

Memory-Learning Continuum

From Amoeba to Human

1. The Continuum Hypothesis

Memory and learning exist on a continuum from molecular persistence to complex cognitive representation.

2. Levels

Level 1 (Molecular): Bacterial chemotaxis

Level 2 (Cellular): Amoeba habituation

Level 3 (Network): *C. elegans* conditioning

Level 4 (Distributed): Insect navigation

Level 5 (Episodic): Mammalian hippocampus

3. Mapping to CM

- Low γ : Level 1–2
- Medium γ : Level 3–4
- High γ : Level 5

4. Evolutionary Table

Organism	Integration	Memory Type
Bacteria	Minimal	Molecular
Protozoa	Low	Cellular
<i>C. elegans</i>	Moderate	Network
Insects	High	Distributed
Mammals	Very High	Episodic