

# Complexity and Evolution

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There is a new systemic understanding of evolution in science, based on recent advances in complexity theory, which sees the emergence of new biological forms and functions as the result of the creativity inherent in all living systems. According to cognitive science, this creativity is an aspect of the process of cognition, which is an intrinsic property of all living systems.

The Neo-Darwinists believe that the generation of new biological forms (morphogenesis) results from random mutations, and that anything is possible, subject to natural selection. This is echoed by biotechnology advocates who believe that we can redesign organisms because anything is possible.

According to complexity theory, new biological forms emerge from the creativity inherent in life, expressed through mutations, gene trading, and symbiogenesis, and subject to the physical and chemical constraints of the organism's environment.

Biological forms and functions are not simply determined by a "genetic blueprint" but are emergent properties of an epigenetic network. To understand their emergence, we need to understand not only the genetic structures and the cell's biochemistry, but also the complex dynamics that unfolds when the epigenetic network encounters the physical and chemical constraints of its environment. This encounter will result in a limited number of possible functions and forms, described mathematically by so-called attractors, geometric patterns that represent the system's dynamic properties.