

3–6–9–12–15 Biological Emergence Ladder

3 Primordial Fields

1. Prion Field — Structure-first biology
2. Bacterium Field — Energy-first biology
3. Viroid Field — Information-first biology

6 First-Order Behaviors

1. Boundary
2. Fusion
3. Amplification
4. Decoherence
5. Grouping
6. Separation

9 Origin Adaptations

Viroid:

1. Rolling-circle replication
2. Self-cleavage ribozymes
3. Secondary structure stabilization

Bacterium:

4. Chemiosmotic metabolism
5. Horizontal gene transfer
6. Binary fission

Prion:

7. Fold-state templating
8. Amyloid aggregation
9. Stress-induced misfolding

12 Transitional Subsystems

Boundary & Compartment:

1. Lipid vesicles
2. Primitive channels
3. Phase-separated microdomains

Metabolic & Energetic:

4. Chemiosmotic gradient
5. Autocatalytic cycles
6. Redox scaffolds

Informational & Replicative:

- 7. Template polymerization
- 8. RNA-peptide coevolution
- 9. Partitioning & fidelity

Structural & Cytoskeletal:

- 10. FtsZ/Min division-placement
- 11. MreB/Crescentin polarity-shape
- 12. ESCRT-III membrane remodeling

15 Multicellular Coherence Systems

Funga-lineage:

- 1. Mycelial mat
- 2. Tip-polarity growth
- 3. Synchronized sporulation
- 4. Symbiotic interfaces
- 5. Resource redistribution networks

Flora-lineage:

- 6. Photosynthetic sheets
- 7. Branching/transport filaments
- 8. Anchoring/root-like systems
- 9. Gas-fluid exchange surfaces
- 10. Positional differentiation

Fauna-lineage:

- 11. Contractile sheets
- 12. Internal lumens
- 13. Proto-nerve nets
- 14. Immune-like recognition
- 15. Motile colony/body-plan coherence