

Source: [\[KBhBIO101LetsDoBio\]](#)

1 | Biology's Guiding Principles

1. Simple set of rules dictates self-assembling of systems
2. Units of order/structure contributes to biological system
3. Instructions + rules governing structure and order built into self-contained units that comprise bigger systems
4. Biological systems has many rules of structure that drive changes to behaviorial and changes to rules themselves

2 | Life's levels of organization

1. Biosphere
2. Ecosystems
3. Communities
4. Populations
5. Organisms
6. Tissue
7. Cells
8. Organelles
9. Molecules

“Biology”, in the most reductionistic sense, is quite deterministic.

But! This is changing. A new field of “systems biology” now includes new understanding and methods to track “rules” across all organizations, and thinking of the whole system, well, as a whole, which of course introduces changes that make biology less deterministic.

3 | Self-organizing cellular structures

Individuals who organize into dynamic groups by following simple structures

- Cells follow DNA instructions
- Possibility for custom-engineering cellular constructs through simple rules
- Regenerative organization — creating possible systems to “program” limb generation, “reprogram” cancer cells to change systems + innovate cancer treatment