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Summary

BREAKING THE EVIDENCE BOTTLENECK: A HYBRID ARTIFICIAL INTELLIGENCE AND HUMAN PIPELINE TO MAP THE OVER THIRTY-FIVE YEAR IMMUNOMODULATORY LEGACY OF LACTOBACILLUS RHAMNOSUS GG

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Stomach & H. Pylori | Nurses | Immunology | Endoscopy | Digestive Oncology

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A hybrid human-AI workflow using three free large language models validated for systematic literature review reduced evidence synthesis time from weeks to days and identified a consistent immunological fingerprint for Lactobacillus rhamnosus GG across 35 years of research.

KEY POINTS

- The pipeline screened over 35 years of PubMed literature (1989-2026) using Gemini 3 Flash, Perplexity Academic, and Claude 4.6 Sonnet, each with distinct architectures optimized for complementary tasks.
- Gemini 3 Flash demonstrated superior sensitivity (0.93-0.97) for rapid screening, while Perplexity Academic achieved near-perfect specificity (0.99) through its Retrieval-Augmented Generation architecture that mitigated hallucinations.
- A consistent core immunological fingerprint was identified for LGG characterized by TNF-α and IL-6 suppression alongside IL-10 and IFN-γ upregulation.
- A paradigm shift in LGG research was observed: historical studies (pre-2019) focused on mucosal barrier integrity and IgA production, whereas recent research (2019-2026) emphasizes complex molecular signaling including IL-22, Type-I Interferons, and Inflammasome modulation.
- The zero-cost methodology democratizes high-level research and provides a replicable solution to the biomedical literature scalability crisis, with the researcher acting as an AI-orchestrator rather than performing mechanical extraction.

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