

Evolutionary Biology: Achievements and Limits of a Scientific Theory

1. Evolutionary biology comprises a number of biological theories. Some are strictly empirical while others locate to the interface of empirical and historical sciences. Individual theories of evolutionary biology, therefore, can be tested scientifically in various ways.
2. Evolutionary biology provides powerful tools to understand central aspects of life. The ability to undergo (micro)evolutionary change is a most fundamental feature of all organisms which can be studied experimentally. While the Darwinian mechanism, in principle, is capable of generating novel biological information (Charles Darwin was a genius, indeed), this mechanism may not be able to create unlimited change of life.
3. If one restricts the arguments to the scientific level, it appears to be difficult to interpret life in view of its over-all similarities and paleontological data without thinking of a phylogenetically derived relatedness of all life forms (macroevolution). However, this does not mean that (natural) macroevolution has been proven beyond doubt. One of several reasons is that scientific theories are never beyond doubt, unless they stop being scientific theories.
4. While evolutionary biology is an important part of the most fascinating biological scientific enterprise, it has been misused within the framework of atheistic worldviews. Such misuse is often characterized by disregarding the various limits of evolutionary biology.
5. Some limits of evolutionary biology simply reflect the time-dependent availability of biological data and their interpretation, others are due to methodological constraints. It will be discussed whether a third class of limits exists concerning unsolved problems of evolutionary biology for which a solution may not exist, one example being the evolution of biological information stored in molecular machines.
7. While many unsolved problems of evolutionary biology exist, they cannot provide empirical evidence for the existence of a creator. However, some of the results of biological research appear to raise questions which reach way beyond the limits of biology and cannot be answered by science.

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PART 1: THEORIES OF BIOLOGICAL EVOLUTION

1.1 Empirical theories of evolutionary biology

Summary: Many mechanisms of biological change can be experimentally studied. They produce variants in individuals which are fixed in populations by Darwinian evolution (i.e., selection) and/or Neutral Evolution (i.e., genetic drift). These mechanisms can be experimentally studied. This part of evolutionary biology is empirical science.

1.2 Comparative biology and evolution

Summary: Life is characterized by similarities at all organizational levels (DNA sequences, physiological processes, anatomical structures, behaviour). In principle, biological similarity may be due to common descent, convergence or (primary) design. Although there are many unsolved questions, similarities of life forms provide strong general evidence for a macroevolutionary history of life, i.e., common descent.

1.3 Historical approaches to evolution

Summary: Biostratigraphic and paleontological data provide evidence for macroevolutionary change. However, many questions are unsolved, especially concerning the origin of major organismal groups (“missing link problem”).

PART 2: THE POTENTIAL OF DARWINIAN EVOLUTION

2.1 Examples of evolutionary change

Summary: Evolution can be seen everywhere in biology. The capability of microevolutionary change is a most fundamental character of life.

2.2 The potential of the Darwinian mechanism

Summary: In principle, the Darwinian mechanism is able to produce structures which represent novel biological information. Such structures may appear as if they were designed.

2.3 Prerequisites for the Darwinian mechanism to work

Summary: The action of the Darwinian mechanism critically depends on the existence of a sophisticated machinery of biological information transfer.

2.4 Primary and secondary design

Summary: Biological structures produced by the Darwinian mechanism can be understood to represent SECONDARY DESIGN. The genetic machinery of biological information transfer can be understood to represent PRIMARY DESIGN.

PART 3 LIMITS OF EVOLUTIONARY CHANGE

3.1 Macroevolution

Summary: Contemporary evolutionary biology asserts that all biological structures observed today are the result of secondary design due to common descent through the Darwinian mechanism.

3.2 Examples for biomolecular machines

Summary: Biomolecular machines are fascinating, extremely complicated and highly sophisticated devices which perform goal-oriented biological functions in all cells. Biological machines are at the center of life and only these biological devices are able to transform energy into order.

3.3 Evolution of biomolecular machines by secondary design?

Summary: It is currently unknown how biomolecular machines could have originated through processes discovered so far by evolutionary biologists.

PART 4 BEYOND THE LIMITS OF EMPIRICAL SCIENCE

4.1 The empirical method

Summary: The empirical method is a highly successful way to study important aspects of reality. However, this method, necessarily and systematically, excludes supernatural causes and is therefore limited.

4.2 Limits of evolutionary explanations

Summary: Some limits of evolutionary biology simply reflect the time-dependent availability of biological data. Some limits are due to methodological constraints (historical method and other constraints).

Does the unknown mechanism of macroevolutionary change reflect a third kind of limit which may be of principal nature?

4.3 Unsolved scientific problems and supranatural causes

Summary: The empirical method cannot possibly provide evidence for the existence of a supranatural reality. However, some of the results of empirical biological research raise questions which reach way beyond the limits of biology and cannot be answered by empirical approaches.