Diagnostic categories and presentations

The compositions and systems disclosed herein are contemplated for use in subjects diagnosed with, presenting traits associated with, or at risk of the following conditions or presentations:

1. autism spectrum condition/autism spectrum disorder
2. ADHD
3. anxiety disorders
4. OCD
5. major depressive disorder
6. persistent depressive disorder
7. treatment-resistant depression
8. depression with psychomotor retardation
9. bipolar depressive or mixed episodes
10. PTSD
11. complex PTSD
12. acute stress disorder
13. adjustment disorders
14. autistic burnout
15. occupational burnout
16. caregiver burnout
17. academic burnout
18. sensory processing disorder
19. executive dysfunction
20. ME/CFS
21. fibromyalgia
22. long-COVID cognitive or autonomic dysfunction
23. perimenopause-associated state-regulation difficulty
24. menopause-associated cognitive or autonomic dysfunction
25. PMDD
26. substance-withdrawal-associated dysregulation
27. traumatic brain injury-associated state-regulation difficulty
28. pathological demand avoidance/PDA profile
29. Tourette syndrome or tic disorders
30. eating disorders with interoceptive/state-regulation features
31. personality disorders with emotional dysregulation features
32. intellectual disability with co-occurring state-regulation difficulty
33. Down syndrome with co-occurring state-regulation difficulty

34. IBS-associated neurobehavioural dysregulation
35. MCAS or histamine-intolerance-associated sensory/autonomic dysregulation
36. chronic pain with fatigue, shutdown, autonomic or sensory dysregulation
37. sleep-restoration impairment with daytime state-regulation impairment
38. subclinical or mixed presentations that do not meet a single formal diagnosis but present clinically significant state-regulation impairment.

8.2 State-regulation phenotypes

Disclosed phenotypes include:

1. impaired action initiation
2. autistic inertia
3. executive state-transition difficulty
4. task paralysis
5. cognitive rigidity
6. perseverative state-locking
7. sensory overload
8. reduced sensory tolerance
9. shutdown episodes
10. meltdown episodes
11. autonomic dysregulation
12. chronic hyperarousal
13. impaired recovery after social demand
14. impaired recovery after sensory demand
15. impaired recovery after cognitive demand
16. burnout-associated loss of adaptive capacity
17. stress-recovery failure
18. anxiety-linked threat-state activation
19. depression-linked inertia
20. psychomotor retardation or psychomotor slowing
21. anhedonia-associated failure to initiate activity
22. trauma-related hyperarousal
23. emotional dysregulation
24. mood dysregulation
25. rejection sensitive dysphoria
26. time blindness
27. working-memory impairment
28. sustained-attention impairment
29. impulse-regulation difficulty

30. sleep-restoration impairment
31. gut-brain-associated neurobehavioural instability
32. demand avoidance
33. interoceptive processing difficulty
34. pain-associated state-regulation difficulty
35. fatigue-associated functional impairment
36. social initiation difficulty
37. reduced social reciprocity
38. social communication impairment
39. social fatigue
40. impaired recovery after demand
41. reduced functional capacity
42. burnout-like adaptive depletion
43. overload-associated functional collapse.

8.3 Populations

Disclosed populations include adults, adolescents, children, elderly subjects, diagnosed subjects, undiagnosed subjects, subclinical subjects, subthreshold subjects, single-diagnosis subjects, multi-diagnosis subjects, male subjects, female subjects, non-binary subjects, pregnant or lactating subjects only under appropriate medical supervision, subjects taking concurrent psychiatric or neurological medication, and subjects with co-occurring gastrointestinal conditions including IBS, SIBO, mast-cell activation syndrome, histamine intolerance, coeliac disease and inflammatory bowel disease.

Concurrent medication contexts include SSRIs, SNRIs, stimulants, antipsychotics, anxiolytics, mood stabilisers, anticonvulsants, beta-blockers, alpha-agonists, melatonin, antihistamines, MAOIs and other medicines, with appropriate medical review.

8.4 Use language

The following forms of use disclosure are included for every ingredient, combination, formulation and kit disclosed herein: composition for use in preventing, treating, reducing, ameliorating, modulating or managing a disclosed indication or phenotype; use of a composition in the manufacture of a medicament for a disclosed indication or phenotype; use of a nutritional product, medical food, supplement, pharmaceutical, compounded preparation or kit for a disclosed indication or phenotype; and a method of supporting, modulating or managing a disclosed state-regulation phenotype where such method is legally protectable or defensively relevant.

8.5 Diagnosis-specific use embodiments

For avoidance of doubt, this publication expressly discloses agmatine-pathway components, including agmatine sulfate, agmatine dihydrochloride, agmatine hydrochloride, agmatine free base and other physiologically acceptable agmatine salts or forms, alone or in combination with PEA-class components, acylcarnitine components, citicoline/choline-cytidine donor components or support-stack ingredients, for use in preventing, treating, reducing, ameliorating, modulating, managing or supporting state-regulation impairments occurring in association with the diagnostic categories and presentations listed in Section 8.1.

The diagnosis-specific disclosure includes the following non-limiting use embodiments.

1. Agmatine-pathway components, alone or in combination, for state-regulation impairment associated with autism spectrum condition, including autistic inertia, shutdown vulnerability, sensory overload, reduced sensory tolerance, impaired recovery after social or sensory demand, social fatigue, social initiation difficulty and burnout-associated loss of adaptive capacity.
2. Agmatine-pathway components, alone or in combination, for state-regulation impairment associated with ADHD, including impaired action initiation, task paralysis, executive state-transition difficulty, sustained-attention impairment, working-memory impairment, time blindness, emotional dysregulation and fatigue-associated executive dysfunction.
3. Agmatine-pathway components, alone or in combination, for state-regulation impairment associated with anxiety disorders, including anxiety-linked threat-state activation, chronic hyperarousal, autonomic dysregulation, avoidance-state locking, sleep-restoration impairment and impaired recovery after perceived threat.
4. Agmatine-pathway components, alone or in combination, for state-regulation impairment associated with OCD, including perseverative state-locking, compulsive perseveration, cognitive rigidity, impaired task switching, threat-state persistence, autonomic arousal linked to intrusive thought cycles and impaired recovery after compulsive or obsessional activation.
5. Agmatine-pathway components, alone or in combination, for state-regulation impairment associated with major depressive disorder, persistent depressive disorder, bipolar depressive episodes, treatment-resistant depression, depression with psychomotor retardation and depression with anhedonia, including depression-linked inertia, psychomotor slowing, reduced reward-driven initiation, fatigue-associated functional impairment and impaired recovery after ordinary demand.
6. Agmatine-pathway components, alone or in combination, for state-regulation impairment associated with PTSD, complex PTSD, acute stress disorder or trauma-related hyperarousal, including persistent vigilance, exaggerated startle, threat-state activation, autonomic dysregulation, sleep-restoration impairment, shutdown, emotional flooding, avoidance-state locking and delayed recovery after trauma-linked cues.
7. Agmatine-pathway components, alone or in combination, for burnout-associated adaptive loss, including autistic burnout, occupational burnout, caregiver burnout, academic burnout and stress-related burnout, where the phenotype includes reduced sensory tolerance, impaired action initiation, social withdrawal, cognitive fatigue, autonomic instability or prolonged recovery after demand.
8. Agmatine-pathway components, alone or in combination, for state-regulation impairment associated with ME/CFS, fibromyalgia, long-COVID cognitive or autonomic dysfunction, chronic pain, perimenopause-associated dysfunction, menopause-associated dysfunction, PMDD, traumatic brain injury-associated dysregulation, MCAS/histamine-intolerance-associated dysregulation, IBS-associated neurobehavioural dysregulation or mixed/subclinical presentations.

Each diagnosis-specific use embodiment is disclosed for agmatine alone; agmatine plus PEA; agmatine plus ALCAR; agmatine plus citicoline; agmatine plus PEA plus ALCAR; agmatine plus PEA plus citicoline; agmatine plus ALCAR plus citicoline; the four-component agmatine/PEA/ALCAR/citicoline regimen; and any disclosed support-stack, microbiome, gut-barrier, mast-cell, mitochondrial, purinergic, methylation, neurosteroid or companion-diagnostic architecture.

These diagnosis-specific embodiments are not framed as broad claims to cure the named conditions. They disclose uses for state-regulation impairments occurring within those diagnostic contexts. The functional target remains the measurable state-regulation phenotype: frequency,

severity, duration, latency, recurrence, intensity, recovery trajectory or functional impact of the relevant state-regulation impairment.

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9. Preferred Four-Component Regimen and Separated Daily Architecture

9.1 Overview

A preferred disclosed regimen comprises four component classes:

1. an agmatine-pathway component;
2. a palmitoylethanolamide-class component;
3. an acylcarnitine component; and
4. a citicoline or choline-cytidine donor component.

In a preferred daily oral system, the components are physically separated into:

1. **First dosage unit:** an enterically protected dosage unit comprising agmatine and PEA, optionally with HPMC or another hydrophilic matrix-forming polymer, configured to reduce gastric exposure, moderate intestinal burst release and co-localise PEA with agmatine at the intestinal release site.
2. **Second dosage unit:** a physically separate immediate-release dosage unit comprising ALCAR and citicoline, configured for prompt upper-GI release and early daily activity-window availability.

The first and second dosage units may be taken together, sequentially, with food, without food, in the morning, in the evening or on a split schedule, but morning administration with food is a preferred embodiment.

9.2 Why the first pair is enteric and co-localised

The agmatine/PEA unit is enterically protected to reduce or avoid pre-absorptive direct gastric mucosal exposure of agmatine. It also includes hydrophilic gel moderation to reduce post-enteric agmatine bolus exposure. PEA may release at substantially the same intestinal site and time as agmatine, providing local mast-cell or neuroimmune modulation while also contributing systemic therapeutic effects.

Co-localisation may occur in the same enteric capsule, same matrix, same bead, same pellet, same mini-tablet, same granule, same sachet fraction, same intestinal-release fraction, physically separate but co-timed pellets, or separate dosage units administered to release at substantially the same site and time.

9.3 Why the second pair is immediate-release and physically separate

ALCAR and citicoline may be provided as immediate-release because they may be well tolerated in gastric/upper-GI conditions and may be intended to support the early activity window with metabolic, cholinergic and membrane substrates. Subjecting ALCAR/citicoline to delayed enteric/HPMC release may postpone availability beyond the intended activity window.

Physical separation is disclosed because: (1) putting all four components in one immediate-release unit would expose agmatine to gastric conditions that enteric protection is designed to bypass; (2) putting all four in one enteric/HPMC unit would delay ALCAR/citicoline unnecessarily; (3) citicoline

may require moisture separation; and (4) PEA and ALCAR may have different release-profile needs and are disclosed as absent from each other's preferred dosage units.

9.4 Preferred capsule embodiment

A preferred daily dose comprises:

1. two first enterically protected capsules, each comprising about 375 mg agmatine dihydrochloride, about 300 mg palmitoylethanolamide and about 60-100 mg HPMC; and
2. one physically separate immediate-release capsule comprising about 500 mg acetyl-L-carnitine hydrochloride and about 250 mg citicoline sodium.

The preferred daily dose provides about 750 mg agmatine dihydrochloride, about 600 mg PEA, about 500 mg ALCAR hydrochloride and about 250 mg citicoline sodium.

Alternative embodiments replace agmatine dihydrochloride with agmatine sulfate, agmatine hydrochloride, agmatine free base or another disclosed agmatine form, with doses adjusted for agmatine base equivalence or left unadjusted for practical labelled mass.

9.5 Preferred sachet embodiment

A preferred pill-free embodiment comprises:

1. a first sachet containing enterically protected particles comprising agmatine and PEA, optionally with a hydrophilic matrix-forming polymer; and
2. a physically separate second sachet containing immediate-release or taste-masked powder or particles comprising ALCAR and citicoline.

The first sachet contents may be sprinkled onto soft food and swallowed without chewing. The second sachet may be mixed with water, food or another vehicle, or swallowed as taste-masked granules.

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10. Gastrointestinal Tolerability Architecture

10.1 Salt-agnostic enteric agmatine with hydrophilic gel moderation

Disclosed herein is an enterically protected dosage unit comprising agmatine in any salt or free-base form and a hydrophilic matrix-forming polymer. The polymer may be present in the fill, core, pellet, granule, mini-tablet, bead, layer or coating of the dosage unit and hydrates after enteric opening to moderate intestinal exposure of agmatine.

This architecture is salt-agnostic. It addresses gastrointestinal tolerability associated with the agmatine cation by reducing direct gastric mucosal exposure and moderating post-enteric bolus concentration. The counterion may be varied for manufacturability, cost, purity, agmatine mass fraction, hygroscopicity, taste, odour, ionic strength, dissolution behaviour, regulatory acceptability or compatibility with excipients.

Non-limiting dissolution targets include: not more than 5% agmatine release after 2 hours at pH 1.2; not more than 30% agmatine release within 15 minutes after transfer to intestinal pH; 40-75% agmatine release within 60 minutes at pH 5.5-6.8; and at least 80% agmatine release within 120 minutes at pH 5.5-6.8. Alternative targets include any acid-stage limit from 0-20%, any burst-stage limit from 5-50%, any intermediate release between 20-90%, and any complete-release window

between 30 and 240 minutes, provided the system reduces gastric exposure and moderates post-enteric local burst concentration.

10.2 Dissolution test method

In one exemplary two-stage dissolution protocol, dosage units are placed in 0.1 N hydrochloric acid or another acid medium at about pH 1.2 at 37 +/- 0.5 degrees C for 2 hours in USP Apparatus II (paddle) at 50 rpm, USP Apparatus I (basket) or a Ph. Eur. equivalent apparatus, with a medium volume of about 500-1000 mL, preferably about 750 mL. Samples are withdrawn at 2 hours and assayed for agmatine content by HPLC, LC-MS, ion chromatography, UV spectrophotometry, derivatisation assay or another validated method. A preferred acid-stage target is not more than about 5% labelled agmatine content released.

In the intestinal stage, the medium is changed or adjusted to phosphate buffer or other intestinal medium at pH 5.5, 6.0, 6.5, 6.8, 7.0 or another relevant pH at 37 +/- 0.5 degrees C. Samples are withdrawn at intervals such as 15, 30, 45, 60, 90, 120, 180 and 240 minutes after buffer change and assayed for agmatine content. A preferred profile begins release after intestinal-pH exposure and reaches at least about 80% labelled agmatine content within about 120 minutes, while HPMC or another polymer moderates release relative to a control dosage unit lacking the hydrophilic matrix-forming polymer.

A control dosage unit identical except for the absence of HPMC or the hydrophilic polymer may be tested under the same conditions to demonstrate moderation of intestinal release. Alternative media, pH thresholds, apparatus, agitation speeds, volumes and assay methods are disclosed.

10.3 Co-localisation of agmatine and PEA

Disclosed herein is co-localisation of agmatine and PEA in the same enterically protected dosage unit, same bead, same pellet, same mini-tablet, same matrix, same capsule, same sachet, same intestinal-release fraction, separate but co-timed pellets, or separate dosage units administered together. PEA may release at substantially the same intestinal site and time as agmatine, providing mast-cell-stabilising or neuroimmune modulation local to the site of agmatine release.

This local tolerability role is disclosed independently of PEA's systemic therapeutic role. The publication also discloses agmatine and PEA not co-localised, agmatine without PEA, PEA without agmatine, and replacement of PEA by another mast-cell stabiliser or anti-inflammatory ingredient.

10.4 Agmatine sulfate retained as active salt

Agmatine sulfate is expressly retained as a disclosed active salt. In some embodiments, GI tolerability is improved through delivery architecture rather than salt substitution, including enteric protection, hydrophilic gel moderation, divided dosing, lower starting dose, co-localised PEA, mast-cell support ingredients, gut-barrier ingredients, buffered or non-buffered excipients, taste-masking and packaging.

10.5 Agmatine dihydrochloride as optional optimisation

Agmatine dihydrochloride is disclosed as an optional optimisation within the salt-agnostic architecture. Potential advantages may include higher agmatine base mass fraction than sulfate and elimination or reduction of sulfate-associated gas, odour or osmotic contribution. These are optimisation rationales rather than the primary tolerability mechanism, which is the combination of gastric bypass, moderated intestinal release and optional co-localised mast-cell support.

10.6 Buffered and non-buffered agmatine formulations

Disclosed embodiments include agmatine formulations with and without buffered media, alkaline excipients and pH-modifying agents. Buffered embodiments may include sodium bicarbonate, sodium carbonate, potassium bicarbonate, potassium carbonate, magnesium carbonate, calcium carbonate, arginine base, tromethamine, citrate buffer, phosphate buffer or mixtures thereof. Non-buffered embodiments expressly exclude high-pH uptake-enhancing media, arginine base, carbonate, bicarbonate, Crea-Trona and Effer-Soda-type systems.

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11. ALCAR TMA/TMAO Control, Citicoline Stability and Sensory Tolerability

11.1 ALCAR upper-intestinal TMA/TMAO reduction

Gut bacteria may convert carnitine and acetyl-L-carnitine to trimethylamine, which can be oxidised by the liver to trimethylamine N-oxide. Targeted stomach, duodenal or proximal jejunal release or rapid upper-gastrointestinal absorption of ALCAR may reduce the amount of carnitine substrate reaching higher-density lower-intestinal bacterial populations.

Accordingly, this disclosure covers ALCAR, L-carnitine, propionyl-L-carnitine and acylcarnitine formulations designed for rapid stomach, duodenal or proximal jejunal release or absorption, including immediate-release capsules, early-opening enteric multiparticulates, pH 5.5-6.0 coatings, time-dependent coatings, taste-masked granules, sachets, tablets, liquids and co-packaged regimens separating ALCAR from colonic-release components.

This disclosure also covers embodiments in which ALCAR is intentionally delayed, sustained, divided, colonic, buccal, sublingual, intranasal, transdermal or parenteral, and embodiments in which TMA/TMAO control is not used.

11.2 Citicoline stability and moisture management

Citicoline sodium and related choline-cytidine donors may be hygroscopic or moisture-sensitive and may be adversely affected by co-formulation with hygroscopic, acidic, basic, amine-containing or otherwise reactive ingredients. Disclosed stability approaches include moisture-protective excipient barriers, desiccant co-packaging, separate blisters, alu-alu packaging, separate sachets, film coating, lipid coating, polymer coating, cyclodextrin complexation, dry granulation, low-water-activity excipients, moisture-scavenging excipients, separate capsule units, multi-compartment packages and any other water-activity management approach.

Disclosed embodiments include citicoline packaged separately from ALCAR, agmatine, choline salts, hygroscopic amines, probiotics or botanical extracts, as well as co-formulated citicoline with suitable stabilisation.

11.3 ALCAR taste and odour masking

Taste-masked and odour-masked forms of ALCAR and related acylcarnitines are disclosed. Approaches include polymer coating, lipid coating, enteric coating, microencapsulation, granulation, cyclodextrin complexation, ion-exchange resin complexation, flavour systems, acid balancing, sweetener systems, aroma masking, over-encapsulation, dual-sachet separation and swallow-without-chewing multiparticulates.

11.4 Physical separation and multi-unit architectures

Disclosed architectures include all components in one dosage unit; each component in a separate dosage unit; agmatine + PEA in a first dosage unit and ALCAR + citicoline in a second dosage unit; agmatine alone in an enteric unit with PEA, ALCAR and citicoline in one or more immediate-release units; ALCAR separated from PEA; citicoline separated from hygroscopic actives; probiotics separated from moisture or oxygen; and any rearrangement across morning, evening, rescue, gut, ecology, support-stack, maintenance or clinic-only products.

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12. Delivery Formats, Routes, Release Profiles and Technologies

12.1 Routes and dosage formats

Any disclosed ingredient or combination may be delivered using any route or format below.

1. oral capsule
2. enteric capsule
3. enteric-coated tablet
4. multiparticulate capsule
5. sachet containing coated granules
6. gummy containing coated mini-pellets
7. oral powder
8. oral liquid
9. ODT containing coated particles
10. buccal film
11. sublingual spray
12. intranasal spray
13. intranasal powder
14. intranasal gel
15. transdermal patch
16. topical gel
17. rectal suppository
18. vaginal pessary
19. inhaled aerosol
20. intravenous infusion
21. intramuscular injection
22. subcutaneous injection
23. implantable depot
24. microneedle patch
25. iontophoretic patch
26. ophthalmic drop
27. otic preparation

Additional oral formats include hard gelatin capsules, HPMC capsules, pullulan capsules, liquid-filled capsules, softgels, compressed tablets, coated tablets, film-coated tablets, chewable tablets, orally disintegrating tablets, effervescent tablets, dispersible tablets, mini-tablets, micro-tablets, sachets, powders, stick packs, granules, pellets, beads, multiple-unit pellet systems, liquids, solutions, suspensions, emulsions, syrups, oral sprays, gummies, chewables, lozenges, troches, oral films, functional foods and beverages.

Packaging formats include blisters, alu-alu blisters, PVC/PVDC blisters, sachets, stick packs, bottles, pouches, flow wraps, daily-dose packaging, calendar packaging, wallet packaging, multi-compartment containers, child-resistant packaging, senior-friendly packaging, desiccant closures and compliance packaging.

12.1A Explicit single-unit ingredient-form and delivery-format matrix

For avoidance of doubt, each single-unit or single-product-unit system disclosed herein includes one capsule, one tablet, one caplet, one gummy, one chewable, one ODT, one sachet, one stick pack, one liquid unit, one spray unit, one film, one patch, one suppository, one pessary, one injection, one infusion container, one implantable depot, one inhaled product, one ophthalmic product or one otic product containing two, three, four or more disclosed functional components in one administrable product unit, including through internal particles, pellets, layers, coatings, reservoirs, compartments, matrices, films, suspensions, emulsions or encapsulated subunits.

The agmatine-pathway member in such a single-unit system is explicitly disclosed as each of: agmatine free base; agmatine hydrochloride; agmatine dihydrochloride; agmatine sulfate; agmatine sulfate hydrate; agmatine phosphate; agmatine citrate; agmatine fumarate; agmatine malate; agmatine tartrate; agmatine succinate; agmatine aspartate; agmatine gluconate; agmatine lactate; agmatine acetate; agmatine orotate; agmatine bisulfate; agmatine carbonate; agmatine bicarbonate; any physiologically acceptable agmatine salt; agmatine hydrate; agmatine solvate; agmatine polymorph; agmatine co-crystal; agmatine cyclodextrin complex; agmatine polymer complex; agmatine protein complex; agmatine ion-pair; agmatine protected salt; agmatine metabolite; agmatine prodrug; agmatine analogue; taste-masked agmatine; coated agmatine; nanoformulated agmatine; liposomal agmatine; and combinations thereof.

The PEA-class member in such a single-unit system is explicitly disclosed as each of: palmitoylethanolamide; N-palmitoylethanolamide; non-micronised PEA; micronised PEA; ultra-micronised PEA; PEA polymorph; PEA co-crystal; PEA complex; cyclodextrin-complexed PEA; PEA prodrug; PEA analogue; oleoylethanolamide; stearoylethanolamide; linoleoylethanolamide; another N-acylethanolamide; self-emulsifying PEA dispersion; self-nanoemulsifying PEA system; liposomal PEA; lipid-nanoparticle PEA; solid-lipid PEA; granulated PEA; coated PEA; taste-masked PEA; and combinations thereof.

The acylcarnitine member in such a single-unit system is explicitly disclosed as each of: acetyl-L-carnitine; acetyl-L-carnitine hydrochloride; acetyl-L-carnitine free base; L-carnitine; L-carnitine L-tartrate; propionyl-L-carnitine; palmitoyl-L-carnitine; another acyl-L-carnitine; acylcarnitine salt; acylcarnitine hydrate; acylcarnitine solvate; acylcarnitine ester; acylcarnitine prodrug; acylcarnitine analogue; taste-masked acylcarnitine; coated acylcarnitine; microencapsulated acylcarnitine; and combinations thereof.

The citicoline or choline-cytidine donor member in such a single-unit system is explicitly disclosed as each of: citicoline; citicoline sodium; citicoline free acid; CDP-choline; cytidine diphosphate choline; citicoline salt; citicoline hydrate; citicoline solvate; citicoline complex; citicoline co-crystal; citicoline prodrug; citicoline analogue; alpha-GPC; choline bitartrate; choline chloride; phosphatidylcholine; phosphatidylserine; cytidine; uridine; phosphocholine donor; phospholipid

donor; coated choline-cytidine donor; moisture-protected choline-cytidine donor; and combinations thereof.

Each listed agmatine-pathway member, each listed PEA-class member, each listed acylcarnitine member and each listed citicoline or choline-cytidine donor member is disclosed in every technically feasible two-component, three-component, four-component or support-stack single-unit combination with each of the following delivery formats:

1. hard gelatin capsule containing powders, granules, pellets, beads, mini-tablets, capsule-in-capsule subunits or coated particles;
2. HPMC capsule containing powders, granules, pellets, beads, mini-tablets, capsule-in-capsule subunits or coated particles;
3. pullulan capsule containing powders, granules, pellets, beads, mini-tablets, capsule-in-capsule subunits or coated particles;
4. liquid-filled capsule or softgel containing dissolved, suspended, lipid-dispersed, self-emulsifying, liposomal or nanoparticle forms;
5. compressed tablet, coated tablet, film-coated tablet, caplet, bilayer tablet, trilayer tablet, multilayer tablet or compression-coated tablet;
6. MUPS tablet containing coated pellets, beads, mini-tablets, granules or multiparticulates;
7. mini-tablet, micro-tablet or tablet-in-capsule system;
8. sachet, stick pack, sprinkle pack or powder sachet containing coated particles, taste-masked particles, enteric particles, immediate-release particles or mixed-release particles;
9. gummy, chewable, chewable tablet, lozenge, troche, functional food bite or soft chew containing coated particles, mini-pellets, microgranules, lipid particles or taste-masked particles;
10. orally disintegrating tablet, dispersible tablet, effervescent tablet, oral film or oral strip containing coated particles, microgranules, films, complexes or taste-masked forms;
11. oral liquid, solution, suspension, emulsion, syrup, drink shot, beverage, oral spray or unit-dose liquid containing dissolved, suspended, coated, liposomal, self-emulsifying or nanoparticle forms;
12. buccal film, buccal tablet, buccal lozenge, buccal spray, sublingual tablet, sublingual film, sublingual drop or sublingual spray;
13. intranasal spray, intranasal powder, nasal drop, nasal gel, nasal film or insufflation system;
14. rectal suppository, rectal capsule, rectal foam, rectal gel, rectal enema or other rectal mucosal dosage form;
15. vaginal pessary, vaginal capsule, vaginal tablet, vaginal film, vaginal gel or other vaginal mucosal dosage form;
16. transdermal patch, topical gel, topical cream, topical ointment, iontophoretic patch, microneedle patch or microneedle array;
17. inhaled aerosol, dry powder inhaler, nebulised solution or pulmonary delivery system;
18. subcutaneous injection, intramuscular injection, intravenous injection, intravenous infusion, sterile solution, sterile suspension or clinically supervised parenteral product;
19. implantable depot, biodegradable depot, osmotic implant or long-acting release implant;
20. ophthalmic drop, ophthalmic gel, ophthalmic insert, otic drop, otic gel or otic preparation.

For each format above, the release behaviour may be immediate, enteric, delayed, sustained, extended, controlled, pulsatile, biphasic, triphasic, chronotherapeutic, upper-intestinal targeted,

gastroretentive, colonic, mucoadhesive, osmotic-pump, matrix-controlled, reservoir-controlled, particle-controlled, layer-controlled, coating-controlled, compartment-controlled or a combination thereof. In single-unit four-component embodiments, the agmatine/PEA-class fraction may be enteric, delayed, matrix-moderated, sustained or mucosal, while the acylcarnitine/choline-cytidine donor fraction may be immediate, taste-masked, moisture-protected, gastric-release, duodenal-release or proximal-jejunal-release within the same administrable product unit.

12.2 Release profiles

1. immediate release
2. enteric/delayed release
3. sustained release
4. extended release
5. controlled release
6. pulsatile release
7. biphasic release
8. triphasic release
9. chronotherapeutic release
10. upper-intestinal targeted release
11. gastroretentive release
12. colonic release
13. mucoadhesive release
14. osmotic-pump release
15. matrix-controlled release
16. reservoir-controlled release

12.3 Formulation technologies

1. HPMC matrix
2. methylcellulose matrix
3. hydroxyethyl cellulose matrix
4. HPC matrix
5. sodium carboxymethyl cellulose matrix
6. polyethylene oxide matrix
7. sodium alginate matrix
8. xanthan gum matrix
9. guar gum matrix
10. gellan gum matrix
11. konjac glucomannan matrix
12. carbomer matrix
13. polycarbophil matrix
14. pectin matrix

15. pullulan matrix
16. enteric HPMCAS coating
17. HPMCP coating
18. Eudragit L100-55 coating
19. Eudragit L100 coating
20. Eudragit S100 coating
21. Eudragit FS30D coating
22. cellulose acetate phthalate coating
23. polyvinyl acetate phthalate coating
24. shellac coating
25. zein coating
26. liposomal delivery
27. solid lipid nanoparticles
28. nanostructured lipid carriers
29. polymeric nanoparticles
30. cyclodextrin complexation
31. self-emulsifying delivery
32. self-nanoemulsifying delivery
33. phytosome delivery
34. spray-dried dispersion
35. hot-melt extrusion
36. electrospun nanofibres
37. 3D-printed dosage form
38. microencapsulation
39. fluid-bed coating
40. coacervation
41. spray chilling
42. ion-exchange resin taste masking
43. mucoadhesive polymer system
44. microneedle array
45. ultrasound-mediated delivery
46. magnetic nanoparticle-guided delivery
47. sprinkle granule technology
48. MUPS technology
49. taste-masked or odour-masked granulation

Enteric pH thresholds include pH 4.5, 5.0, 5.5, 6.0, 6.5, 6.8, 7.0, 7.2, 7.5 and every intermediate value. Enteric materials include HPMCAS, HPMCP, cellulose acetate phthalate, polyvinyl acetate phthalate, Eudragit L100-55, Eudragit L100, Eudragit S100, Eudragit FS30D, shellac, zein and mixtures thereof. Matrix materials include HPMC in all grades including K100M, K15M, K4M, E-series

and equivalents; methylcellulose; hydroxyethyl cellulose; HPC; sodium carboxymethyl cellulose; PEO; carbomer; polycarbophil; sodium alginate; pectin; xanthan gum; guar gum; konjac glucomannan; pullulan; gellan gum; and combinations thereof.

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13. Dose Ranges

Dose ranges are disclosed as daily doses, per-administration doses, loading doses, maintenance doses, paediatric weight-adjusted doses, geriatric doses, acute/rescue doses, titrated doses and sustained-release dose equivalents. Doses are not medical recommendations.

13.1 Agmatine

Agmatine in any salt or free-base form is disclosed at 1 mg to 20,000 mg per day, including 10-10,000 mg/day, 25-5,000 mg/day, 50-5,000 mg/day, 100-3,000 mg/day, 250-2,000 mg/day, 500-1,500 mg/day, about 750 mg/day as salt, about 750 mg/day as agmatine dihydrochloride, and about 750-1,000 mg/day as agmatine sulfate. Paediatric ranges include 0.1-50 mg/kg/day, including 1-30 mg/kg/day, where clinically appropriate. Acute/rescue single doses include 1-5,000 mg, including 250-2,500 mg.

13.2 PEA

PEA in any form is disclosed at 1-5,000 mg per day, including 25-3,000 mg/day, 50-3,600 mg/day, 100-2,400 mg/day, 300-1,200 mg/day and about 600 mg/day. Paediatric ranges include 1-50 mg/kg/day, including 5-30 mg/kg/day, where clinically appropriate.

13.3 ALCAR and related acylcarnitines

ALCAR in any form is disclosed at 1-8,000 mg per day, including 50-4,000 mg/day, 100-3,000 mg/day, 250-2,000 mg/day, 250-1,000 mg/day and about 500 mg/day. Paediatric ranges include 1-100 mg/kg/day, including 5-50 mg/kg/day, where clinically appropriate.

13.4 Citicoline and related choline/cytidine donors

Citicoline in any form is disclosed at 1-5,000 mg per day, including 25-4,000 mg/day, 50-2,000 mg/day, 100-1,000 mg/day, 100-500 mg/day and about 250 mg/day. Paediatric ranges include 0.1-50 mg/kg/day, including 2-25 mg/kg/day, where clinically appropriate.

13.5 Support-stack ingredients

Each ingredient in the Master Ingredient List is disclosed at any known nutraceutical, pharmaceutical, dietary, research, veterinary, paediatric, geriatric, loading, maintenance, rescue, topical, intranasal, injectable or route-appropriate dose. Specific non-limiting ranges include: magnesium L-threonate 100-5,000 mg/day; taurine 50-6,000 mg/day; ashwagandha extract 25-2,000 mg/day; holy basil extract 25-3,000 mg/day; zinc L-carnosine 5-300 mg/day; vitamin D3 100-10,000 IU/day with higher supervised doses; L-carnosine 25-3,000 mg/day; glucoraphanin-containing extract 10-2,000 mg/day; myrosinase-containing material 1-1,000 mg/day; sulforaphane equivalents 1-200 mg/day; probiotics 1 million-100 billion CFU/day; CoQ10 5-1,200 mg/day; alpha-lipoic acid 10-1,200 mg/day; NAC 50-4,000 mg/day; creatine 100-20,000 mg/day; glycine 100-10,000 mg/day; L-theanine 10-1,000 mg/day; omega-3 EPA/DHA 50-5,000 mg/day.

13.6 Ratios

Agmatine:PEA ratios include 100:1 to 1:100 by mass, including 10:1 to 1:10, 5:1 to 1:5, 2:1 to 1:2 and approximately 750:600. Agmatine:ALCAR, agmatine:citicoline, PEA:ALCAR, PEA:citicoline and ALCAR:citicoline ratios include analogous ranges. In the four-component system, each component may represent 1-90% of the active mass, including 5-60%, 10-50% and 15-40%.

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14. Concrete Formulation Examples

The following examples are non-limiting and are provided to make the disclosure concrete.

Example A1. Enteric agmatine sulfate/HPMC capsule

An HPMC hard capsule or other enteric dosage unit contains agmatine sulfate 250-2000 mg, preferably about 750 mg, HPMC 25-400 mg, optionally PEA 50-1200 mg, magnesium stearate, sodium stearyl fumarate or silica as processing aids, coated or enclosed in an enteric capsule to provide no more than 5% agmatine release after 2 hours at pH 1.2 and moderated release at pH 5.5-6.8.

Example A2. Enteric agmatine dihydrochloride/HPMC capsule

The same architecture as A1, with agmatine dihydrochloride replacing agmatine sulfate at a dose adjusted for agmatine base equivalence or at a practical labelled mass such as 750 mg/day. The dihydrochloride is disclosed as an optimisation, not a requirement.

Example A3. Preferred Capsule A

Capsule A is an enterically protected capsule comprising a dry powder fill. Each Capsule A contains about 375 mg agmatine dihydrochloride, about 300 mg palmitoylethanolamide, about 60-100 mg HPMC K100M or HPMC K15M, microcrystalline cellulose or silicified microcrystalline cellulose quantity sufficient, about 4-8 mg colloidal silicon dioxide, sodium stearyl fumarate at about 0.5-1.0% by weight and optionally 0-80 mg dibasic calcium phosphate.

Two Capsule A units provide about 750 mg agmatine dihydrochloride and about 600 mg palmitoylethanolamide per daily dose.

Example A4. Capsule A with agmatine sulfate

Capsule A is prepared using agmatine sulfate in place of agmatine dihydrochloride, optionally at about 375 mg per capsule, about 500 mg per capsule or a mass adjusted for agmatine base equivalence. The same HPMC, enteric, PEA and excipient architecture is used.

Example A5. Capsule A with alternative hydrophilic polymer

Capsule A is prepared using methylcellulose, hydroxyethyl cellulose, hydroxypropyl cellulose, sodium carboxymethyl cellulose, polyethylene oxide, sodium alginate, xanthan gum, gellan gum, guar gum, konjac glucomannan, pectin, carbomer, polycarbophil, pullulan or mixtures instead of or in combination with HPMC.

Example A6. Multiparticulate enteric agmatine/PEA beads

Agmatine-containing pellets or beads are coated with an enteric polymer and filled into a capsule, sachet, gummy, tablet or food-compatible format, optionally with PEA in the same beads, separate

beads, or an immediate-release fraction. HPMC or another hydrophilic polymer may be present in each bead, a coating, an overcoat or the surrounding fill.

Example A7. Co-localised agmatine/PEA enteric mini-tablets

Agmatine and PEA are present in the same enteric-coated mini-tablet so that PEA releases at substantially the same intestinal site and time as agmatine. Multiple mini-tablets are filled into a capsule or sachet as a multiple-unit pellet system.

Example A8. Separated agmatine and PEA multiparticulates

Agmatine is present in enteric HPMC-matrix pellets and PEA is present in separate delayed-release, immediate-release, liposomal, micronised or self-emulsifying particles in the same or separate dosage unit.

Example A9. Buffered enteric agmatine matrix

Any agmatine enteric/HPMC formulation further comprises a pH modifier or buffering agent such as sodium bicarbonate, sodium carbonate, potassium bicarbonate, arginine base, tromethamine, magnesium carbonate or mixtures thereof.

Example A10. Non-buffered enteric agmatine matrix

Any agmatine enteric/HPMC formulation expressly excludes alkaline buffering media, arginine base, carbonate, bicarbonate, Crea-Trona, Effer-Soda or high-pH uptake-enhancement media.

Example B1. Preferred Capsule B

Capsule B is an immediate-release capsule comprising a dry powder fill containing about 500 mg acetyl-L-carnitine hydrochloride, about 250 mg citicoline sodium, microcrystalline cellulose or silicified microcrystalline cellulose quantity sufficient, about 3-8 mg colloidal silicon dioxide, and sodium stearyl fumarate or magnesium stearate at not more than about 1% by weight. Capsule B is not enterically protected and does not contain agmatine or PEA in a preferred embodiment.

Example B2. Single-unit four-component capsule or tablet

A single oral dosage unit contains the four-component system in independently formulated fractions. The unit may be a capsule, tablet, caplet, bilayer tablet, multilayer tablet, compression-coated tablet, MUPS tablet, capsule-in-capsule or multiparticulate capsule. In one embodiment, enteric-coated agmatine/PEA hydrophilic-matrix pellets, beads, granules or mini-tablets are combined within the same dosage unit with immediate-release, taste-masked or moisture-protected ALCAR/citicoline pellets, granules, mini-tablets or powder. The dosage unit may provide, per unit or per daily serving, about 250-1000 mg agmatine sulfate, agmatine dihydrochloride or another agmatine salt, about 100-1200 mg PEA, about 250-1000 mg acetyl-L-carnitine hydrochloride and about 100-500 mg citicoline sodium. Each of those ingredients may be replaced or supplemented by any disclosed salt, hydrate, solvate, polymorph, stereoisomer, ester, amide, analogue, derivative, metabolite, prodrug, co-crystal, complex, ion-pair, protected form, coated form, taste-masked form, nanoform, liposomal form, functional equivalent or class substitute. The agmatine/PEA fraction is configured for gastric resistance and moderated intestinal release, while the ALCAR/citicoline fraction is configured for immediate gastric release or early duodenal/proximal jejunal release. Moisture protection may be provided by coated particles, lipid barriers, low-water-activity excipients, desiccant packaging or high-barrier blister packaging.

Example B3. Preferred daily capsule regimen

A daily oral regimen comprises two Capsule A units and one Capsule B unit, administered in the morning with food. The daily regimen provides about 750 mg agmatine dihydrochloride, about 600 mg PEA, about 500 mg ALCAR hydrochloride and about 250 mg citicoline sodium.

Example B4. Daily blister system

A daily blister comprises two first enterically protected capsules containing agmatine, PEA, HPMC and excipients, and one physically separate second immediate-release capsule containing ALCAR, citicoline and excipients. The first and second capsules are packaged in separate blister cavities. The blister may be alu-alu, high-barrier, calendar-labelled, QR-coded and configured for adherence tracking.

Example B5. Pill-free sachet system

A pill-free daily sachet system comprises Sachet A and Sachet B. Sachet A contains enterically protected granules comprising agmatine, PEA, a hydrophilic polymer and excipients. Sachet B contains immediate-release or taste-masked granules comprising ALCAR, citicoline and excipients. Sachet A and Sachet B are physically separate but packaged together as a daily dose. Sachet A is sprinkled onto soft food and swallowed without chewing.

Example B6. ODT or liquid suspension system

An orally disintegrating tablet or liquid oral suspension contains enterically coated agmatine/PEA microgranules that are swallowed after disintegration or suspension. A separate immediate-release ALCAR/citicoline tablet, film, powder or sachet is administered with the same meal.

Example C1. Intranasal agmatine rescue

Agmatine or an agmatine salt is provided as a buffered or non-buffered intranasal spray, powder, drop or gel for acute, rescue, loading or maintenance use in state-regulation applications, alone or with oral maintenance products. Non-limiting excipients include water, saline, phosphate buffer, citrate buffer, viscosity modifiers, mucoadhesive polymers, preservatives, tonicity agents, absorption modulators and pH adjusters.

Example C2. IV loading plus intranasal maintenance

A clinically supervised intravenous agmatine loading protocol is followed by intranasal or oral agmatine maintenance, optionally with PEA, ALCAR, citicoline or any support-stack ingredient.

Example C3. Oral maintenance plus intranasal rescue

A daily oral agmatine-containing maintenance system is paired with an intranasal agmatine, PEA, CBD, LDN, BH4 or other disclosed rescue dosage form, where lawful and appropriate.

Example C4. Support-stack product

A separate support-stack product contains any two or more of magnesium L-threonate, taurine, ashwagandha, holy basil, zinc L-carnosine, vitamin D3, L-carnosine, glucoraphanin, myrosinase, sulforaphane, CoQ10, alpha-lipoic acid, NAC, glycine, omega-3 fatty acids, quercetin and luteolin.

Example C5. Ecology product

A separate microbiome or ecology product contains one or more of L. reuteri ATCC PTA 6475, L. reuteri DSM 17938, B. longum BB536, Bacillus coagulans MTCC 5856, S. boulardii, B. subtilis, prebiotics, butyrate, tributyrin, colostrum or lactoferrin.

Example C6. Companion diagnostic kit

A kit includes one or more compositions and instructions or testing materials for measuring state-regulation symptoms, HRV, sleep, microbiome markers, nutrient status, agmatine-related metabolites, TMAO, histamine, tryptase, inflammatory markers or other biomarkers.

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15. Administration Protocols and Service Models

Disclosed protocols include morning-only administration with food; morning-only administration without food; evening-only administration; twice-daily administration; three-times-daily administration; split dosing; as-needed or PRN dosing; starter-dose ramp protocols over 1-8 weeks; no-ramp protocols; dose-reduction protocols; taper protocols; cycling protocols; loading-dose protocols; maintenance-dose protocols; acute rescue protocols; paediatric weight-adjusted dosing; geriatric dosing; renal-impairment-adjusted dosing; hepatic-impairment-adjusted dosing; supervised clinical administration; telemedicine-guided self-administration; app-guided adherence; caregiver-supported dosing; school/workplace-compatible dosing; and sensory-sensitive administration.

15.1 Morning-only rationale

Morning-only administration is disclosed because it may align agmatine/PEA state-regulation effects, ALCAR metabolic substrate and citicoline cholinergic/membrane support with the day's demands. Morning dosing may also reduce sleep-interference risk from citicoline and simplify adherence for subjects with executive dysfunction. Evening and split dosing remain disclosed.

15.2 Clinical service models

Disclosed clinical service models include IV agmatine loading followed by intranasal maintenance; intranasal loading as a needle-free alternative; oral maintenance plus intranasal rescue; clinic-supervised loading followed by home maintenance; telemedicine-guided titration; compounding pharmacy preparation; nurse-supervised home administration; outpatient infusion-centre administration; and hybrid clinic-home programmes.

15.3 Four-tier programme

A four-tier programme is disclosed. Tier 1 comprises IV, intranasal, buccal, sublingual or oral loading to establish rapid agmatine-pathway exposure or rapid state-regulation support. Tier 2 comprises daily maintenance using agmatine, PEA, ALCAR, citicoline or any disclosed ingredient. Tier 3 comprises an oral support system including the four-component system, support-stack ingredients, probiotic ecology products, mitochondrial agents, gut-barrier agents, anti-inflammatory agents, amino acids, vitamins, minerals or botanicals. Tier 4 comprises behavioural guidance, pacing support, environmental adjustment, sensory-load management, sleep regularisation, demand cycling, meal timing, exercise pacing, digital tracking, outcome measurement, coaching, clinician review, telemedicine check-ins or app-guided adherence.

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16. Outcome Measures and Companion Diagnostics

Therapeutic or supportive response to any disclosed composition may be assessed using subjective, caregiver-reported, clinician-rated, behavioural, physiological, wearable, biomarker, microbiome, metabolomic or digital measures. The invention is not limited to any instrument.

16.1 Executive initiation and transition

Measures include task-initiation latency, number of external prompts required to initiate action, number of internal attempts required, transition latency between tasks or states, reliability of action initiation across contexts, subjective effort required to initiate, subject-reported inertia, caregiver-reported initiation and clinician-rated executive function. Instruments include BRIEF-A, CANTAB, WCST, set-shifting tasks, structured initiation logs and ecological momentary assessment.

16.2 Sensory regulation

Measures include sensory overload frequency, sensory overload severity, overload duration, sensory tolerance threshold, exposure duration before overload, recovery latency after sensory overload and range of sensory modalities tolerated. Instruments include AASP, GSQ, SPM-2 and structured event logs.

16.3 Shutdown and meltdown

Measures include shutdown frequency, shutdown duration, shutdown severity, recovery latency following shutdown, range of functional domains impaired during and after shutdown, meltdown frequency, meltdown duration, meltdown severity, peak intensity, behavioural dysregulation and recovery trajectory. Instruments include MSSAA, structured event logs, caregiver diaries and clinician-observation protocols.

16.4 Autonomic regulation

Measures include resting HRV, SDNN, RMSSD, HF-HRV, LF/HF ratio, heart-rate recovery, wearable continuous HRV monitoring, resting heart rate, post-demand physiological settling, sleep restoration, PSQI and physiological challenge tests. Improvement may be measured relative to a low-demand baseline, within-subject longitudinal baseline or sleep-state proxy baseline.

16.5 Recovery and burnout

Measures include time to recover after sensory, cognitive, social, emotional, physical or autonomic demand; completeness of recovery; depth of post-overload impairment; burnout severity; rate of adaptive-capacity erosion; rest efficacy; demand-tolerance trajectory; AASPIRE Autistic Burnout Measure; Maslach Burnout Inventory; Copenhagen Burnout Inventory; Perceived Stress Scale; WHODAS and CGI-I/CGI-S.

16.6 Social functioning

Measures include social initiation frequency, latency to initiate social contact, spontaneous social bids, response latency to social bids, social approach behaviour, social reciprocity, conversational participation, duration of sustained social engagement before fatigue, social-fatigue severity, social-fatigue recovery time, communication capacity during or after overload, SRS-2, SFQ, caregiver reports and clinician-rated social functioning.

16.7 Cognitive rigidity and perseveration

Measures include cognitive flexibility, perseverative thought or behaviour frequency, rumination-like rigidity, set-shifting latency, subjective effort required to disengage from a current pattern, Y-BOCS, WCST, CANTAB intra-extra dimensional set-shift and clinician-rated rigidity scales.

16.8 Mood, anxiety and trauma-related presentations

Measures include PHQ-9, MADRS, HAM-D, GAD-7, HAM-A, PCL-5, CAPS-5, DASS-21, threat-state activation ratings, hyperarousal measures, avoidance frequency, intrusive symptoms and emotional recovery.

16.9 Gastrointestinal tolerability

Measures include nausea, cramping, bloating, diarrhoea, abdominal discomfort, gas, burping, upper-abdominal pressure, symptom onset time relative to dose, symptom duration, stool frequency, stool consistency, GSRS and structured tolerability logs.

16.10 Improvement thresholds

In some embodiments, treatment reduces task-initiation latency by at least about 10%, 20%, 30% or 50% relative to baseline; reduces time to recover after overload by at least about 10%, 20%, 30% or 50%; reduces shutdown frequency, shutdown duration, meltdown frequency, meltdown duration, sensory overload severity or subjective inertia over at least one week, two weeks, four weeks or eight weeks; improves HRV markers; or improves caregiver, clinician or subject-reported state-regulation outcomes.

16.11 Companion diagnostic and personalisation measures

Personalised dosing, product selection, route selection, loading decisions or dose titration may be guided by plasma agmatine, arginine, ornithine, citrulline, nitric oxide metabolites, PEA, acylcarnitines, carnitine, TMAO, citicoline-related metabolites, choline, betaine, homocysteine, methylmalonic acid, folate, B12, B6, vitamin D, zinc, copper, ferritin, selenium, magnesium, omega-3 index, CoQ10, lactate, pyruvate, glutathione, cysteine, taurine, carnosine, methylglyoxal, zonulin, calprotectin, lipopolysaccharide-binding protein, p-cresol, short-chain fatty acids, Clostridial markers, microbiome sequencing, BH4, neopterin, biopterin, cytokines, histamine, tryptase, prostaglandins, leukotrienes, lipoxins, cortisol, HRV, sleep metrics, activity metrics, symptom phenotype clusters and treatment-response data.

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17. Observational Development Examples

The following observations were made during development and are presented as non-limiting examples of contemplated response patterns, tolerability issues and outcome measures. They are not presented as formal clinical trial data.

17.1 Subject A - agmatine-pathway component alone

Subject A was an adult male diagnosed with autism spectrum condition and ADHD. Subject A received about 1000 mg/day immediate-release agmatine sulfate orally with food. Within the first three weeks, observations included improved autonomic regulation, sensory gating, social reward/motivation, gastrointestinal function and stress recovery capacity. Autonomic and sensory changes were observed within hours to days; social motivation and GI changes emerged within the first week; stress recovery was established within three weeks, including reduced recovery time after

overload. A tonic baseline shift was observed by the end of the second week. Autistic cognitive architecture, stimming behaviour, personality and identity remained unchanged. Autistic inertia did not meaningfully respond within the observation period, supporting the hypothesis that metabolic/executive substrate support may be required for phases 3 and 4.

Beginning approximately three weeks into daily immediate-release agmatine sulfate, Subject A developed gas, bloating and abdominal pressure, emerging approximately one to two hours after dosing and escalating from lower-GI gas to upper-abdominal discomfort. This observation supports the disclosed salt-form, enteric and HPMC-moderated tolerability architecture.

17.2 Subject B - blinded adolescent observation

Subject B was an adolescent male diagnosed with autism spectrum condition, presenting with chronic shutdown, social withdrawal and executive initiation failure. Subject B received about 890 mg/day agmatine sulfate and was aware only that a new supplement had been started. Over 24 days, parent-reported outcomes included improved social motivation and approach behaviour, increased eye contact, self-initiated return to academic study, improved stress recovery and voluntary attendance at a formal examination in an unfamiliar location under anxiety.

17.3 Subject C - four-component regimen with GI intolerance

Subject C was an adult male diagnosed with autism spectrum condition and ADHD, presenting with severe shutdown episodes, social withdrawal and gastrointestinal sensitivity. Subject C received a four-component regimen comprising agmatine sulfate, PEA, ALCAR and citicoline. State-regulation observations included novel capacity to engage in functional activity during shutdown episodes and recovery to functional capacity within approximately two hours after a higher agmatine rescue dose, compared with a baseline recovery period of days. Executive initiation also improved, including travel-preparation tasks without historically characteristic procrastination and initiation failure. GI symptoms included bloating, cramping and diarrhoea at about 1000 mg/day agmatine sulfate, worsened during travel and resolved on discontinuation. A related subject reported similar symptoms, suggesting individual or familial susceptibility.

17.4 Subject D - independent observer

Subject D was a young adult male diagnosed with autism spectrum condition, presenting with social withdrawal and limited functional capacity outside the home. Subject D received agmatine sulfate for approximately three weeks and self-reported persistent autonomic calm, improved gastrointestinal function, increased social motivation and attendance at in-person social events outside the home. These reports were volunteered before hypothesis disclosure.

17.5 Subject E - addition of acylcarnitine and citicoline components

Subject E was a middle-aged female presenting with significant ADHD traits. Subject E took a three-component regimen comprising agmatine sulfate, ALCAR and citicoline, without a PEA-class component. Subject E self-reported an executive-drive and attentional-focus signature distinct from agmatine-only observations, supporting the phase-based model in which ALCAR and citicoline contribute effects complementary to agmatine.

17.6 Cross-subject comparison

Agmatine-pathway-only observations converged on calm, sensory gating, social motivation and recovery, while the full four-component or agmatine+ALCAR+citicoline observations included executive initiation and drive effects. This cross-subject pattern supports disclosure of both

agmatine-only and multi-component systems, and also supports disclosure of the four-component regimen as addressing a broader failure cycle.

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18. Product Architecture Territory

18.1 Multi-product systems

Disclosed is a multi-product system in which Product 1 comprises agmatine delivery, Product 2 comprises a support stack and Product 3 comprises a probiotic or ecology product. Product 1 may include oral agmatine, enteric agmatine, intranasal agmatine, IV agmatine, sublingual agmatine, transdermal agmatine or any agmatine-pathway component. Product 2 may include magnesium L-threonate, taurine, ashwagandha, holy basil, zinc carnosine, vitamin D3, carnosine, mitochondrial agents, amino acids, vitamins, minerals, anti-inflammatory agents or any support-stack ingredient. Product 3 may include L. reuteri, B. longum BB536, Bacillus coagulans, S. boulardii, Bacillus subtilis, prebiotics, postbiotics, butyrate, microbiome modulators or any ecology ingredient.

18.2 Layered state-regulation programme

Disclosed is a supplement or clinical programme in which individual products address different layers of a state-regulation failure cycle: overload termination or NMDA gain control; inflammatory, mast-cell or purinergic state activation; mitochondrial energy recovery; membrane restoration, choline-cytidine support or phospholipid rebuilding; gut barrier integrity; microbiome ecology and microbial metabolites; cortisol, GABA-A tone, vagal tone or stress recovery; catecholamine, serotonin, BH4 or methylation substrate availability.

18.3 Subscription, refill and pack models

Disclosed are subscription, refill, membership, auto-ship, monthly box, quarterly box, clinic pack, starter pack, titration pack, maintenance pack, travel pack, acute pack and personalised replenishment models for any disclosed product system. Packs may include instructions, QR codes, app onboarding, outcome measures, biomarker test kits, wearables, dosing calendars, adherence tools, adverse-event reporting and clinician or coach review.

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19. Specific Defensive Embodiments

The following embodiments are individually disclosed. They are non-limiting and do not narrow the broader disclosure above.

1. A composition comprising agmatine or a physiologically acceptable agmatine salt in an enterically protected dosage unit that reduces pre-absorptive direct gastric mucosal exposure of agmatine.
2. The composition of embodiment 1 wherein the agmatine form is agmatine sulfate.
3. The composition of embodiment 1 wherein the agmatine form is agmatine dihydrochloride.
4. The composition of embodiment 1 wherein the agmatine form is agmatine hydrochloride, phosphate, citrate, orotate, fumarate, malate, tartrate, succinate, gluconate, lactate, acetate, bisulfate, carbonate, bicarbonate, co-crystal, cyclodextrin complex, polymer complex, prodrug, analogue, hydrate, solvate or free base.
5. A dosage unit comprising agmatine and a hydrophilic matrix-forming polymer that moderates intestinal burst release after enteric opening.

6. The dosage unit of embodiment 5 wherein the hydrophilic polymer is HPMC of any viscosity grade, including K100M, K15M, K4M, E-series grades and equivalents.
7. The dosage unit of embodiment 5 wherein the hydrophilic polymer is selected from methylcellulose, hydroxyethyl cellulose, hydroxypropyl cellulose, sodium carboxymethyl cellulose, polyethylene oxide, sodium alginate, xanthan gum, guar gum, gellan gum, konjac glucomannan, pectin, carbomer, polycarbophil, pullulan and mixtures thereof.
8. A dosage unit according to any of embodiments 1-7 wherein not more than about 5% of agmatine is released after two hours at pH 1.2.
9. A dosage unit according to any of embodiments 1-8 wherein not more than about 30% of agmatine is released within about 15 minutes after transfer to pH 5.5-6.8 medium.
10. A dosage unit according to any of embodiments 1-9 wherein at least about 80% of agmatine is released within about 120 minutes after transfer to pH 5.5-6.8 medium.
11. A composition comprising agmatine and PEA co-localised in the same intestinal release zone for local mast-cell modulation at the site of agmatine release.
12. The composition of embodiment 11 wherein PEA is non-micronised, micronised, ultra-micronised, liposomal, self-emulsifying, cyclodextrin-complexed, nanoparticle-associated, solid-lipid-associated or a PEA polymorph/co-crystal/complex.
13. A composition comprising agmatine and PEA in the same enteric/HPMC dosage unit.
14. A composition comprising agmatine in an enteric/HPMC dosage unit and PEA in a physically separate dosage unit.
15. A composition comprising agmatine in an enteric/HPMC dosage unit and expressly excluding PEA.
16. A composition comprising agmatine in an enteric/HPMC dosage unit and expressly excluding ALCAR.
17. A composition comprising agmatine in an enteric/HPMC dosage unit and expressly excluding citicoline.
18. A composition comprising agmatine sulfate and PEA but not ALCAR.
19. A composition comprising agmatine sulfate, PEA, ALCAR and citicoline.
20. A composition comprising agmatine dihydrochloride, PEA, ALCAR and citicoline.
21. A kit comprising an agmatine/PEA enteric unit and an ALCAR/citicoline immediate-release unit.
22. A kit comprising agmatine, PEA, ALCAR and citicoline as four separate dosage units.
23. A single dosage unit comprising agmatine, PEA, ALCAR and citicoline with independent release fractions for two or more components.
24. A system in which ALCAR is immediate-release and agmatine is enteric or delayed-release.
25. A system in which ALCAR is formulated for gastric, duodenal or proximal jejunal release to reduce lower-intestinal TMA formation.
26. A system in which citicoline is separately packaged from agmatine, PEA, ALCAR, choline salts, hygroscopic amines or moisture-sensitive ingredients.
27. A taste-masked or odour-masked ALCAR composition for sensory-sensitive users.
28. An intranasal agmatine composition for acute, rescue, loading, maintenance or state-regulation support.
29. A clinically supervised IV agmatine loading protocol followed by oral, buccal, sublingual, transdermal or intranasal maintenance.

30. An oral maintenance system paired with an intranasal rescue system.
31. A four-tier programme comprising loading, maintenance, oral support stack and behavioural/digital support.
32. A morning-only daily regimen comprising an enteric agmatine/PEA unit and an immediate-release ALCAR/citicoline unit.
33. A daily regimen without a starter ramp.
34. A daily regimen with a 1-8 week starter ramp.
35. A daily regimen administered with food.
36. A daily regimen administered without food.
37. A composition or kit comprising agmatine alone for state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated or recovery-associated applications.
38. A composition or kit comprising agmatine + PEA for state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated or recovery-associated applications.
39. A composition or kit comprising agmatine + ALCAR for state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated or recovery-associated applications.
40. A composition or kit comprising agmatine + citicoline for state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated or recovery-associated applications.
41. A composition or kit comprising agmatine + PEA + ALCAR for state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated or recovery-associated applications.
42. A composition or kit comprising agmatine + PEA + citicoline for state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated or recovery-associated applications.
43. A composition or kit comprising agmatine + ALCAR + citicoline for state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated or recovery-associated applications.
44. A composition or kit comprising agmatine + PEA + ALCAR + citicoline for state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated or recovery-associated applications.
45. A composition for use in autistic inertia comprising agmatine and at least one mast-cell, mitochondrial, membrane, microbiome or gut-barrier support ingredient.
46. A composition for use in reducing sensory overload comprising agmatine and PEA, optionally with magnesium L-threonate, taurine, quercetin, luteolin, vitamin D3, CBD or a non-intoxicating cannabinoid.
47. A composition for use in improving recovery after social demand comprising agmatine, PEA and one or more of L. reuteri, B. longum BB536, oxytocin-pathway modulators, BH4 pathway support, magnesium, taurine or citicoline.
48. A composition for use in reducing shutdown vulnerability comprising agmatine, ALCAR, citicoline and one or more mitochondrial support ingredients.

49. A composition for use in fatigue-associated executive dysfunction comprising ALCAR, citicoline, CoQ10, creatine, alpha-lipoic acid, taurine or any combination thereof, with or without agmatine.
50. A composition for use in gut-brain-axis state dysregulation comprising agmatine, PEA, zinc L-carnosine, vitamin D3, glutamine, butyrate, colostrum, lactoferrin, probiotics or combinations thereof.
51. A composition for use in histamine-associated sensory reactivity comprising PEA, quercetin, luteolin, DAO, vitamin D3, zinc L-carnosine or combinations thereof, with or without agmatine.
52. A composition for use in p-cresol-associated or Clostridial-associated dysregulation comprising glucoraphanin, sulforaphane, myrosinase, B. longum, S. boulardii, Bacillus subtilis, butyrate or combinations thereof, with or without agmatine.
53. A formulation in which agmatine sulfate is retained as the active salt and GI tolerability is improved through delivery architecture rather than salt substitution.
54. A formulation in which agmatine dihydrochloride is used as an optimisation for higher agmatine mass fraction and reduction or elimination of sulfate-associated effects.
55. A formulation in which the agmatine counterion is selected for manufacturability, regulatory acceptability, stability, taste, odour, hygroscopicity, cost, dissolution profile or compatibility with enteric/HPMC release moderation.
56. A formulation in which the counterion is not relied upon as the primary GI tolerability mechanism.
57. A formulation in which enteric protection, hydrophilic gel moderation and optional PEA co-release are the primary GI tolerability architecture regardless of agmatine salt form.
58. A composition comprising agmatine and a mast-cell stabiliser other than PEA, including quercetin, luteolin, ketotifen-like agents, cromolyn-like agents, DAO, vitamin D3, zinc carnosine, curcumin, CBD, non-intoxicating cannabinoids or any combination thereof, where lawful and suitable.
59. A composition comprising agmatine with a gut-barrier agent including zinc L-carnosine, glutamine, butyrate, colostrum, lactoferrin, vitamin D3, probiotics, prebiotics or zonulin modulators.
60. A composition comprising agmatine with a purinergic-state modulator including vitamin D3, suramin, suramin analogues, BH4-pathway agents, adenosine-pathway agents or cell-danger-response modulators.
61. A composition comprising agmatine with an NMDA-modulating support ingredient including magnesium L-threonate, magnesium salts, glycine, taurine, theanine, NAC or polyamine-pathway modulators.
62. A composition comprising agmatine with a mitochondrial support system including ALCAR, CoQ10, creatine, alpha-lipoic acid, taurine, B vitamins, selenium, iron, magnesium or NAD-pathway support ingredients.
63. A composition comprising agmatine with membrane restoration ingredients including citicoline, phosphatidylserine, phosphatidylcholine, omega-3 fatty acids, choline donors, uridine or cytidine donors.
64. A product system comprising a morning product and an evening product with different ingredient allocation, release profiles or routes.
65. A product system comprising a starter pack, titration pack, maintenance pack, rescue pack, paediatric pack, sensory-sensitive pack, clinic pack, travel pack or subscription refill pack.

66. A product system guided by biomarker, wearable, symptom-scale, microbiome, metabolomic or companion-diagnostic data.
67. A product system in which outcome measures include task-initiation latency, external prompts to initiate action, transition latency, HRV, sleep, overload frequency, shutdown frequency, meltdown frequency, social-fatigue recovery time, ecological momentary assessment, caregiver reports or clinician-rated scales.
68. A blister system containing separate cavities for two enteric agmatine/PEA capsules and one immediate-release ALCAR/citicoline capsule.
69. A sachet system containing enteric agmatine/PEA particles and a physically separate immediate-release or taste-masked ALCAR/citicoline powder.
70. A MUPS system comprising enterically coated agmatine/PEA mini-tablets or pellets and a separate immediate-release acylcarnitine/citicoline unit.
71. An orally disintegrating tablet containing enterically coated agmatine/PEA microgranules and a separate immediate-release ALCAR/citicoline unit.
72. A liquid suspension containing enterically coated agmatine/PEA particles swallowed without chewing.
73. A sensory-sensitive administration system using small capsules, sprinkle particles, gummies with coated particles, taste-masking, odour-masking, flavour masking, texture masking, caregiver supports or app-guided prompting.
74. A companion diagnostic kit for measuring HRV, sleep, symptom scales, agmatine-related metabolites, PEA, acylcarnitines, citicoline-related metabolites, TMAO, histamine, tryptase, DAO capacity, inflammatory markers, nutrient status or microbiome markers.
75. A method of selecting agmatine salt form, release profile, route or dose based on GI tolerance, histamine intolerance, MCAS, IBS, SIBO, DAO capacity, stool pattern, gastric symptoms or prior response to immediate-release agmatine sulfate.
76. A method of selecting ALCAR release profile based on TMA/TMAO risk, microbiome profile, diet, carnitine tolerance, GI symptoms or cardiovascular risk markers.
77. A method of selecting citicoline packaging or co-formulation based on moisture sensitivity, water activity, hygroscopicity, package transmission rate or chemical compatibility.
78. A method of evaluating response using baseline, low-demand baseline, within-subject longitudinal trajectory, sleep-state proxy baseline, HRV gap between waking and sleep state, or standardised demand/recovery challenge.
79. A composition or protocol in which the treatment target is a transdiagnostic state-regulation impairment rather than a diagnostic category.
80. A composition or protocol in which the therapeutic target is disruption of a demand-response-recovery cycle.
81. A composition or protocol addressing a four-phase state-regulation failure cycle comprising tonic dysregulation, threshold collapse, recovery failure and membrane/executive depletion.
82. A composition or protocol in which agmatine and PEA address tonic dysregulation and threshold collapse, while ALCAR and citicoline address metabolic recovery and membrane/executive depletion.
83. A composition or protocol in which pair 1 creates capacity and pair 2 provides drive, such that the full four-component system addresses capacity without drive and drive without capacity.
84. A composition or protocol in which PEA locally mitigates agmatine-associated mast-cell or histamine effects at the intestinal release site.

85. A composition or protocol in which agmatine's NMDA, imidazoline, nitric oxide or polyamine pathway effects are combined with PEA's PPAR-alpha, ALIAmide, mast-cell or neuroimmune effects.
86. A composition or protocol in which ALCAR's acetyl-group and mitochondrial effects are combined with citicoline's choline, cytidine, phospholipid and dopaminergic receptor-support effects.
87. A composition or protocol in which acetylcholine synthesis is supported by concurrent acetyl donor and choline donor availability.
88. A composition or protocol in which membrane repair, mitochondrial function, receptor function or cholinergic-autonomic function is supported by cross-pair interactions between agmatine, PEA, ALCAR and citicoline.

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20. Positive Inclusion and Exclusion Matrix

The following inclusion/exclusion embodiments are disclosed to prevent narrow design-around based on addition, omission, replacement or physical separation of a single feature.

1. Agmatine formulations with enteric protection and with HPMC.
2. Agmatine formulations with enteric protection and without HPMC.
3. Agmatine formulations with HPMC and without an external enteric coating, including acid-resistant capsules and matrix systems.
4. Agmatine formulations with another hydrophilic gel-former instead of HPMC.
5. Agmatine formulations with PEA co-localised.
6. Agmatine formulations with PEA not co-localised.
7. Agmatine formulations without PEA.
8. Agmatine formulations with ALCAR.
9. Agmatine formulations without ALCAR.
10. Agmatine formulations with citicoline.
11. Agmatine formulations without citicoline.
12. Agmatine formulations with PEA and ALCAR in the same dosage unit.
13. Agmatine formulations with PEA and ALCAR in physically separate dosage units.
14. Agmatine formulations with citicoline in the same dosage unit as ALCAR.
15. Agmatine formulations with citicoline separated from ALCAR.
16. Agmatine formulations with buffered media.
17. Agmatine formulations without buffered media.
18. Agmatine formulations with arginine base.
19. Agmatine formulations without arginine base.
20. Agmatine formulations with carbonate or bicarbonate.
21. Agmatine formulations without carbonate or bicarbonate.
22. Agmatine formulations with PEA bioavailability technology.
23. Agmatine formulations without PEA bioavailability technology.
24. Agmatine formulations with LipiSperse-type technology.

25. Agmatine formulations without LipiSperse-type technology.
26. Agmatine formulations with micronised PEA.
27. Agmatine formulations with ultra-micronised PEA.
28. Agmatine formulations with non-micronised PEA.
29. Agmatine formulations with PEA replaced by quercetin, luteolin, DAO, curcumin, CBD, vitamin D3 or another mast-cell/histamine-modulating ingredient.
30. Agmatine formulations with agmatine sulfate retained as the salt.
31. Agmatine formulations with sulfate replaced by dihydrochloride.
32. Agmatine formulations with sulfate replaced by a chloride salt.
33. Agmatine formulations with sulfate replaced by a non-chloride salt.
34. Agmatine formulations with immediate-release support-stack ingredients.
35. Agmatine formulations with modified-release support-stack ingredients.
36. Agmatine formulations with probiotics in the same product.
37. Agmatine formulations with probiotics in a separate product.
38. Agmatine formulations expressly excluding probiotics.
39. Agmatine formulations expressly excluding prescription-only ingredients.
40. Agmatine formulations including prescription-only ingredients only in lawful, supervised clinical contexts.
41. Agmatine formulations in consumer supplement format, medical-food format, pharmaceutical format, compounded format, veterinary format and research format.
42. Four-component systems in a single dosage unit.
43. Four-component systems in two dosage units.
44. Four-component systems in three dosage units.
45. Four-component systems in four dosage units.
46. Four-component systems with morning-only dosing.
47. Four-component systems with split dosing.
48. Four-component systems with an acute/rescue route.
49. Four-component systems without any acute/rescue route.
50. Four-component systems with or without companion diagnostics.

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21. Kit and Pack Configurations

1. A two-bottle kit comprising an enteric agmatine/PEA product and an immediate-release ALCAR/citicoline product.
2. A three-product kit comprising an agmatine product, a support-stack product and a microbiome/ecology product.
3. A four-product kit comprising an agmatine product, a mast-cell/PEA product, a mitochondrial product and a membrane/citicoline product.
4. A morning pack containing ALCAR, citicoline, tyrosine, B vitamins and agmatine; and an evening pack containing magnesium, taurine, glycine, PEA, ashwagandha or holy basil.

5. A maintenance pack containing daily oral agmatine and PEA; and an acute/rescue pack containing intranasal agmatine, sublingual agmatine, buccal agmatine or another fast-onset route.
6. A sensory-sensitive pack containing taste-masked ALCAR, odour-masked acylcarnitines, small capsules, sprinkle multiparticulates, gummies with coated particles or low-sensory-burden administration aids.
7. A gastrointestinal-sensitive pack containing enteric agmatine, HPMC matrix moderation, PEA, zinc carnosine, glutamine, butyrate, probiotics or histamine-support ingredients.
8. A paediatric supervised pack containing weight-adjusted doses, mini-tablets, sprinkles, gummies, liquids or sachets, together with caregiver outcome logs.
9. A clinician pack containing screening questionnaires, adverse-event checklists, consent materials, vital-sign monitoring, HRV baseline, titration schedule and follow-up outcome instruments.
10. A digital pack in which a QR code or app links dosing events to ecological momentary assessment, wearable data, sleep data and symptom-state logging.
11. A daily-dose blister containing two enteric agmatine/PEA units and one immediate-release ALCAR/citicoline unit.
12. A paired sachet strip containing enteric agmatine/PEA particles and immediate-release or taste-masked ALCAR/citicoline powder.
13. A clinic-home pack comprising a supervised loading product, oral maintenance product, intranasal rescue product and companion monitoring instruments.
14. A travel pack containing stabilised packaging, dosing calendar, rescue format and gastrointestinal-sensitive administration instructions.
15. A subscription refill pack configured around phenotype tracking, dose titration and recurring biomarker or wearable review.

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22. Phenotype-Bundle Embodiments

Each bundle may be formulated as a single dosage unit, physically separate dosage units, a kit, a programme, a morning/evening split, a maintenance/rescue pair, a clinic-home protocol or a personalised protocol. Each bundle may include all listed ingredients, any subset, or substitution by functionally equivalent ingredients.

Bundle 1. Autistic inertia / task initiation

Agmatine, PEA, ALCAR, citicoline, magnesium L-threonate, taurine, tyrosine, BH4-pathway support. Optional components include any agmatine salt or form, any PEA form, any ALCAR/acylcarnitine form, any citicoline/choline/cytidine donor form, any mast-cell stabiliser, any mitochondrial support agent, any membrane-support ingredient, any microbiome/ecology ingredient and any formulation technology described in this publication.

Bundle 2. Sensory overload / reduced sensory tolerance

Agmatine, PEA, magnesium L-threonate, taurine, quercetin, luteolin, vitamin D3, CBD. Optional components include any agmatine salt or form, any PEA form, any ALCAR/acylcarnitine form, any citicoline/choline/cytidine donor form, any mast-cell stabiliser, any mitochondrial support agent, any

membrane-support ingredient, any microbiome/ecology ingredient and any formulation technology described herein.

Bundle 3. Shutdown recovery / post-demand recovery

Agmatine, PEA, ALCAR, CoQ10, creatine, alpha-lipoic acid, glycine, NAC. Optional components include any agmatine salt or form, any PEA form, any ALCAR/acylcarnitine form, any citicoline/choline/cytidine donor form, any mast-cell stabiliser, any mitochondrial support agent, any membrane-support ingredient, any microbiome/ecology ingredient and any formulation technology described herein.

Bundle 4. Meltdown vulnerability / emotional dysregulation

Agmatine, PEA, taurine, magnesium, L-theanine, ashwagandha, holy basil, omega-3 fatty acids. Optional components include any disclosed agmatine, PEA, ALCAR, citicoline, mast-cell, mitochondrial, membrane, microbiome or formulation equivalent.

Bundle 5. Social fatigue / social reciprocity

Agmatine, PEA, L. reuteri, B. longum BB536, vitamin D3, BH4, citicoline, omega-3 fatty acids, oxytocin-pathway support and secretin-pathway support. Optional components include any disclosed equivalent.

Bundle 6. Gut-brain dysregulation

Agmatine, PEA, zinc L-carnosine, glutamine, butyrate, colostrum, lactoferrin, probiotics. Optional components include any disclosed equivalent.

Bundle 7. p-cresol / Clostridial ecology

Glucoraphanin, myrosinase, sulforaphane, B. longum BB536, S. boulardii, Bacillus subtilis, butyrate, berberine. Optional components include agmatine, PEA, ALCAR, citicoline and any disclosed equivalent.

Bundle 8. Mitochondrial fatigue

ALCAR, CoQ10, creatine, alpha-lipoic acid, taurine, B vitamins, selenium, iron. Optional components include agmatine, PEA, citicoline and any disclosed equivalent.

Bundle 9. Membrane and attention restoration

Citicoline, phosphatidylserine, phosphatidylcholine, omega-3 fatty acids, uridine, choline donors, ALCAR, magnesium. Optional components include agmatine, PEA and any disclosed equivalent.

Bundle 10. Stress-recovery / hyperarousal

Ashwagandha, holy basil, taurine, magnesium L-threonate, phosphatidylserine, L-theanine, glycine, allopregnanolone-pathway agents. Optional components include agmatine, PEA, ALCAR, citicoline and any disclosed equivalent.

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23. Salt-by-Architecture Matrix

The following salt-by-architecture matrix makes clear that each agmatine form is disclosed in each dosage architecture. Each entry is an individual embodiment and may further include or exclude PEA, ALCAR, citicoline, HPMC, another hydrophilic polymer, a buffer, a mast-cell stabiliser, a gut-barrier agent, a mitochondrial agent, a membrane-support agent or any Master Ingredient List ingredient.

1. agmatine sulfate formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
2. agmatine sulfate formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
3. agmatine sulfate formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
4. agmatine sulfate formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
5. agmatine sulfate formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
6. agmatine sulfate formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
7. agmatine sulfate formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any

buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

8. agmatine sulfate formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
9. agmatine sulfate formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
10. agmatine sulfate formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
11. agmatine sulfate formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
12. agmatine sulfate formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
13. agmatine sulfate hydrate formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
14. agmatine sulfate hydrate formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

15. agmatine sulfate hydrate formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
16. agmatine sulfate hydrate formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
17. agmatine sulfate hydrate formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
18. agmatine sulfate hydrate formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
19. agmatine sulfate hydrate formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
20. agmatine sulfate hydrate formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
21. agmatine sulfate hydrate formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

22. agmatine sulfate hydrate formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
23. agmatine sulfate hydrate formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
24. agmatine sulfate hydrate formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
25. agmatine dihydrochloride formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
26. agmatine dihydrochloride formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
27. agmatine dihydrochloride formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
28. agmatine dihydrochloride formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
29. agmatine dihydrochloride formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient,

for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

30. agmatine dihydrochloride formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
31. agmatine dihydrochloride formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
32. agmatine dihydrochloride formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
33. agmatine dihydrochloride formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
34. agmatine dihydrochloride formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
35. agmatine dihydrochloride formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
36. agmatine dihydrochloride formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation,

neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

37. agmatine hydrochloride formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
38. agmatine hydrochloride formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
39. agmatine hydrochloride formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
40. agmatine hydrochloride formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
41. agmatine hydrochloride formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
42. agmatine hydrochloride formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
43. agmatine hydrochloride formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

44. agmatine hydrochloride formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
45. agmatine hydrochloride formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
46. agmatine hydrochloride formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
47. agmatine hydrochloride formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
48. agmatine hydrochloride formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
49. agmatine phosphate formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
50. agmatine phosphate formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
51. agmatine phosphate formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for

gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

52. agmatine phosphate formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
53. agmatine phosphate formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
54. agmatine phosphate formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
55. agmatine phosphate formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
56. agmatine phosphate formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
57. agmatine phosphate formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
58. agmatine phosphate formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-

associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

59. agmatine phosphate formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
60. agmatine phosphate formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
61. agmatine citrate formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
62. agmatine citrate formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
63. agmatine citrate formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
64. agmatine citrate formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
65. agmatine citrate formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

66. agmatine citrate formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
67. agmatine citrate formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
68. agmatine citrate formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
69. agmatine citrate formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
70. agmatine citrate formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
71. agmatine citrate formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
72. agmatine citrate formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
73. agmatine orotate formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability,

state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

74. agmatine orotate formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
75. agmatine orotate formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
76. agmatine orotate formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
77. agmatine orotate formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
78. agmatine orotate formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
79. agmatine orotate formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
80. agmatine orotate formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain,

immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

81. agmatine orotate formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
82. agmatine orotate formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
83. agmatine orotate formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
84. agmatine orotate formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
85. agmatine fumarate formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
86. agmatine fumarate formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
87. agmatine fumarate formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

88. agmatine fumarate formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
89. agmatine fumarate formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
90. agmatine fumarate formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
91. agmatine fumarate formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
92. agmatine fumarate formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
93. agmatine fumarate formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
94. agmatine fumarate formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
95. agmatine fumarate formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master

Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

96. agmatine fumarate formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
97. agmatine malate formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
98. agmatine malate formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
99. agmatine malate formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
100. agmatine malate formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
101. agmatine malate formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
102. agmatine malate formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-

associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

103. agmatine malate formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
104. agmatine malate formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
105. agmatine malate formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
106. agmatine malate formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
107. agmatine malate formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
108. agmatine malate formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
109. agmatine tartrate formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

110. agmatine tartrate formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
111. agmatine tartrate formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
112. agmatine tartrate formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
113. agmatine tartrate formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
114. agmatine tartrate formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
115. agmatine tartrate formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
116. agmatine tartrate formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
117. agmatine tartrate formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any

buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

118. agmatine tartrate formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
119. agmatine tartrate formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
120. agmatine tartrate formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
121. agmatine succinate formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
122. agmatine succinate formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
123. agmatine succinate formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
124. agmatine succinate formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-

associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

125. agmatine succinate formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
126. agmatine succinate formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
127. agmatine succinate formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
128. agmatine succinate formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
129. agmatine succinate formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
130. agmatine succinate formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
131. agmatine succinate formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

132. agmatine succinate formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
133. agmatine aspartate formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
134. agmatine aspartate formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
135. agmatine aspartate formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
136. agmatine aspartate formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
137. agmatine aspartate formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
138. agmatine aspartate formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
139. agmatine aspartate formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any

buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

140. agmatine aspartate formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
141. agmatine aspartate formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
142. agmatine aspartate formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
143. agmatine aspartate formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
144. agmatine aspartate formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
145. agmatine gluconate formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
146. agmatine gluconate formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

147. agmatine gluconate formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
148. agmatine gluconate formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
149. agmatine gluconate formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
150. agmatine gluconate formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
151. agmatine gluconate formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
152. agmatine gluconate formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
153. agmatine gluconate formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
154. agmatine gluconate formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or

non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

155. agmatine gluconate formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
156. agmatine gluconate formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
157. agmatine lactate formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
158. agmatine lactate formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
159. agmatine lactate formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
160. agmatine lactate formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
161. agmatine lactate formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain,

immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

162. agmatine lactate formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
163. agmatine lactate formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
164. agmatine lactate formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
165. agmatine lactate formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
166. agmatine lactate formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
167. agmatine lactate formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
168. agmatine lactate formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

169. agmatine acetate formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
170. agmatine acetate formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
171. agmatine acetate formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
172. agmatine acetate formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
173. agmatine acetate formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
174. agmatine acetate formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
175. agmatine acetate formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
176. agmatine acetate formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for

gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

177. agmatine acetate formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
178. agmatine acetate formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
179. agmatine acetate formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
180. agmatine acetate formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
181. agmatine bisulfate formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
182. agmatine bisulfate formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
183. agmatine bisulfate formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

184. agmatine bisulfate formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

185. agmatine bisulfate formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

186. agmatine bisulfate formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

187. agmatine bisulfate formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

188. agmatine bisulfate formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

189. agmatine bisulfate formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

190. agmatine bisulfate formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

191. agmatine bisulfate formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master

Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

192. agmatine bisulfate formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
193. agmatine carbonate formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
194. agmatine carbonate formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
195. agmatine carbonate formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
196. agmatine carbonate formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
197. agmatine carbonate formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
198. agmatine carbonate formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-

associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

199. agmatine carbonate formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
200. agmatine carbonate formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
201. agmatine carbonate formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
202. agmatine carbonate formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
203. agmatine carbonate formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
204. agmatine carbonate formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
205. agmatine bicarbonate formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

206. agmatine bicarbonate formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
207. agmatine bicarbonate formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
208. agmatine bicarbonate formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
209. agmatine bicarbonate formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
210. agmatine bicarbonate formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
211. agmatine bicarbonate formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
212. agmatine bicarbonate formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
213. agmatine bicarbonate formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any

buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

214. agmatine bicarbonate formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
215. agmatine bicarbonate formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
216. agmatine bicarbonate formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
217. agmatine free base formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
218. agmatine free base formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
219. agmatine free base formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
220. agmatine free base formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-

associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

221. agmatine free base formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
222. agmatine free base formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
223. agmatine free base formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
224. agmatine free base formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
225. agmatine free base formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
226. agmatine free base formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
227. agmatine free base formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

228. agmatine free base formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
229. agmatine co-crystal formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
230. agmatine co-crystal formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
231. agmatine co-crystal formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
232. agmatine co-crystal formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
233. agmatine co-crystal formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
234. agmatine co-crystal formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
235. agmatine co-crystal formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any

buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

236. agmatine co-crystal formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
237. agmatine co-crystal formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
238. agmatine co-crystal formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
239. agmatine co-crystal formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
240. agmatine co-crystal formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
241. agmatine cyclodextrin complex formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
242. agmatine cyclodextrin complex formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

243. agmatine cyclodextrin complex formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
244. agmatine cyclodextrin complex formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
245. agmatine cyclodextrin complex formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
246. agmatine cyclodextrin complex formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
247. agmatine cyclodextrin complex formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
248. agmatine cyclodextrin complex formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
249. agmatine cyclodextrin complex formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

250. agmatine cyclodextrin complex formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
251. agmatine cyclodextrin complex formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
252. agmatine cyclodextrin complex formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
253. agmatine polymer complex formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
254. agmatine polymer complex formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
255. agmatine polymer complex formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
256. agmatine polymer complex formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
257. agmatine polymer complex formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient,

for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

258. agmatine polymer complex formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
259. agmatine polymer complex formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
260. agmatine polymer complex formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
261. agmatine polymer complex formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
262. agmatine polymer complex formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
263. agmatine polymer complex formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
264. agmatine polymer complex formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation,

neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

265. agmatine prodrug formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
266. agmatine prodrug formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
267. agmatine prodrug formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
268. agmatine prodrug formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
269. agmatine prodrug formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
270. agmatine prodrug formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
271. agmatine prodrug formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

272. agmatine prodrug formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

273. agmatine prodrug formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

274. agmatine prodrug formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

275. agmatine prodrug formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

276. agmatine prodrug formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

277. agmatine analogue formulated as a immediate-release oral capsule or tablet, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

278. agmatine analogue formulated as a enteric capsule without hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

279. agmatine analogue formulated as a enteric capsule with HPMC or an equivalent hydrophilic matrix, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic,

sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

280. agmatine analogue formulated as a enteric capsule with HPMC or equivalent hydrophilic matrix and co-localised PEA, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
281. agmatine analogue formulated as a multiparticulate enteric bead, pellet, mini-tablet or MUPS system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
282. agmatine analogue formulated as a sachet, stick pack, gummy, sprinkle, ODT, liquid suspension or food-compatible format containing enteric-coated agmatine particles, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
283. agmatine analogue formulated as a buccal or sublingual film, tablet, lozenge or spray, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
284. agmatine analogue formulated as a intranasal spray, powder, gel, drop or insufflation system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
285. agmatine analogue formulated as a transdermal, iontophoretic or microneedle system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
286. agmatine analogue formulated as a rectal or other mucosal dosage form, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

287. agmatine analogue formulated as a clinically supervised injectable, infusion, implantable depot or sterile solution/suspension, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.
288. agmatine analogue formulated as a co-crystal, complexed, liposomal, nanoparticle, self-emulsifying or taste-masked oral system, alone or with PEA, ALCAR, citicoline, any hydrophilic matrix-forming polymer, any enteric material, any buffer or non-buffered system, and any Master Ingredient List ingredient, for gastrointestinal tolerability, state-regulation, neurodevelopmental, psychiatric, autonomic, sensory, cognitive, fatigue-associated, social-functioning, recovery-associated, gut-brain, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine or sleep/stress-recovery applications.

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24. Prior Art and Background Acknowledged

The following prior art and background areas are acknowledged for context. This acknowledgement is not an admission that any reference is enabling, material or closest prior art for any specific embodiment. The disclosed subject matter includes broader surrounding territory, alternative architectures and combinations that these references do not exhaust.

1. Agmatine uptake and buffered oral administration concepts, including systems using agmatine salts and buffered media.
2. Agmatine and palmitoylethanolamide compositions for neurological or pain-related disorders.
3. Palmitoylethanolamide and acetyl-L-carnitine compositions for inflammatory or neuropathic pain.
4. Agmatine or pharmaceutically acceptable salts for autism-related applications.
5. Background literature relating to agmatine gastric acid secretion, gastric mucosal injury, imidazoline-related gastric histamine release and mast-cell histamine exocytosis.
6. Background literature relating to agmatine in autism models, agmatine biomarker differences in autistic subjects, ADHD-related agmatine/arginine/nitric oxide/glutamate markers, depression, anxiety, OCD, PTSD and stress-resilience models.
7. Background literature relating to PEA, mast-cell modulation, PPAR-alpha, ALIAmide activity, neuroinflammation, pain, depression, stress, PTSD and autism-adjacent contexts.
8. Background literature relating to ALCAR, mitochondrial energy metabolism, fatigue, depression, ADHD, autism, neuroprotection and carnitine-related TMA/TMAO biology.
9. Background literature relating to citicoline, phospholipid synthesis, choline/cytidine pathways, dopamine receptor support, attention, working memory, cognitive performance and neuroprotection.
10. Background literature relating to sulforaphane, carnosine, L. reuteri, B. longum, microbiome ecology, oxytocin/secretin pathways, BH4, purinergic/cell-danger-response concepts, mast-cell biology, histamine intolerance and gut-brain mechanisms.
11. General formulation art relating to enteric coatings, HPMC matrices, multiparticulate systems, MUPS, controlled release, intranasal delivery, taste-masking, moisture-protective packaging, alu-alu blisters and companion diagnostics.

This publication discloses, among other things, the combination of state-regulation target, salt-agnostic agmatine tolerability architecture, enteric plus hydrophilic release moderation, co-localised PEA as both systemic component and local mast-cell support, separated ALCAR/citicoline immediate-release architecture, ALCAR upper-intestinal TMA/TMAO control, citicoline moisture management, detailed outcome measures and product/service systems.

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25. Claim-Territory Crosswalk

This section is included to make explicit that the defensive disclosure covers the technical territory attempted in the patent-style draft, while also broadening it for defensive-publication purposes.

1. High-value concrete prior-art embodiments: disclosed in Section 1A.
2. Four-component regimen: disclosed in Sections 7, 9, 13, 14, 19 and 25.
3. Transdiagnostic state-regulation impairment: disclosed in Sections 3, 4, 8 and 16.
4. Phenotypes including sensory overload, shutdown, autistic inertia, recovery failure and social functioning: disclosed in Sections 3, 8, 16 and 22.
5. Associated populations including autism, ADHD, anxiety and burnout: disclosed in Section 8.
6. Enteric agmatine/PEA first unit and immediate-release ALCAR/citicoline second unit: disclosed in Sections 9, 10, 11 and 14.
7. Palmitoylethanolamide and acylcarnitine not in the same dosage unit: disclosed in Sections 9, 11, 19 and 20, while alternative co-formulated embodiments are also disclosed defensively.
8. Agmatine salts including dihydrochloride, hydrochloride, sulfate and free base: disclosed in Sections 5, 10, 13, 14 and 23.
9. PEA forms including micronised, ultra-micronised and related N-acylethanolamides: disclosed in Sections 5, 7, 10 and 14.
10. Acylcarnitine forms including ALCAR hydrochloride and related carnitines: disclosed in Sections 5, 11, 13 and 14.
11. Citicoline and choline-cytidine donors: disclosed in Sections 5, 11, 13 and 14.
12. Preferred daily dose of about 750 mg agmatine dihydrochloride, 600 mg PEA, 500 mg ALCAR hydrochloride and 250 mg citicoline sodium: disclosed in Sections 9, 13 and 14.
13. Hydrophilic matrix-forming polymers and HPMC grades: disclosed in Sections 3, 10, 12, 14 and 19.
14. Dissolution targets and test method: disclosed in Section 10.
15. Specific capsule, blister and sachet embodiments: disclosed in Sections 14 and 21.
16. Morning administration: disclosed in Section 15.
17. Outcome measures and improvement thresholds: disclosed in Section 16.
18. Agmatine/PEA two-component fallback: disclosed in Sections 7, 10, 14 and 19.
19. Enteric agmatine/HPMC dosage unit for reducing GI intolerance: disclosed in Sections 10, 14, 19 and 23.
20. Dosage system and packaging: disclosed in Sections 12, 14, 18 and 21.
21. Alternative routes including intranasal, buccal, sublingual, transdermal and parenteral: disclosed in Sections 12, 14 and 15.
22. Observational examples supporting rationale and tolerability choices: disclosed in Section 17.

23. Support stacks, ecology products, companion diagnostics and clinical service models: disclosed in Sections 15, 16, 18, 21 and 22.

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26. Statement of Defensive Intent

This document is published as a defensive technical disclosure. Its purpose is to establish public prior art across the broadest feasible territory of compositions, formulations, salt forms, delivery architectures, tolerability solutions, dose ranges, indications, populations, mechanistic territories, assessment methods, clinical service models, product architectures and formulation technologies involving agmatine, palmitoylethanolamide, acetyl-L-carnitine, citicoline and related compounds for neurodevelopmental, psychiatric, autonomic, cognitive, sensory, gastrointestinal, immune, inflammatory, mitochondrial, microbiome, purinergic, endocrine, social-functioning, fatigue, sleep, stress-recovery and state-regulation applications.

This publication does not assert regulatory approval or proven clinical efficacy. The disclosed subject matter is presented as technical compositions, formulations, routes, dose ranges, protocols and measurement systems capable of being made and used by a skilled person for prior-art purposes, and to ensure that the described territory cannot be asserted as undisclosed in future patent applications by any party.

No composition, formulation, salt form, delivery method, dose, indication, route, population, kit, protocol, technology or product model described herein is excluded from this disclosure unless explicitly stated. The use of "including but not limited to", "such as", "for example", "may", "optionally", "contemplated" and equivalent language is intended to be illustrative and non-limiting. Where specific examples are given, the general category is also disclosed. Where a general category is given, each named species and each technically feasible combination is also disclosed.

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27. Public Mechanistic Synthesis

This section is a public-facing synthesis of the disclosed technology. It is written so that a technically literate reader can understand the rationale without reading private research notes, draft claim files or internal planning documents. It does not narrow the detailed embodiments disclosed in Sections 1A and 1-26. Instead, it explains the full mechanistic model in a consistent, searchable structure.

The core disclosure is that agmatine and agmatine-adjacent systems may be used to modulate state regulation in mental-health, neurodevelopmental, autonomic, sensory, cognitive, social, fatigue, recovery, gut-brain, immune, inflammatory, mitochondrial, microbiome, endocrine and stress-recovery contexts. The phrase state regulation is used deliberately. The target is not a single diagnostic label or a single symptom. The target is a repeatable functional loop: demand, physiological response, state transition and recovery.

27.1 Plain-language overview

A person can fail to function for many reasons that do not look alike on the surface. One person cannot start a task even though they want to. Another person melts down after noise, light or social pressure. Another person can perform well for a short period and then loses capacity for hours or days. Another person becomes rigid, perseverative, anxious or socially unavailable when the environment changes. Another person appears depressed, slowed or unmotivated, but the bottleneck is not preference; it is the inability to enter a usable action state.

This disclosure treats those presentations as different outputs of a shared state-regulation problem. A state-regulation problem can involve excessive background arousal, poor sensory gating, neuroimmune threshold lowering, gut-brain inflammatory signalling, impaired mitochondrial recovery, insufficient membrane or cholinergic substrate, altered dopamine/reward salience, poor vagal recovery, sleep disruption, endocrine stress load, microbiome metabolite load or environmental prediction error.

Agmatine is disclosed as a central intervention point because it sits at the intersection of NMDA signalling, imidazoline signalling, nitric oxide biology, polyamine metabolism, autonomic regulation, stress biology, gut-brain signalling and inflammatory modulation. Agmatine-adjacent ingredients are disclosed because the state-regulation loop is larger than agmatine alone. A useful public way to understand the disclosed system is: agmatine may help turn down maladaptive gain and terminate overload; PEA-class agents may raise inflammatory and mast-cell thresholds; acylcarnitines may support recovery energy; and citicoline or related choline-cytidine donors may support membrane repair, acetylcholine availability and executive switching.

27.2 The demand-response-recovery model

The disclosed model begins with a demand. A demand may be sensory, social, cognitive, emotional, motoric, interoceptive, metabolic, microbial, inflammatory, endocrine, sleep-related or environmental. The nervous system then enters a response state. That response state may be appropriate, proportionate and recoverable, or it may be amplified, rigid, delayed, prolonged or metabolically expensive. The subject then either recovers toward baseline or remains partly locked in the response state.

In healthy state regulation, demand produces a state change that is strong enough to meet the demand and flexible enough to end when the demand ends. In impaired state regulation, several failures are possible. The threshold for activation may be too low. The response may be too intense. The response may not match the demand. The person may be unable to initiate an action state. The person may be unable to leave the prior state. The person may recover slowly or incompletely. The person may accumulate recovery debt until ordinary demands produce shutdown, meltdown, social withdrawal, fatigue, rigidity or burnout.

This model is disclosed for autism, ADHD, anxiety, depression, OCD, PTSD, complex trauma, sensory-processing differences, autistic inertia, burnout, chronic stress presentations, social fatigue, psychomotor slowing, fatigue syndromes, gut-brain inflammatory states and mixed presentations. Each diagnostic label is a context in which state-regulation impairment may appear; the mechanistic target is the impaired loop itself.

27.3 Four-phase failure cycle

A useful synthesis of the disclosed mechanisms is a four-phase cycle.

Phase 1: tonic dysregulation. Baseline state is already unstable before the next demand appears. Possible contributors include NMDA gain dysregulation, altered glutamate/GABA balance, nitric oxide and BH4 disturbance, chronic sympathetic tone, low vagal recovery, HPA-axis activation, sleep disruption, inflammation, oxidative stress and prior overload. In this phase, the person is not starting from neutral. Ordinary inputs arrive into a primed system.

Phase 2: threshold collapse. Ordinary sensory, social, cognitive or biological demands cross threshold too easily. Possible contributors include mast-cell activation, histamine signalling, PEA/PPAR-alpha-relevant neuroimmune tone, LPS/TLR4/NF-kB signalling, gut barrier permeability, zonulin-associated intestinal permeability, microbiome dysbiosis, p-cresol or other microbial

metabolites, endocrine stress load and cumulative environmental mismatch. The same demand that another person can absorb may trigger overload in the susceptible subject.

Phase 3: recovery failure. After overload, the body needs to end the defensive state and rebuild functional capacity. If NMDA-mediated excitation, sympathetic activation, inflammatory signalling or interoceptive threat persists, the subject may remain locked in the overload state. If the overload state ends but mitochondrial energy, acetyl-group availability, carnitine status, CoQ10 status, magnesium status or sleep restoration are inadequate, the person may be calm but depleted.

Phase 4: membrane, cholinergic and executive depletion. Repeated dysregulation can impair the substrates needed for flexible cognition and action initiation. Choline, cytidine, uridine, phospholipid synthesis, acetylcholine availability, membrane integrity, dopamine receptor-support context and synaptic plasticity may become relevant. This phase may present as task initiation failure, cognitive rigidity, social communication fatigue, poor working memory, perseveration, psychomotor slowing or inability to shift state on demand.

The disclosed four-component architecture is mapped to this cycle: agmatine-pathway components for tonic gain and overload termination; PEA-class components for threshold and neuroimmune/mast-cell support; acylcarnitine components for recovery energy; and citicoline or related donors for membrane, acetylcholine and executive state-transition support.

27.4 Agmatine axis

The agmatine axis includes exogenous agmatine, endogenous agmatine production, agmatine salts and forms, arginine decarboxylation, microbial agmatine production, agmatine deiminase activity, polyamine metabolism, imidazoline receptor activity, NMDA receptor modulation and nitric oxide synthase modulation. Agmatine is disclosed in sulfate, hydrochloride, dihydrochloride, phosphate, citrate, malate, fumarate, succinate, lactate, gluconate, acetate, orotate, carbonate, bicarbonate, bisulfate, free-base, hydrate, co-crystal, complex, prodrug and analogue forms.

Agmatine may be relevant to state regulation through NMDA receptor gain. NMDA signalling influences how strongly prediction errors, sensory inputs, pain signals, social threat cues and cognitive demands are weighted. Too much gain may amplify ordinary input into threat, overload, perseveration or excitotoxic stress. Too little flexible updating may contribute to rigidity or inability to shift state. Agmatine is disclosed as a way to modulate that gain, without the publication depending on any single receptor-level theory being ultimately complete.

Agmatine may also be relevant through nitric oxide biology. Nitric oxide signalling interacts with vascular tone, immune activation, oxidative stress, peroxynitrite burden, mitochondrial function and neurotransmission. Disrupted arginine, nitric oxide, BH4 or polyamine pathways may appear in neurodevelopmental, psychiatric, inflammatory and gut-brain states. Agmatine is disclosed for modulating these pathways in connection with autism, ADHD, anxiety, depression, trauma-related hyperarousal, burnout, sensory overload, shutdown, social fatigue and recovery failure.

Agmatine may also be relevant through imidazoline and autonomic signalling. Imidazoline-linked mechanisms, alpha-2 adrenergic tone, sympathetic arousal, vagal recovery, gastric secretion, stress response and histamine/mast-cell interactions may all influence whether a person can settle, initiate, tolerate input and recover. This is why the disclosure covers both central nervous system uses and gastrointestinal tolerability architecture.

27.5 Neuroimmune, mast-cell and PEA axis

The PEA axis includes palmitoylethanolamide, N-acylethanolamides, PPAR-alpha activity, ALIAmide activity, mast-cell modulation, microglial modulation, neuroimmune tone, histamine-related

threshold effects and local gastrointestinal tolerability. PEA-class components are disclosed as systemic state-regulation agents and as local co-localised support when oral agmatine is released in the intestine.

In the state-regulation model, inflammatory and mast-cell burden can lower the threshold at which ordinary input becomes overload. A subject with elevated neuroimmune tone may not need a large stressor to enter a defensive state. Small changes in light, sound, social uncertainty, food, gut irritation, sleep debt or interoceptive discomfort may be enough. PEA-class agents are disclosed for raising that threshold and reducing the probability that demand becomes overload.

PEA is also disclosed as a formulation partner for agmatine. Oral agmatine can be useful and still be poorly tolerated. Some users experience nausea, burning, cramping, loose stools, bloating or histamine-like reactions. The public technical solution disclosed here is not merely changing the salt. It is controlling where and how agmatine is released, and optionally releasing PEA in the same intestinal window to support local mast-cell and inflammatory tolerance.

27.6 Mitochondrial, acylcarnitine and recovery-energy axis

The acylcarnitine axis includes acetyl-L-carnitine, L-carnitine, carnitine tartrate, propionyl-L-carnitine, acylcarnitine profiles, mitochondrial fatty-acid transport, acetyl-CoA availability, energy metabolism, fatigue biology, post-demand recovery and TMA/TMAO-aware formulation.

Recovery after overload is not just a psychological event. It requires energy. If a person exits a defensive state but lacks sufficient mitochondrial throughput or acetyl-group availability, they may be calm yet unable to act. This can look like depression, autistic inertia, fatigue, shutdown recovery, post-social crash, academic burnout, occupational burnout or delayed recovery after sensory load.

ALCAR and related acylcarnitines are disclosed as recovery-phase components. They may support mitochondrial function, acetyl-group availability, acetylcholine substrate relationships, cognitive effort and return of functional capacity. The disclosure also covers formulation choices that reduce lower-intestinal exposure of carnitine substrates to microbial conversion into trimethylamine and TMAO, including immediate-release upper-intestinal delivery, physical separation and taste/odour masking.

27.7 Citicoline, choline-cytidine and executive-membrane axis

The choline-cytidine axis includes citicoline, CDP-choline, choline donors, cytidine, uridine, alpha-GPC, phosphatidylcholine, phosphatidylserine, acetylcholine synthesis, membrane repair, dopaminergic receptor-support context, working memory, cognitive flexibility and action initiation.

In this model, executive dysfunction is not treated only as a motivational or behavioural problem. It may reflect insufficient state transition capacity: the person cannot move from rest to action, planning to execution, social demand to recovery, one task to another or threat mode to flexible mode. Membrane substrate, cholinergic tone and dopaminergic support can matter because the system needs physical and signalling resources to switch reliably.

Citicoline and related donors are disclosed for initiation, sustained attention, working memory, language, social communication, cognitive flexibility and recovery of functional drive. Citicoline is also disclosed as a formulation challenge because of moisture sensitivity. Public embodiments therefore include physical separation, alu-alu blisters, desiccants, low-water-activity packaging, separate immediate-release capsules, coated particles and multi-chamber kits.

27.8 Microbiome, gut-barrier, LPS and polyamine axis

The gut-brain axis disclosed here includes microbial agmatine production and consumption, arginine decarboxylase, agmatine deiminase, putrescine and polyamine metabolism, E. coli, Enterococcus species, Clostridial ecology, p-cresol, LPS, endotoxin, LBP, TLR4, NF-kB, gut permeability, zonulin, SCFAs, inulin fermentation, FOS, GOS, probiotics, postbiotics, FMT-like ecology shifts and toxin-binding strategies.

This axis matters because state regulation is affected by the body state from which the brain is reading. If gut barrier dysfunction or microbial metabolites repeatedly signal danger or inflammation, the nervous system may assign excessive threat value to ordinary input. This can express as anxiety, sensory intolerance, social withdrawal, shutdown, irritability, cognitive fog, fatigue, sleep disruption or rigid behaviour.

The disclosure covers direct agmatine supplementation and indirect modulation of endogenous agmatine biology. It covers microbiome strategies that increase, preserve, consume, transport or reshape agmatine-related pathways. It also covers support ingredients and ecology products intended to reduce LPS burden, p-cresol burden, gut permeability, mast-cell activation, histamine load or inflammatory signalling.

27.9 Autonomic, HPA-axis, vagal and predictive-processing axis

The autonomic axis includes sympathetic tone, parasympathetic recovery, vagal tone, HRV, HPA-axis activation, cortisol rhythm, startle, vigilance, alpha-2 adrenergic mechanisms, NPY, VTA dopamine, interoception, predictive coding, precision weighting, threat evaluation and social-safety signalling.

Many mental-health and neurodevelopmental presentations can be understood as prediction problems embodied in physiology. The person is not merely thinking incorrectly. The body may be generating a state that tells the brain the environment is unsafe, unpredictable or too expensive to engage. A sensory demand, social demand or transition demand then receives excessive precision and triggers defensive physiology.

Agmatine-pathway components, PEA-class components, acylcarnitines, citicoline, magnesium, taurine, theanine, adaptogens, sleep-support ingredients, microbiome interventions, exercise, cold exposure and environmental design are disclosed as ways to alter this predictive/autonomic context. The aim is not sedation. The aim is to improve the ability to enter the right state, maintain it while useful and leave it when the demand ends.

27.10 Environmental and behavioural interface

The disclosed compositions are not limited to pill-only use. State regulation is shaped by the environment. Predictability, sensory load, social demand, transitions, task structure, recovery windows, sleep timing, food tolerance, caregiver behaviour, school demands and workplace demands can all determine whether biochemical capacity becomes functional capacity.

This publication therefore discloses combined biochemical, diagnostic, behavioural and environmental systems. A product may be paired with a diary, app, clinician protocol, parent protocol, school accommodation, sensory plan, sleep plan, exercise plan, cold exposure protocol, meal plan, microbiome protocol or outcome-tracking system. The biochemical component and environmental component are disclosed separately and together.

27.11 Phenotype map

The same mechanistic axes may appear as different public-facing phenotypes. The following table is illustrative and non-limiting.

Phenotype	Possible disclosed bottleneck	Disclosed intervention classes
Autistic inertia	State initiation and transition failure; NMDA gain; dopamine/reward salience; mitochondrial recovery debt	Agmatine-pathway components, citicoline/choline donors, acylcarnitines, magnesium, environmental transition design
Sensory overload	Low demand threshold; glutamate/NMDA gain; mast-cell and neuroimmune tone; autonomic hyperarousal	Agmatine, PEA-class agents, magnesium, taurine, theanine, gut-barrier support, sensory-load design
Shutdown recovery	Failure to terminate overload plus insufficient energy rebuilding	Agmatine, ALCAR/acylcarnitines, CoQ10, creatine, sleep support, graded recovery protocols
Meltdown vulnerability	Threshold collapse, autonomic threat activation, inflammatory load, sleep debt	PEA, agmatine, mast-cell support, microbiome support, sleep and environmental protocols
Social fatigue	Prediction load, sensory load, vagal/social engagement cost, recovery debt	Agmatine, PEA, ALCAR, citicoline, oxytocin-pathway and microbiome strategies, social-demand dosing protocols
Depression-linked inertia	Psychomotor slowing, reward/initiation failure, inflammatory and mitochondrial load	Agmatine, ALCAR, citicoline, methylation support, omega-3s, sleep and activity protocols
Anxiety-linked threat activation	Excessive precision on threat prediction, HPA-axis activation, sympathetic tone	Agmatine, magnesium, theanine, taurine, adaptogens, PEA, microbiome and vagal strategies
Burnout-associated adaptive loss	Repeated demand without adequate recovery; mitochondrial and membrane depletion	ALCAR, CoQ10, citicoline, magnesium, agmatine, sleep restoration, demand reduction and staged re-entry
Gut-brain dysregulation	LPS, permeability, p-cresol, histamine, microbiome agmatine/polyamine imbalance	Probiotics, prebiotics, postbiotics, binders, PEA, zinc carnosine, butyrate, agmatine-pathway modulation
Cognitive rigidity/ perseveration	Impaired state switching, NMDA/glutamate gain, executive substrate depletion	Agmatine, citicoline, choline/cytidine donors, magnesium, behavioural transition supports

27.12 Formulation rationale in public terms

The preferred public formulation architecture is not merely a list of ingredients. It is a technical solution to conflicting requirements. Agmatine may be useful, but immediate gastric exposure or high local intestinal concentration may reduce tolerability. PEA may support systemic threshold regulation and local intestinal tolerance. ALCAR may be useful for recovery, but lower-intestinal microbial exposure can raise TMA/TMAO concerns and taste/odour can impair adherence. Citicoline may be useful for cognition and membrane support, but moisture sensitivity can complicate co-formulation.

The preferred solution separates functions. A first enterically protected unit contains agmatine and optionally PEA in a hydrophilic release-moderating matrix such as HPMC. This reduces gastric exposure and moderates intestinal concentration. A second immediate-release unit contains ALCAR and citicoline, physically separated for release timing, sensory tolerance, TMA/TMAO control and moisture management. The same logic is disclosed for capsules, tablets, mini-tablets, pellets, sachets, stick packs, liquids with enteric particles, ODTs, nasal sprays, buccal systems, sublingual systems, transdermals, rectal systems and supervised parenteral systems.

27.13 Diagnostic and measurement rationale

A state-regulation product should be measured by state-regulation outcomes. This disclosure includes conventional symptom measures, but it also discloses functional measures that are closer to the proposed mechanism: task-initiation latency, prompt requirement, transition time, sensory threshold, recovery time after demand, shutdown frequency, meltdown frequency, post-social recovery duration, HRV, sleep restoration, GI tolerance, fatigue, school/work attendance, caregiver-observed functional capacity and blinded observer ratings.

Companion diagnostics may include plasma agmatine, arginine, ornithine, polyamine markers, nitric oxide metabolites, BH4-related markers, inflammatory cytokines, LBP, endotoxin proxies, TMAO, zonulin, histamine/DAO markers, acylcarnitine profiles, free and total carnitine, CoQ10, lactate/pyruvate, cortisol rhythm, vitamin and mineral status, amino acids, stool microbiome pathways and urinary organic acids. These tests are disclosed for selection, stratification, monitoring, safety, tolerability and mechanism exploration.

27.14 Clinical, consumer and research-use models

The same disclosed technical system may appear in multiple public formats. It may be a dietary supplement, medical food, pharmaceutical product, compounded product, clinician-supervised kit, research formulation, trial pack, telemedicine kit, school-support kit, burnout-recovery kit, sensory-resilience kit, microbiome ecology kit, rescue product, maintenance product or subscription refill system.

Protocols may include loading, maintenance, titration, washout, rescue, morning-only use, split dosing, pre-demand dosing, post-overload recovery dosing, bedtime adjunct use, with-food dosing, without-food dosing, sensory-event dosing, social-demand dosing, travel dosing, school/work re-entry protocols and clinician-supervised protocols. Each protocol is disclosed for the ingredient classes, formulations, routes, populations and outcome measures described in this publication.

27.15 Searchable mechanism index

For clarity and searchability, this publication expressly discloses the following mechanism terms and their use in connection with agmatine and agmatine-adjacent mental-health or state-regulation products: NMDA gain modulation; GluN2B modulation; glutamate/GABA balance; excitatory/inhibitory balance; imidazoline receptor activity; alpha-2 adrenergic tone; nitric oxide synthase modulation; BH4 insufficiency; peroxynitrite burden; oxidative stress; Nrf2; NF-kB; iNOS; nNOS; eNOS; polyamine metabolism; arginine decarboxylase; agmatine deiminase; putrescine; microbial agmatine production; microbiome dysbiosis; LPS; endotoxin; LBP; TLR4; gut permeability; zonulin; p-cresol; mast-cell activation; histamine; PPAR-alpha; ALIAmide activity; microglial activation; neuroinflammation; cytokine tone; mitochondrial dysfunction; fatty-acid transport; acetyl-CoA; acylcarnitine profile; TMA; TMAO; phosphatidylcholine synthesis; phosphatidylserine; acetylcholine; dopamine receptor support; BDNF; NPY; ERK; CREB; mTOR; vagal tone; HRV; HPA-axis activation; cortisol rhythm; sensory gating; predictive processing; precision weighting; interoception; social-safety signalling; recovery debt; autistic inertia; shutdown; meltdown; sensory overload; social fatigue; burnout; psychomotor slowing; perseveration; cognitive rigidity; executive state-transition difficulty.

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28. Public Prior-Art Territory Summary

This section states the public prior-art territory in a compact form. It is intended to make clear that the disclosure is not limited to the preferred four-component embodiment.

28.1 Ingredient territory

The publication discloses agmatine, agmatine salts, agmatine forms, agmatine prodrugs, agmatine analogues, agmatine-production modulators, PEA-class agents, N-acylethanolamides, acylcarnitines, carnitine forms, citicoline, choline/cytidine donors, membrane-support ingredients, mitochondrial-support ingredients, mast-cell-support ingredients, microbiome ingredients, prebiotics, probiotics, postbiotics, gut-barrier ingredients, toxin binders, anti-inflammatory ingredients, antioxidants, minerals, B vitamins, amino acids, omega-3 fatty acids, adaptogens, sleep-support ingredients, purinergic modulators, endocrine-pathway agents and companion-diagnostic materials.

28.2 Composition territory

The publication discloses each ingredient alone, each ingredient pair, three-component combinations, four-component combinations, support stacks, ecology products, diagnostic kits and combined product-service systems. The disclosure includes open, closed and consisting-essentially-of compositions. It includes formulations with and without PEA, with and without ALCAR, with and without citicoline, with and without HPMC, with and without enteric protection, with sulfate and non-sulfate agmatine salts, and with single-unit or physically separated dosage architectures.

28.3 Use territory

The publication discloses uses for state regulation, mental health, autism, ADHD, anxiety, OCD, depression, PTSD, complex trauma, sensory overload, autistic inertia, executive dysfunction, shutdown, meltdown, social fatigue, burnout, fatigue, recovery failure, sleep disruption, gut-brain dysregulation, inflammatory states, mitochondrial impairment, microbiome-linked dysfunction, autonomic dysregulation, endocrine stress load, cognitive rigidity, perseveration, action initiation and social functioning.

28.4 Delivery territory

The publication discloses oral immediate-release, delayed-release, enteric, hydrophilic-matrix, sustained-release, pulsatile, multiparticulate, MUPS, bead, pellet, mini-tablet, capsule, tablet, sachet, stick-pack, sprinkle, gummy, ODT, liquid, food-compatible, buccal, sublingual, intranasal, transdermal, iontophoretic, microneedle, rectal, injectable, infusion, implantable depot and rescue formats.

28.5 Measurement territory

The publication discloses symptom scales, functional outcomes, caregiver reports, clinician reports, blinded observer reports, digital diaries, wearable measures, HRV, sleep measures, GI tolerance measures, task-initiation measures, transition measures, recovery measures and laboratory biomarkers. The publication also discloses using those measures to select subjects, stratify responders, monitor safety, titrate dose, compare formulations and define meaningful improvement.

28.6 Defensive-publication statement

The disclosed subject matter is intentionally published as prior art. The purpose is to make public the broad concept of agmatine and agmatine-adjacent compositions, formulations, protocols, diagnostics, mechanisms, products and service systems for mental-health, neurodevelopmental and state-regulation applications. No private working note is required to practice the public disclosure. The detailed public embodiments and mechanistic rationale in this document stand on their own.