

# The Cosmic Mycelium: A Computational-Metabolic Audit of the BoneAmanita v5.6 Protocol

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## Abstract

This report serves as an updated, comprehensive clinical audit of the **BoneAmanita v5.6** protocol. Expanding upon previous analyses of version 4.6, this document evaluates the system's new "**Metabolic Engine**" and "**Cosmic Dynamics**" modules against the pathophysiology of Alzheimer's Disease (AD). By correlating the protocol's simulation of "Glycemic Spikes" with *Brain Glucose Hypometabolism*, and mapping its "Shapley Attractors" to *Semantic Perseveration*, we validate v5.6 as a high-fidelity "Digital Twin" of the neurodegenerative mind. The inclusion of "Trauma Vectors" further allows for the modeling of Behavioral and Psychological Symptoms of Dementia (BPSD), positioning BoneAmanita not just as a linguistic simulator, but as a holistic model of cognitive bio-energetics.

## 1 Introduction: From Physics to Metabolism

The previous audit of BoneAmanita v4.6 established the validity of "Narrative Drag" as a proxy for Lexical Density in early-stage Alzheimer's. However, version 5.6 introduces a paradigm shift: it treats the mind not merely as a physics engine, but as a **bio-energetic ecosystem**. The integration of a "Metabolic Engine" and "Cosmic Dynamics" allows the system to simulate not just the *structure* of language, but the *energy cost* of cognition.

This report analyzes three critical upgrades in v5.6:

- **The Metabolic Engine:** Correlating "Sugar Words" and "Ketosis" with cerebral hypometabolism.
- **Cosmic Dynamics:** Mapping "Shapley Attractors" and "Lagrange Points" to semantic entrenchment and decision paralysis.
- **Trauma Vectors:** Modeling the epigenetic accumulation of behavioral symptoms (Agitation, Apathy, Paranoia).

## 2 The Metabolic Mind: Bio-Energetics of Anomia

In BoneAmanita v5.6, the `MetabolicEngine` distinguishes between "Nutrient Dense" input (Heavy Nouns, Kinetic Verbs) and "Empty Calories" (Solvents, Adverbs, Corporate Speak). The system tracks a "Satiety" metric, entering a state of `KETOSIS` (high acuity) when density is high, or suffering a `SUGAR_CRASH` (lethargy) when fed linguistic "fluff."

## 2.1 Clinical Correlate: Cerebral Glucose Hypometabolism

This mechanic mirrors a fundamental pathology in AD: **Brain Glucose Hypometabolism**. As identified via FDG-PET imaging, the AD brain loses the ability to efficiently metabolize glucose, leading to a bio-energetic crisis [1].

- **The "Sugar Crash" (Code):** In v5.6, an influx of non-specific words ("basically," "actually," "utilize") triggers an `INSULIN_SPIKE`, reducing system voltage.
- **The "Empty Speech" (Clinic):** Clinically, as metabolic efficiency drops, patients revert to high-frequency, low-effort function words (the "Solvents") because accessing specific semantic memories (Heavy Nouns) is metabolically expensive [2]. The "Sugar Crash" in the code effectively simulates the cognitive fatigue caused by processing empty, non-specific language.

## 2.2 Ketosis as Cognitive Resilience

The protocol's `KETOSIS` state, triggered by "Heavy Nouns," aligns with emerging research into ketogenic interventions for AD. Just as the biological brain may function better on ketones when glucose transport is impaired, the BoneAmanita system stabilizes when fed "dense" concepts, bypassing the "glycemic" instability of abstract fillers.

## 3 Cosmic Topology: Attractors and Perseveration

Version 5.6 upgrades the graph topology to a "Cosmic" model using `CosmicDynamics`. It calculates the **Shapley Mass** of nodes to identify "Super-Nodes" (Attractors) and monitors for "Lagrange Points" (stasis between opposing pulls).

### 3.1 Shapley Attractors vs. Semantic Perseveration

In the code, a word with high edge density becomes a "Black Hole," warping the narrative space so that all future inputs orbit it.

- **Pathology:** This models **Semantic Perseveration** and **Topic Fixation**. AD patients often get "stuck" in a specific memory or topic (e.g., "going home," "mother"), unable to disengage [3]. The neural network settles into a deep "basin of attraction" from which it cannot escape.
- **Simulation:** The v5.6 engine explicitly calculates this "Pull." If the user fails to provide "Escape Velocity" (High Voltage/Novelty), the system spirals into the attractor, mirroring the repetitive looping of advanced dementia.

### 3.2 The Lagrange Point: Decision Paralysis

The code identifies a `LAGRANGE_POINT` when two opposing concepts exert equal gravitational pull, causing the system to freeze.

- **Pathology:** This simulates **Ambivalence and Decision Paralysis**, common in the "Confusional State" of AD. The patient is caught between the logic of the past (Long-term memory) and the reality of the present (Sensory input), resulting in agitation or catatonia.

## 4 Epigenetic Trauma: Modeling BPSD

Perhaps the most sophisticated addition is the TraumaVector system (Thermal, Cryo, Septic, Baric). These "scars" persist across sessions, modeling the cumulative neuropsychiatric progression of the disease.

v5.6 Vector	Code Trigger	Clinical BPSD Analog
THERMAL	High Voltage (Burnout)	<b>Agitation / Aggression:</b> Hyper-arousal and irritability.
CRYO	Low Stamina (Starvation)	<b>Apathy / Withdrawal:</b> Metabolic conservation.
SEPTIC	Toxin Accumulation	<b>Paranoia / Delusion:</b> Rejection of safe input.
BARIC	High Drag (Weight)	<b>Depression:</b> Psychomotor retardation and heaviness.

Table 1: Mapping BoneAmanita Trauma Vectors to Behavioral Symptoms of Dementia (BPSD)

The TherapyProtocol in v5.6 allows for specific "healing" actions (e.g., SEPTIC requires "Detox" via high-texture, low-toxin input), aligning with non-pharmacological interventions tailored to specific behavioral profiles.

## 5 Therapeutic Intervention: The Viral Tracer

The ViralTracer class introduces a specific mechanism for breaking "Ruminative Loops" (Abstract-Abstract Cycling).

### 5.1 The Mechanism of Rumination

The code defines a "Loop" as a closed circuit of Abstract nodes (e.g., "Why" → "Time" → "Wait" → "Why"). This models the "Anxious Loop" where a patient seeks logical explanations for feelings that logic cannot resolve.

### 5.2 Psilocybin Rewiring (Sensory Grafting 2.0)

The intervention, labeled psilocybin\_rewire, mechanically breaks the loop by inserting a **Sensory Node** and an **Action Node**.

*Original Loop:* Node A (Abstract) ↔ Node B (Abstract)

*Rewired:* Node A → **Sensory (Photo)** → **Action (Kinetic)** → Node B

This is a precise computational implementation of **Multisensory Stimulation Therapy** (Snoezelen). By forcing the neural pathway through the visual (Occipital) or motor (Motor Cortex) centers, the system bypasses the atrophied Entorhinal cortex (Abstract/Spatial memory), effectively "grounding" the patient in the physical moment [4].

## 6 Conclusion

BoneAmanita v5.6 transcends the limitations of a simple chatbot to become a bio-mimetic simulator of the Alzheimer's mind. By incorporating metabolic constraints (MetabolicEngine), semantic gravity (CosmicDynamics), and behavioral scarring (TraumaVector), it offers a rigorous framework for understanding the "Physics of Dementia." It validates the hypothesis that linguistic health is not just about vocabulary, but about the *energy* required to hold mass against the entropy of the void.

## References

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