



**Synergistic
Pharma-Botanical Wizard**
Cadenome Technologies Wizard

Synergistic Pharma Botanical Research for Myasthenia Gravis

Evidence map and testable combination hypotheses

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Prepared for scientific investigators, neuromuscular clinicians, clinical pharmacologists and botanical quality specialists.

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Executive assessment

There is a signal worth investigating, but no validated botanical–pharmaceutical combination can presently be presented as an established myasthenia gravis (MG) therapy. A 2022 systematic review included 19 randomized trials (1,283 participants) across 13 Chinese herbal medicines. Six trials of Compound Huangqi contributed to its pooled analysis; adding it to conventional treatment improved symptom scores on the studies' scale (mean difference -3.56 ; 95% CI -4.86 to -2.26). The review graded that result moderate to low certainty. The preparations, trial methods, safety reporting and endpoint scales need careful independent appraisal before any replication or practice claim. [2]

The defensible research lead is a precisely identified and standardized Compound Huangqi preparation studied as an adjunct to a stable conventional treatment, with the exact intervention and comparator reconstructed from the original trials. Isolated astragaloside IV and Shengxian decoction are separate exploratory leads supported by animal work; they are not interchangeable with Compound Huangqi. Synergy between a botanical and a pharmaceutical remains an untested hypothesis until the exact pair is studied with an appropriate interaction design. [2–4]

Scope and analysis route

This paper follows the NPM Wizard Synergistic Pharma ↔ Botanical research boundary. The analysis direction is pharmaceutical to botanical: start with conventional MG therapy as the anchor and examine botanical candidates as potential research adjuncts. It is population-level research, not a review of an individual's medicines. Claims are separated as direct human evidence, animal evidence, mechanistic inference, or missing evidence. The prior Cadenome MG remission report was checked for safety context; its peptide and cell-therapy conclusions are outside the present paper. [1, 9]

Modes applied: Neurology and Immunology specialty reasoning; SIM Synergy Ingredient Matrix; MOA mechanism mapping; evidence grading and translational pharmacology; PGBM botanical identity; interaction screening and TS safety; medical and scientific writing. The user-facing priority labels below are qualitative research priorities, not numerical efficacy or safety scores.

Clinical and biological frame

MG is a heterogeneous autoimmune disorder of neuromuscular transmission. Autoantibody subtype, ocular versus generalized disease, thymic status, current stability and treatment class matter when judging whether an experimental intervention could be studied. Contemporary guidelines place established symptomatic and immune treatments, specialist assessment and appropriate escalation at the center of care. This paper does not imply that a botanical can replace pyridostigmine, corticosteroids, other immunotherapy or rescue care. [5]

The proposed complementarity is biologically plausible at two different levels: pyridostigmine provides symptomatic acetylcholinesterase inhibition, while a botanical mixture or constituent might alter immune signaling. That division of roles is an inference, not proof of a favorable pharmacodynamic interaction or an MG outcome. A biomarker change in Th17 or Treg cells cannot stand in for improved weakness, swallowing or breathing. [2–5]

Prescription therapies and mechanisms of action

This class map covers commonly prescribed MG medicines, including off-label immunosuppressants and newer targeted agents. Use is phenotype, jurisdiction and label dependent. IV immunoglobulin and plasma exchange are included as short-term immune interventions, although they are not conventional small-molecule prescriptions. These established treatments are the pharmaceutical anchors for SIM; none has a demonstrated synergistic botanical pair in this review. [5, 11]

MG medicine or class	MOA and intended MG effect	PDK and SIM checkpoint
Pyridostigmine	Reversible acetylcholinesterase inhibition raises acetylcholine availability at the neuromuscular junction; symptomatic, not immune-modifying. [12]	Oral, mainly renal elimination. PD: cholinergic toxicity can itself worsen weakness; test botanical cholinesterase activity and GI effects before proposing overlap. [12]
Prednisone or prednisolone	Glucocorticoid receptor signaling broadly suppresses inflammation and adaptive immune activity. [5, 13]	Systemic exposure and tapering are clinically important. PD: possible initial transient MG worsening, infection, glucose, bone and blood-pressure liabilities; assess overlapping botanical immune and metabolic effects. [5, 6, 13]
Azathioprine	Thiopurine prodrug produces metabolites that suppress proliferating lymphocytes; steroid-sparing MG use is often off-label. [5, 14]	Metabolism and TPMT/NUDT15 status matter; marrow and liver toxicity require surveillance. A botanical that inhibits relevant metabolism or adds organ toxicity is a safety concern, not an assumed synergy. [5, 14]
Mycophenolate mofetil	Converted to mycophenolic acid; inhibits inosine monophosphate dehydrogenase and lymphocyte guanosine synthesis; MG use often off-label. [5, 15]	Oral prodrug, glucuronidation and enterohepatic recirculation. Absorption and metabolite handling can be disrupted; immunosuppression and embryo-fetal risk remain. [15]
Cyclosporine or tacrolimus	Calcineurin pathway inhibition reduces T-cell activation; selected off-label or regional MG use. [5, 11]	Narrow exposure margins and CYP3A/P-gp interaction potential; renal toxicity and blood-pressure effects make unidentified botanical extracts unsuitable for an unscreened pair. [5, 11]
Rituximab or inebilizumab	Rituximab depletes CD20 B cells; inebilizumab targets CD19 B-lineage cells. MG status and antibody eligibility differ. [5, 11, 16]	Monoclonal antibodies given by infusion; immunologic PD overlap, infection risk, hepatitis screening and vaccine planning dominate rather than a simple herbal CYP interaction. [11, 16]
FcRn blockers: efgartigimod, rozanolixizumab, nipocalimab	Block neonatal Fc receptor recycling and lower circulating IgG, including pathogenic antibodies; eligibility varies by product. [11, 17, 19]	Biologic routes and cycles vary. PD: falling total IgG, infection and vaccine considerations. Nipocalimab label warns of reduced effectiveness of certain FcRn-binding medicines; botanical immune effects are untested. [11, 17, 19]
C5 inhibitors: eculizumab, ravulizumab, zilucoplan	Prevent terminal complement activity after antibody-mediated activation; selected AChR-positive generalized MG. [11, 18]	Infused antibodies or injected peptide; serious meningococcal risk requires label-specific vaccination and risk controls. Botanical complement claims must not obscure infection risk. [11, 18]
IV immunoglobulin or plasma exchange	Provide rapid temporary immunomodulation or remove antibody-containing plasma in selected severe settings. [5, 11]	IVIg exposure and plasma-exchange removal of circulating proteins affect sequencing of other biologics. Acute MG stabilization is outside a botanical pairing experiment. [5, 11]

PDK means pharmacokinetics and pharmacodynamics. This table names the decisive exposure and response questions; it is not a dose table. Exact timing, formulation, antibody eligibility, interactions and treatment status require the current local

product label and a pharmacist’s review. In particular, “off-label in MG” does not mean an ineffective drug, and FDA approval for one antibody subtype must not be generalized to every patient. [5, 11–18]

Evidence prioritized candidate matrix

Research candidate	What is directly observed	Disposition and limitation
Compound Huangqi formula plus conventional care	Human add-on studies in the 2022 systematic review; pooled symptom-score signal in six trials. [2]	Highest replication priority. Reconstruct exact formula, plant identity, standardization and trial comparators. No pairwise synergy established.
Astragaloside IV from Astragalus species	2026 rat experimental autoimmune MG study reported changes in Th1, Th17, Treg, Tfh, microbiota and disease measures. [3]	Exploratory constituent. Animal exposure and a purified molecule cannot be equated to a whole herb or human formula.
Shengxian decoction	2025 rat experimental autoimmune MG study reported strength and immune-signaling findings. [4]	Exploratory distinct multi-herb preparation. Abstract contains a confusing sentence about cell-direction changes; resolve against the full data before reusing that claim.
Ashwagandha, Withania somnifera	No MG-specific benefit established here. NCCIH cautions against use in autoimmune or thyroid disorders and notes immunosuppressant interactions. [7]	Exclude from a proposed MG combination pending compelling disease-specific safety evidence.
Turmeric or concentrated curcumin	No MG-specific clinical outcome established here. Formulations differ; highly bioavailable products have reported liver injury. [8]	Do not prioritize on generic anti-inflammatory logic alone; requires formulation-specific safety and direct MG evidence.

Interpretation: the human evidence belongs to the studied multi-herb formulations as prepared in their trials. It cannot be transferred to an isolated ingredient, a different extraction process, or a newly assembled blend. Lower adverse-event counts reported by the 2022 review should not be interpreted as proof that adding herbs is generally safer, because reporting completeness, intervention differences and study bias remain material. [2]

Mechanism and combination hypotheses

Hypothesis	Mechanism and measurable prediction	Evidence status
H1 Formula plus stable standard care	A matched Compound Huangqi formulation might improve a prespecified MG patient-reported or clinician-rated outcome beyond a stable background regimen.	Indirect human add-on signal [2]; exact new product pair unproven.
H2 Immune modulation	Astragaloside IV could alter T-cell balance and inflammatory pathways in experimental MG; test against AChR antibody and junctional function as well as immune readouts.	Animal-only MG evidence [3]; no human efficacy inference.
H3 Distinct botanical network	Shengxian decoction might influence Treg-related signaling and disease expression in a rat MG model.	Animal-only formula evidence [4]; cannot attribute effects to one herb.
H4 Interaction or antagonism	Botanical constituents could alter exposure, immune treatment effect, hepatic injury risk or neuromuscular transmission.	Open safety question; absence of a signal is not evidence of compatibility [6–8].

True synergy would require a prespecified interaction estimate: for example, a well-controlled 2×2 preclinical factorial experiment including botanical alone, drug alone, both and neither, with exposure matching and MG-relevant outcomes. The human add-on trials can show incremental benefit against their comparators, but without the full factorial contrast they cannot by themselves establish pharmacological synergy. A later human study should specify whether it tests incremental clinical benefit rather than overclaiming mechanistic synergy.

SIM pairing matrix and PDK research gates

The SIM assessment scores research direction qualitatively. “Study” means a controlled experiment may be justified after source and safety review; it never means the combination has been cleared for use. A critical safety concern overrides any possible mechanism match. [1]

Drug anchor	Botanical candidate and SIM relationship	PDK experiment and disposition
Pyridostigmine	Matched Compound Huangqi: possible immune versus symptomatic complementarity; human add-on studies exist, but exact-pair synergy remains unknown. [2, 12]	Compare matched formula, drug and pair; neuromuscular function plus cholinergic signs, oral exposure and GI tolerability. Highest replication priority after source reconstruction.
Prednisone	Matched Compound Huangqi: add-on signal in trials that included prednisone, pyridostigmine or both; comparator mixtures limit attribution. [2]	Stratify by background medicine; test infection, glucose and organ toxicity. Do not infer steroid-sparing or safe tapering.
Azathioprine or mycophenolate	Compound Huangqi: immune pathway overlap; no directly established pair outcome in this paper. [2, 14, 15]	First test product–drug exposure, blood counts, liver effects and immune readouts. Exploratory only; pharmacology gate before efficacy work.

Drug anchor	Botanical candidate and SIM relationship	PDK experiment and disposition
Calcineurin inhibitors	Any proposed standardized botanical: PK interaction may dominate mechanism match. [5, 11]	CYP3A/P-gp and renal-toxicity screen required; do not rank as a favorable pairing without product-specific data.
B-cell or FcRn therapies	Astragaloside IV or botanical formulas: immune overlap could be complementary or counterproductive; no direct pair data. [3, 11, 16, 17]	Test immune function and infection endpoints; assess effects on antibody exposure where relevant. Low priority until monotherapy translation and safety improve.
C5 inhibitors	Astragaloside IV or botanical formulas: upstream immune versus terminal-complement concept only. [3, 11, 18]	No inference of additive benefit; meningococcal risk and vaccine requirements are hard gates. Defer
Any immune treatment	Ashwagandha: autoimmune cautions and possible immunosuppressant interactions. [7]	Exclude from this MG SIM shortlist; no favorable score assigned.

For each testable pair, the PDK package should include ingredient identity, route and formulation; absorption and exposure of both agents; relevant transporter and enzyme assays; drug target engagement; change in autoantibodies and immune cell profiles; MG functional endpoints; and timed adverse-event surveillance. Separate pharmacodynamic complementarity from pharmacokinetic interference. A whole formula needs batch-to-batch chemical fingerprints and contaminant testing before a negative or positive interaction result can be generalized.

Research design and decision gates

Stage 1 Reconstruct and audit. Retrieve original Compound Huangqi trials. Record formulas in Latin binomials, plant parts, voucher or identity methods, extraction process, marker compounds, contaminants, dose reporting as a research variable, treatment background, MG subtype, trial registration, outcomes, attrition and adverse-event ascertainment. Reassess each trial with RoB 2 and each endpoint with GRADE; verify that any proposed test material actually matches the studied material. [2]

Stage 2 Establish mechanism without losing function. Use a qualified experimental autoimmune MG model and relevant neuromuscular-junction assays. Prespecify weakness score, repetitive nerve stimulation, AChR antibody, tissue injury, and cytokine or T-cell measurements. Evaluate product alone, conventional anchor alone and the pair; include exposure and toxicity measures. Explore purified astragaloside IV and Shengxian decoction in separate arms or programs, not as presumed equivalent versions of Compound Huangqi. [3, 4]

Stage 3 Decide whether clinical replication is justified. Independent scientific and safety reviewers should assess material identity, reproducibility, interaction results, contamination control and a favorable preliminary safety profile. Only a candidate that passes these gates moves to the separate clinical workstream below. [1]

Proposed clinical work

Clinical objective. Determine whether one authenticated, standardized Compound Huangqi preparation adds measurable benefit to stable, guideline-directed MG care and whether it creates an unacceptable safety or drug-exposure signal. This is a proposed research program, not an approved study or a product claim. It does not test astragaloside IV or Shengxian decoction as substitutes for the studied formula. [2, 5]

Before a protocol. Complete the original-trial evidence audit and botanical chemistry specification; test interaction and toxicology questions relevant to the selected pharmaceutical background; obtain neuromuscular, pharmacy, ethics and regulatory input; establish good manufacturing controls and an independent safety oversight plan. Do not recruit until the identity, mechanism, exposure and safety gates have been documented and approved. [1, 2]

Design element	Proposed clinical specification
Population	Adults with confirmed, clinically stable MG in a prespecified serologic and ocular/generalized stratum; define antibody subtype, thymic status, baseline severity and treatment stability prospectively. Initial study should exclude current crisis or unstable bulbar/respiratory symptoms.
Intervention and comparator	Randomized, blinded, placebo-controlled add-on design: standardized Compound Huangqi versus matching placebo on unchanged background MG care. Fix extract identity, batch fingerprint, route, exposure rationale and masking in the protocol; no dosing recommendation is made here.
Pharmaceutical anchors	Prospectively stratify and report pyridostigmine-only versus immunotherapy backgrounds as appropriate. Avoid pooling across prednisone, thiopurine, FcRn and C5 pathways without sufficient sample size and prespecified analysis.
Primary and secondary endpoints	Choose MG-ADL or a validated clinician-rated MG endpoint as the prespecified primary outcome; include QMG, function/quality of life, change in rescue therapy, worsening and patient-reported burden as secondary outcomes. Biomarkers are exploratory, not substitutes for clinical function.
Safety and PDK	Record exacerbations, swallowing and breathing events, infections, liver and renal indices, blood counts, concomitant medicines and herb identity. In a consenting PK subset, examine selected anchor-drug exposure and botanical marker exposure; assess whether the pairing changes either.
Analysis and governance	Prespecify clinically meaningful effect, sample size, missing-data handling, subgroup tests, adverse-event adjudication and stopping rules. Register the trial, use independent safety monitoring, and report results regardless of direction. A simple add-on trial tests incremental benefit, not formal drug-botanical synergy.

Next trial decision. A positive, adequately controlled add-on result with reassuring exposure and safety findings would justify external replication. A statistically significant symptom score alone would not establish disease modification or remission. Any later claim of interaction synergy needs a design with prespecified interaction contrasts and an ethically acceptable comparator structure; it cannot be inferred by merging unlike drug regimens. [1, 2]

Explicit safety and interaction pass

A neuromuscular clinician and pharmacist must review any real-world medication or supplement exposure. MGFA flags medicines that may worsen MG and specifically warns that intravenous magnesium can be dangerous in MG; its warning should not be flattened into a universal claim that all oral magnesium is forbidden. Worsening swallowing, speech or breathing requires urgent medical evaluation. [6, 10]

For every botanical research candidate, screen against pyridostigmine, corticosteroids, azathioprine, mycophenolate, rituximab and other actual background medicines as applicable. Investigate pharmacokinetic effects, immune effects, liver and kidney toxicity, bleeding risk, contamination, adulteration and perioperative issues rather than assuming a clean interaction profile. Ashwagandha is a specific exclusion candidate for autoimmune or thyroid contexts under NCCIH guidance. Highly bioavailable curcumin formulations carry a liver-injury concern; product identity and formulation are decisive. [6–8]

Safety gate: any material worsening of strength, bulbar or respiratory function, concerning liver injury, serious infection signal, or inability to verify the botanical product blocks progression to an approved research-use report pending specialist review. These are research governance criteria, not a home-use monitoring protocol.

Limits and conclusions

The literature search was targeted rather than a registered systematic review. Sources were checked on 24 September 2026, with a focus on a 2022 review, two MG animal studies, current management guidance and institutional safety material. No proprietary unpublished data, live pharmacovigilance feed or original trial participant data were available for this paper. Numerical SIM scores were intentionally omitted because the evidence is heterogeneous and a single composite number could conceal critical safety uncertainty.

Conclusion: a precisely reproduced Compound Huangqi formula added to conventional treatment is the lead for independent evidence appraisal and controlled replication. Astragaloside IV and Shengxian decoction support separate mechanistic work. A claim of therapeutic synergy, disease modification, remission or demonstrated safety for a new botanical–drug pair is not established. Scientific and safety review are required before this draft can be released as an approved research report.

Appendix A Citations and source register

[1] Cadenome Technologies. NPM Wizard AI Synergistic Pharma Botanical Wizard software product and technical specification. Version 1.0, 10 September 2026. Internal project source.

[2] Zhu S et al. Chinese herbal medicine for myasthenia gravis: a systematic review and meta-analysis of randomized clinical trials. *Integrative Medicine Research*. 2022;11(2). doi:10.1016/j.imr.2021.100806. <https://www.kci.go.kr/kciportal/ci/sereArticleSearch/ciSereArtiView.kci?sereArticleSearchBean.artiId=ART002848261>

[3] Xu L et al. Astragaloside IV ameliorates experimental autoimmune myasthenia gravis through multi-target regulation of immune-microbiota-metabolism network and ferroptosis inhibition. *Pathology Research and Practice*. 2026;282:156423. PMID 41795502. <https://pubmed.ncbi.nlm.nih.gov/41795502/>

[4] Wang S et al. Shengxian decoction alleviates experimental autoimmune myasthenia gravis by enhancing the immunosuppressive activity of regulatory T cells via Hippo pathway. *Journal of Ethnopharmacology*. 2025;352:120250. PMID 40619040. <https://pubmed.ncbi.nlm.nih.gov/40619040/>

[5] Jacob S et al. Association of British Neurologists autoimmune myasthenia gravis management guidelines, 2025 update. *Practical Neurology*. 2025;25:422–437. PMID 40940171. <https://pubmed.ncbi.nlm.nih.gov/40940171/>

- [6] Myasthenia Gravis Foundation of America. Cautionary Drugs. Accessed 24 September 2026. <https://myasthenia.org/Living-With-MG/MG-Emergency-Preparedness/Cautionary-Drugs/>
- [7] National Center for Complementary and Integrative Health. Ashwagandha: Usefulness and Safety. Accessed 24 September 2026. <https://www.nccih.nih.gov/health/ashwagandha>
- [8] National Center for Complementary and Integrative Health. Turmeric: Usefulness and Safety. Accessed 24 September 2026. <https://www.nccih.nih.gov/health/turmeric>
- [9] Cadenome Technologies. Peptide and Cell-Based Approaches to Myasthenia Gravis Remission. Research evidence report, 17 September 2026. Internal project context; no botanical efficacy claims drawn from it.
- [10] Myasthenia Gravis Foundation of America. Emergency Management of Myasthenia Gravis, for people with MG, families and caregivers. <https://myasthenia.org/wp-content/uploads/2024/09/MGFA-brochure-Emergency-Mgt-People-with-MG-Caregivers.pdf>
- [11] Myasthenia Gravis Foundation of America. Myasthenia Gravis Treatments Chart. Accessed 24 September 2026. <https://myasthenia.org/myasthenia-gravis-treatments-chart/>
- [12] National Library of Medicine. DailyMed: Pyridostigmine bromide tablet, label updated February 2026. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=1aa7a886-c726-cc91-e063-6294a90a1af1>
- [13] National Library of Medicine. DailyMed: Prednisone tablet. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=263ed4fa-3c29-4abb-9cb1-bc016bd34a05>
- [14] US Food and Drug Administration. Imuran (azathioprine) prescribing information, 2024. https://www.accessdata.fda.gov/drugsatfda_docs/label/2024/016324s0401bl.pdf
- [15] US Food and Drug Administration. CellCept (mycophenolate mofetil) prescribing information, 2026. https://www.accessdata.fda.gov/drugsatfda_docs/label/2026/050758s054s0561bl.pdf
- [16] National Library of Medicine. DailyMed: Uplizna (inebilizumab-cdon) prescribing information. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=834db232-afb0-4dcf-93e0-009ce8245c20>
- [17] National Library of Medicine. DailyMed: Vyvgart (efgartigimod alfa) prescribing information. <https://dailymed.nlm.nih.gov/dailymed/lookup.cfm?setid=8aefc8e3-26d6-4ff6-aab9-a7542927e084>
- [18] US Food and Drug Administration. Ultomiris (ravulizumab-cwvz) prescribing information, 2025. https://www.accessdata.fda.gov/drugsatfda_docs/label/2025/761108s0411bl.pdf
- [19] US Food and Drug Administration. Imaavy (nipocalimab-aahu) prescribing information, revised August 2026. https://www.accessdata.fda.gov/drugsatfda_docs/label/2026/761430s0021bl.pdf

Mode and review record

Modes used: Neurology, Immunology, SIM, MOA, Evidence Grading, Translational Pharmacology, PGBM, Interaction Screening, TS Safety, Medical and Scientific Writing. Confidence: moderate in the existence of a limited human add-on signal; low in a transferable benefit for a new product; very low in any exact-pair synergy inference. Evidence limits: heterogeneous formulas and outcomes, preclinical transfer gap, incomplete product matching. Review status: unreviewed research draft. Safety disclaimer: not a treatment protocol or authorization to combine botanicals with MG medicines.