Pranavaha White Paper

A mechanistic hypothesis linking pranayama, cholinergic regulation, and tobacco cessation

Dr. Nischaya Nagori and Divyanshu Singh Chouhan

Lead author: Dr. Nischaya Nagori
Dr. Nischaya Nagori, Consciousness Researcher & Vedic Scholar, Vaidik Wisdom Series
Divyanshu Singh Chouhan, Software Engineer and Research Contributor

vaidikwisdomseries.com

Final workspace synthesis prepared on 2 April 2026

Publication posture

This document is intentionally conservative. The underlying literature is strong enough for a serious mechanistic white paper, but the local computational workspace does not yet contain reproduced docking, molecular-dynamics, or MM-PBSA outputs. The correct claim is: integrated hypothesis plus executable roadmap, not full mechanistic closure.

Executive Summary

The Pranavaha thesis begins with a narrow but consequential claim: cigarette smoking is not only a receptor-binding problem, but also a broken breath ritual that repeatedly perturbs autonomic regulation, inflammatory signaling, and conditioned craving. The white paper integrates recent alpha7 nicotinic acetylcholine receptor structural biology, updated understanding of the cholinergic anti-inflammatory pathway, slow-breathing physiology, OM / Bhramari findings, and cessation trial evidence into one coherent framework.

The strongest support currently available in this workspace is literature-backed. The 2025 structural work on alpha7 receptor desensitization is real and central. The CAP revision toward extrasplenic neuronal signaling is real and central. The HRV, humming, and mantra findings are real enough to justify mechanistic discussion. Smoking-cessation RCTs and module-development papers support feasibility. What is not yet real in this workspace is reproduced docking, real DiffDock output, molecular dynamics, MM-PBSA, PBPK, or virtual-trial simulation.

This white paper therefore serves two functions at once: it is a polished technical narrative for researchers, funders, and reviewers, and it is a publication-aligned boundary document that keeps the project honest about what has been executed versus what still needs to be run.

Core Thesis

The Pranavaha model proposes that authentic slow nasal breathing and structured mantra recitation may restore regulatory functions that smoking counterfeits badly. Nicotine provides partial agonism and slower recovery at alpha7 receptors, while slow breathing is hypothesized to generate short endogenous acetylcholine pulses, vagal engagement, and more adaptive autonomic timing. The clinical ambition is not simply craving suppression. It is ritual replacement, inflammatory regulation, and restoration of self-regulation.

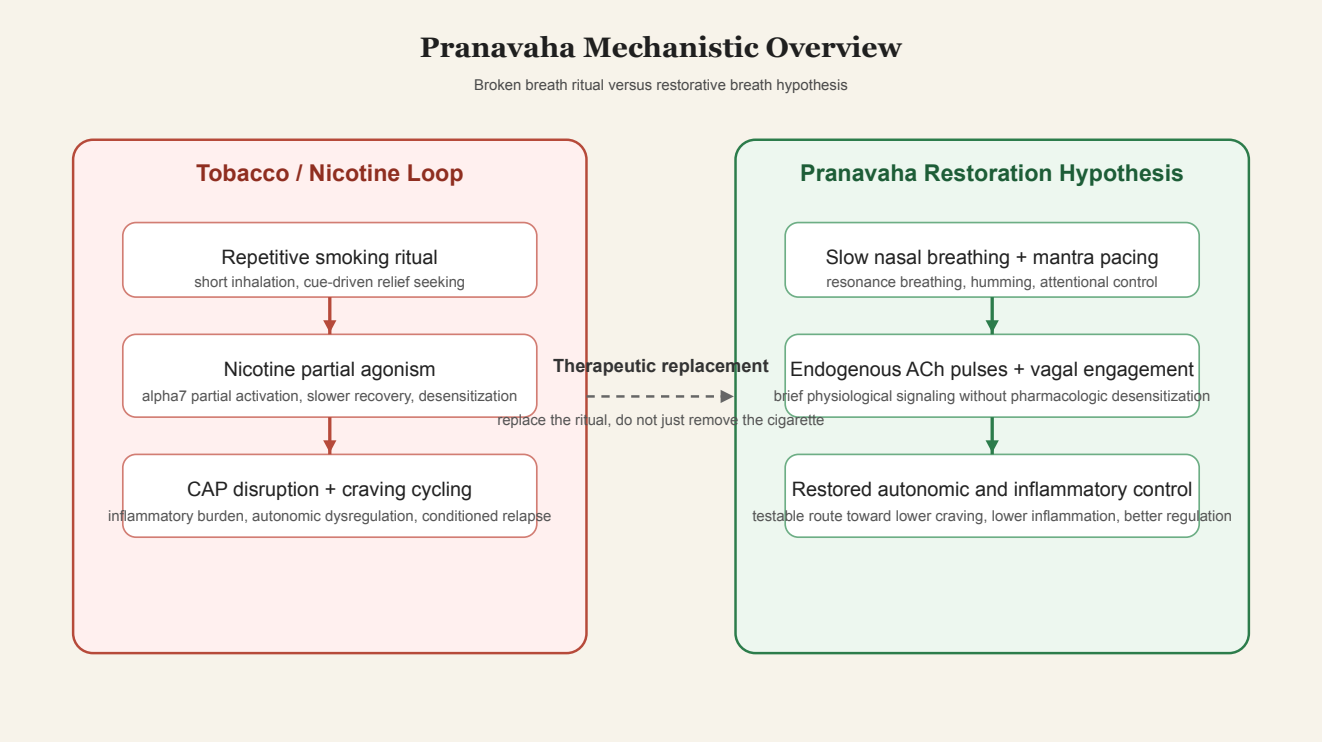

Figure 1: Mechanistic overview of the project's central comparison: repetitive smoking ritual versus the restorative-breath hypothesis.

What The Evidence Supports Right Now

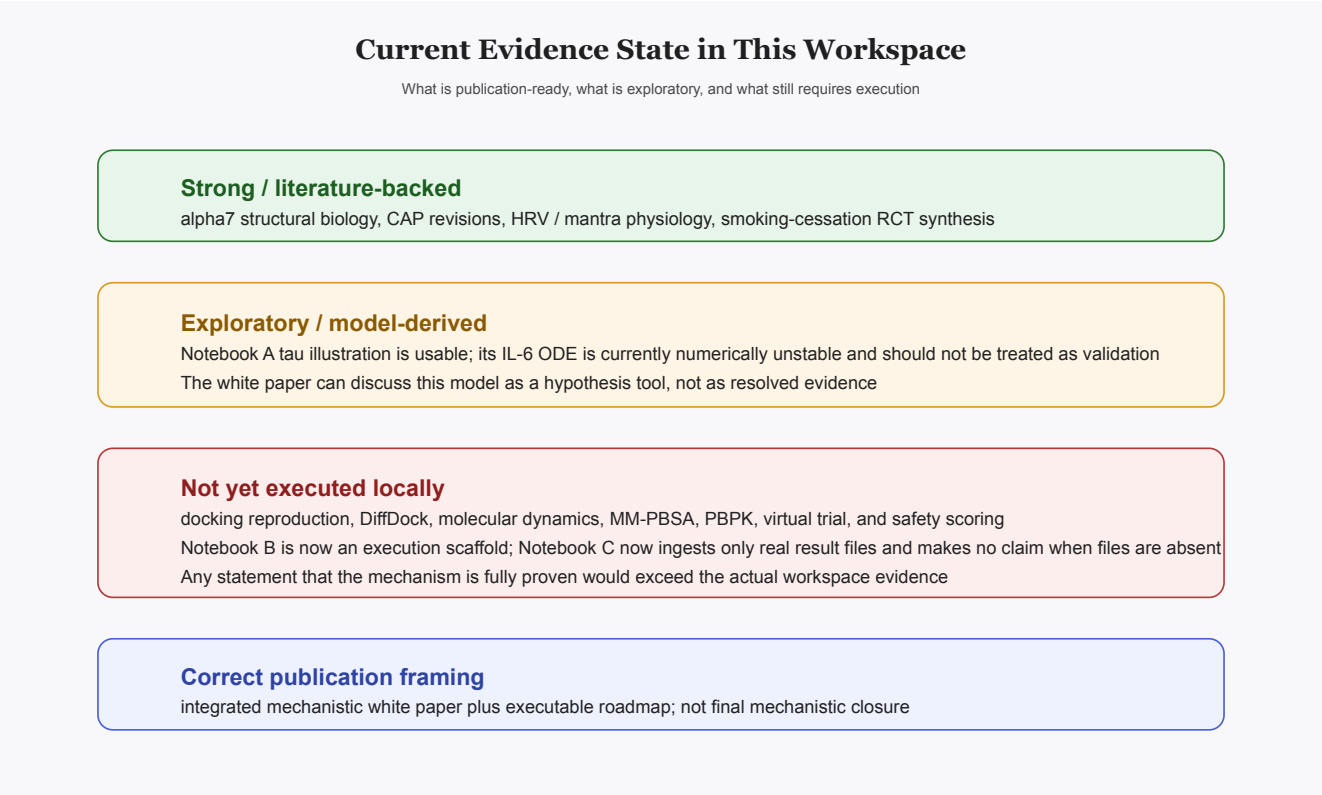

Figure 2: Current evidence boundaries in the workspace after the remediation pass.

Strong literature-backed pillars

- **Alpha7 structural biology:** The 2025 Science Advances study on progressive recovery from nicotine-induced desensitization provides the most important molecular anchor in the project.
- **Cholinergic anti-inflammatory pathway:** The extrasplenic neuronal revision materially strengthens the argument that autonomic and cholinergic timing matter.
- **Pranayama and HRV physiology:** Resonance-frequency breathing, vagal metrics, and mantra-style differences support a serious autonomic mechanism discussion.
- **OM / Bhramari evidence:** The fMRI OM paper, humming-related nitric-oxide study, and pulmonary-function trial justify cautious mechanistic synthesis.
- **Smoking-cessation intervention studies:** The yoga and breathing literature is heterogeneous, but sufficient to justify feasibility and trial design discussion.

Still exploratory or incomplete

- The local ODE model is illustrative, but its current parameterization becomes numerically unstable for `pranayama` and `triple` runs.
- Docking has not been reproduced locally.
- No real DiffDock, molecular-dynamics, or MM-PBSA result files are present.
- PBPK, virtual-trial, and safety scoring remain proposed workflows.

Included Workspace Figures

The tau figure below is a real artifact generated from the current workspace. It is safe to include because it illustrates a literature-backed kinetic contrast rather than pretending to validate an unexecuted simulation pipeline.

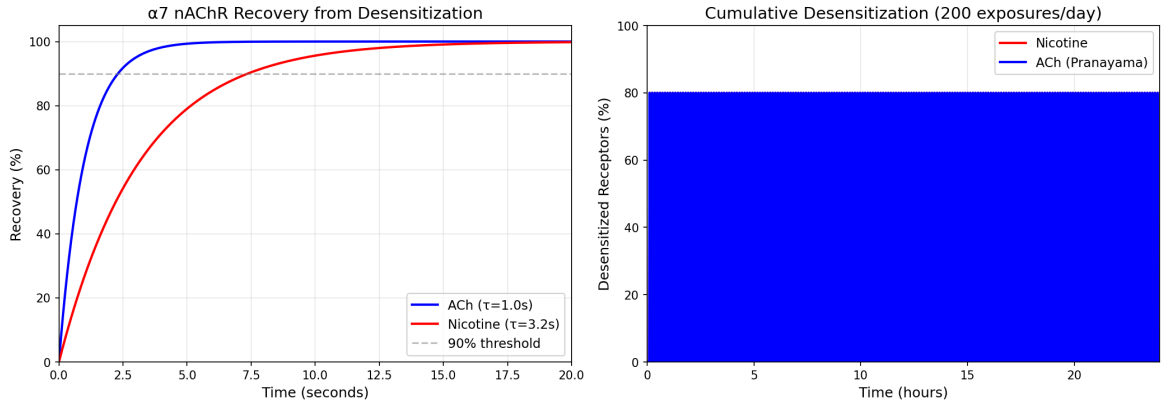

Figure 3: Illustrative tau comparison from Notebook A. This figure is a computational illustration of the literature-reported recovery asymmetry and not a stand-alone validation of the full Pranavaha model.

Computational Workspace Status

Notebook A: exploratory ODE calibration

Notebook A now has the correct breathing cadence of 6 breaths per minute and writes all outputs into a dedicated artifact directory. Its value is conceptual: it helps inspect parameter behavior and failure modes. Its current limitation is decisive and must be stated plainly: the `pranayama` and `triple` branches are numerically unstable under the present parameterization.

Notebook B: honest docking scaffold

Notebook B no longer fabricates PDBQT conversion or presents published values as if they were reproduced locally. It now:

- downloads the receptor structures needed for local work,
- infers a docking box from a co-crystal,
- records the published piperine / donepezil comparison,
- writes a manifest and readiness report, and
- refuses to claim validation without real prepared inputs and actual Vina runs.

Notebook C: results-ingestion only

Notebook C no longer generates synthetic trajectories, fake MM-PBSA numbers, or mock validation tables. It now behaves as a strict analysis harness: if real DiffDock, trajectory, MM-PBSA, or validation files are present, it summarizes them; if they are absent, it states that no validation claim is possible.

Integrated White Paper Narrative

Why this hypothesis remains interesting

The project retains its value because the mechanistic pieces are not arbitrary. Smoking clearly couples cue-conditioned behavior to receptor pharmacology. Slow breathing clearly affects autonomic timing. Humming clearly affects upper-airway and vagal-relevant physiology. Recent alpha7 structural work clearly sharpens the desensitization story. Bringing these strands together is intellectually serious, even if the final therapeutic claim remains unproven.

Why the project must stay disciplined

The same integrative ambition that makes the project interesting can also make it vulnerable to overstatement. When multiple literatures are combined, it becomes easy to slide from "coherent mechanistic synthesis" into "fully solved therapeutic mechanism." This workspace no longer does that. The publication-grade position is:

- the molecular and physiological synthesis is strong enough for a white paper and a mechanistic manuscript,
- the computational execution package is partly prepared but not complete,
- and the decisive next step is not rhetoric but reproducible computation followed by human study.

Correct near-term claim

The Pranavaha framework is best presented as a testable, interdisciplinary cessation hypothesis with unusually strong structural and physiological motivation. It is not yet best presented as a completed molecular-validation platform.

Decisive Next Experiments

1. Reproduce docking locally with prepared receptor and ligand files, then archive poses, score logs, and receptor preparation steps.
2. Stabilize or redesign the ODE model so that the `pranayama` and `triple` branches no longer diverge numerically.
3. Generate real DiffDock / MD / MM-PBSA outputs and place them in the expected artifact directories so Notebook C can summarize them without special handling.
4. Freeze a submission-grade reference list with complete bibliographic metadata and remove remaining placeholder-style citations where possible.
5. Use the current white paper for communication, but keep the manuscript and computational paper aligned to the actual execution state after every new experiment.

Supporting Documents

This white paper sits alongside the following source-of-truth documents in the same workspace:

- `pranavaha_arxiv_draft.md`: full technical manuscript source
- `pranavaha_arxiv_v1.0.pdf`: full manuscript PDF
- `PRANAVAHA_POC_Computational_Validation.md`: computational roadmap and execution scaffold
- `DOCUMENT_STATUS.md`: authoritative document and artifact map

Author Notes

Dr. Nischaya Nagori is the lead author of this work, a consciousness researcher, and a Vedic scholar whose research focuses on the interface between classical Vedic knowledge, consciousness studies, and contemporary scientific models.

Divyanshu Singh Chouhan is a software engineer and research contributor whose work emphasizes making advanced technology understandable and practically usable for wider audiences.

Selected References

1. Liu S, Chen H, Zhu X, et al. Structural insights into the progressive recovery of alpha7 nicotinic acetylcholine receptor from nicotine-induced desensitization. **Science Advances** (2025).
2. Merchant W, Wyler S, Chen B, Gautron L. The molecular components of the anti-inflammatory cholinergic pathway are extrasplenic. **PLoS ONE** (2025).
3. Kalyani BG, Venkatasubramanian G, Arasappa R, et al. Neurohemodynamic correlates of OM chanting: A pilot fMRI study. **International Journal of Yoga** (2011).
4. Vialatte FB, Bakardjian H, Prasad R, Cichocki A. EEG paroxysmal gamma waves during Bhramari Pranayama. **Consciousness and Cognition** (2009).
5. Weitzberg E, Lundberg JO. Humming greatly increases nasal nitric oxide. **American Journal of Respiratory and Critical Care Medicine** (2002).
6. Mooventhan A, Khode V. Effect of Bhramari pranayama and OM chanting on pulmonary function in healthy individuals. **International Journal of Yoga** (2014).
7. Bernardi L, Sleight P, Bandinelli G, et al. Effect of rosary prayer and yoga mantras on autonomic cardiovascular rhythms. **BMJ** (2001).
8. Singh S, Dhanlika D, Haldar P, Sharma G. Efficacy of yoga on tobacco cessation: a systematic review and meta-analysis. **Nicotine and Tobacco Research** (2025).
9. Kumar S, Saini S, Mishra G, et al. Volitional Yoga Breathing for Smokers: Development, Validation, and Feasibility. **Cureus** (2026).
10. Chandra Shekar MV, Bhargav H, Holla B, et al. Development, validation and feasibility testing of Y-BLISS module. **Journal of Family Medicine and Primary Care** (2025).