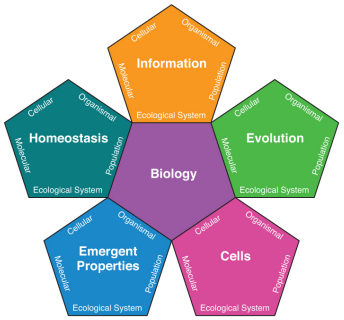
Integrating Concepts in Biology



PowerPoint Slides for Chapter 4:

Evolution and Origin of Cells

4.1 What is evolution?

by A. Malcolm Campbell, Laurie J. Heyer, & Christopher Paradise

Biology Learning Objectives

- Define evolution and distinguish the four mechanisms of evolution.
- Illustrate how natural selection works by giving a real example.

ELSI Learning Objectives

- Distinguish religion and science as two different ways of understanding the world.
- Evaluate the difference between *belief* and *acceptance* of evolution.
- Define the scientific term *theory*.

Fossil Evidence of Early Life

Opening Figure

William Schopf, UCLA

Define Evolution

Change in allele frequency in a population over time.

Define Theory

Change in allele frequency in a population over time.

An understanding that has been validated so often it is accepted as true beyond doubt

Themes of Evolution

- The origin of living systems occurred by natural processes, and life continues to evolve within a changing environment.
- Organisms can be linked by lines of descent from common ancestry.
- Natural selection is a mechanism of evolution that accounts for adaptation.
- Human activity can alter the course of evolution.

Properties of Life

- life replicates itself
- life undergoes changes
- life requires energy
- life occupies three-dimensional space big enough to contain cargo

Natural Selection Example

Five tenants of natural selection:

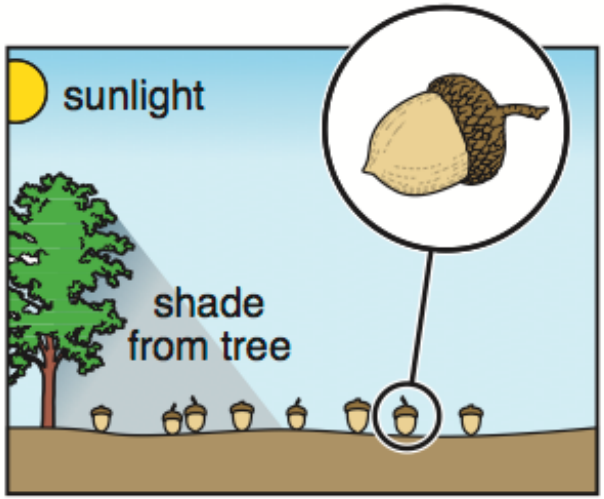


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Fig. 4.1

Natural Selection Example

Five tenants of natural selection: 1) overproduction = limited resources
2) variation in the population

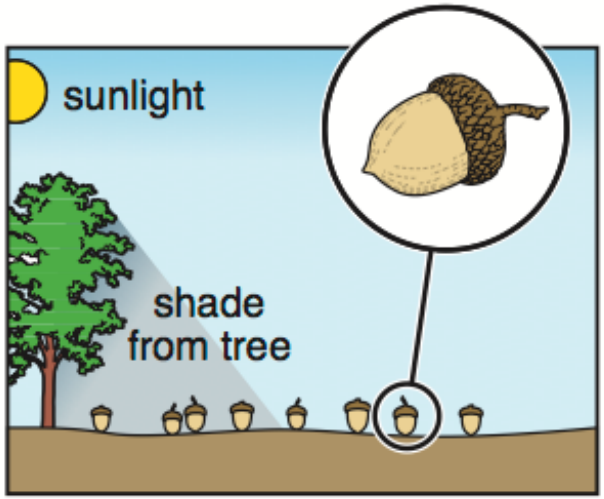

Fig. 4.1

Natural Selection Example

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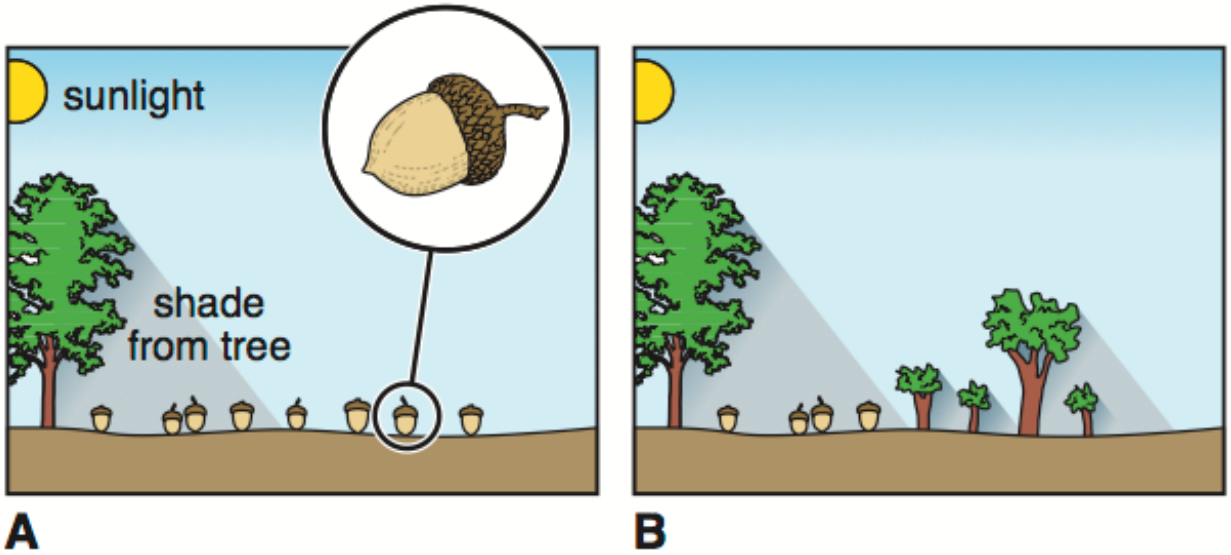

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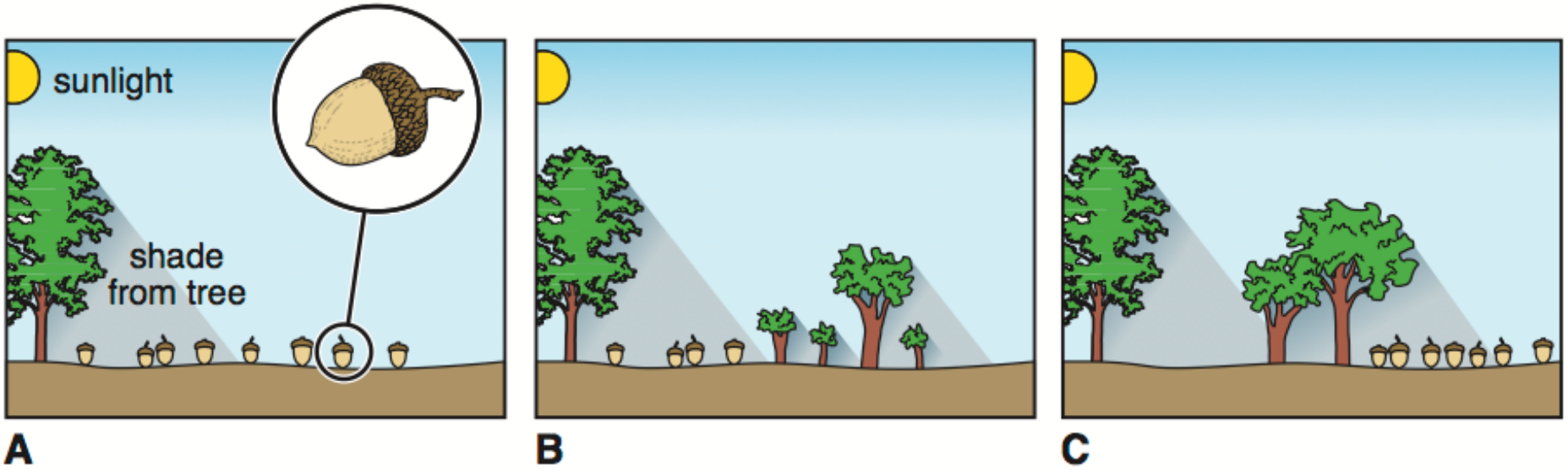


4) adaptive advantage for some.
5) reproduction for those who survive.

Fig. 4.1

Definition of Evolution

Fig. 4.2

Definition of Evolution

change in allele frequency in a population over time

Fig. 4.2

Four Mechanisms of Evolution

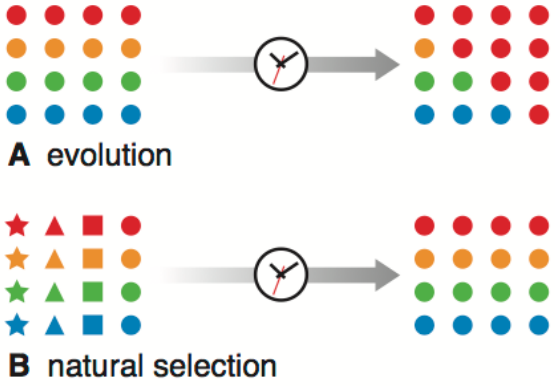
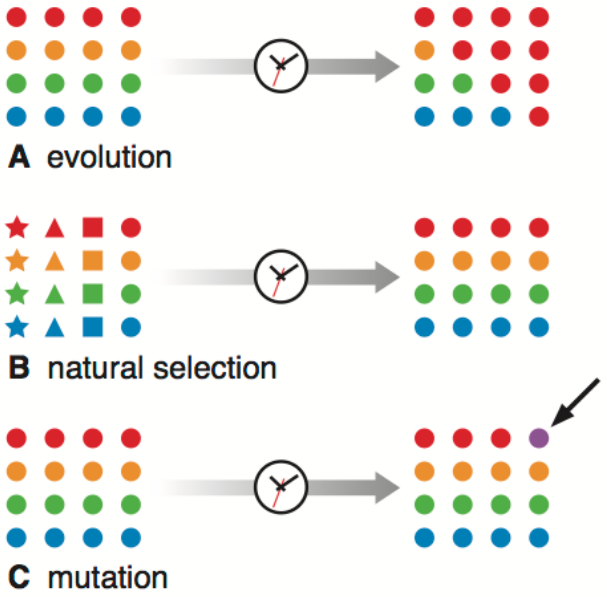


Fig. 4.2

Four Mechanisms of Evolution



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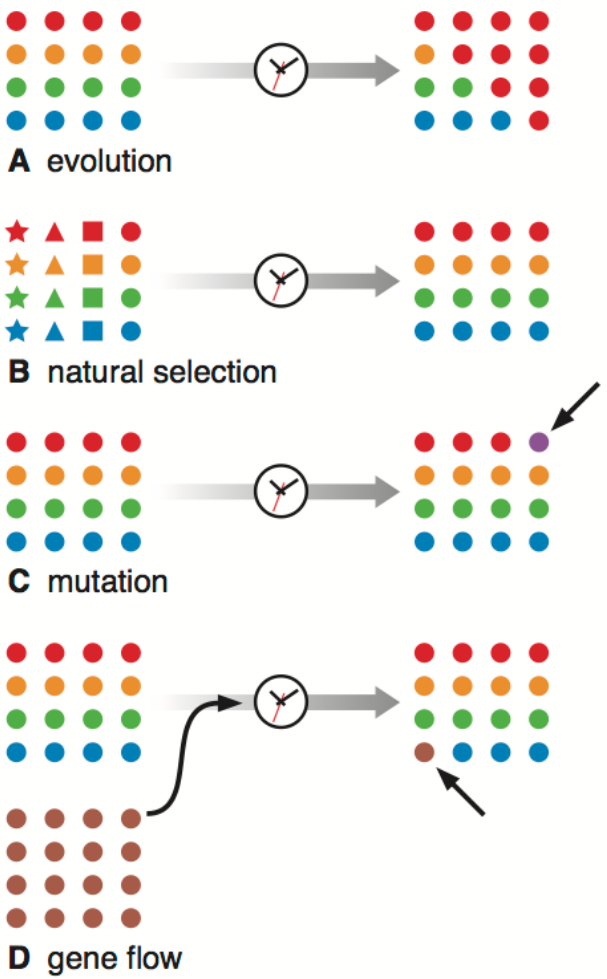

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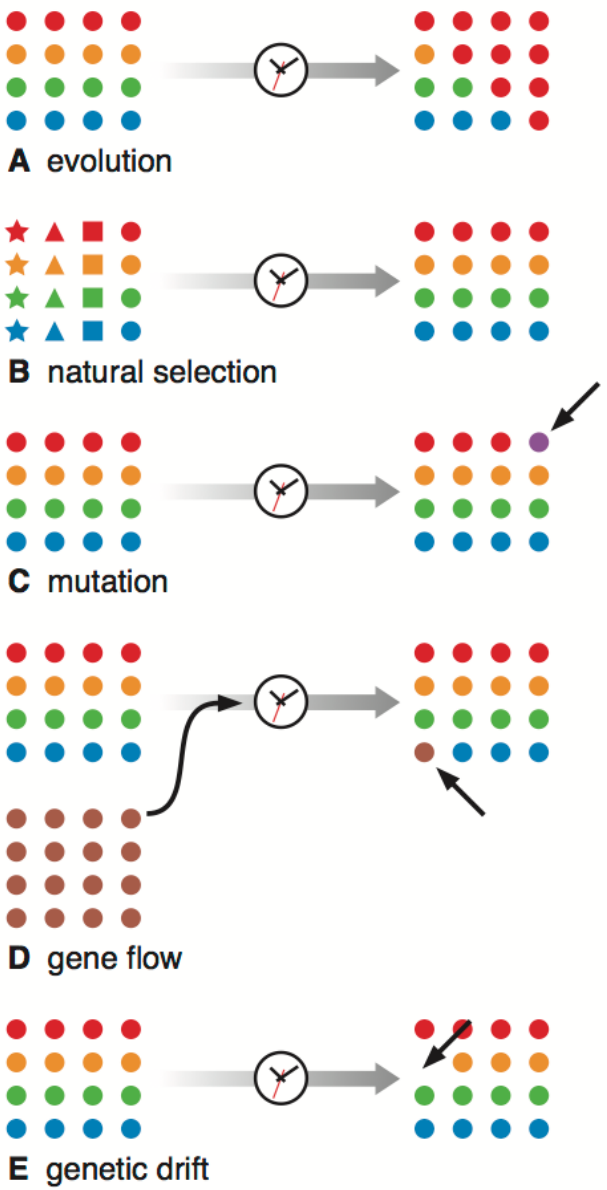
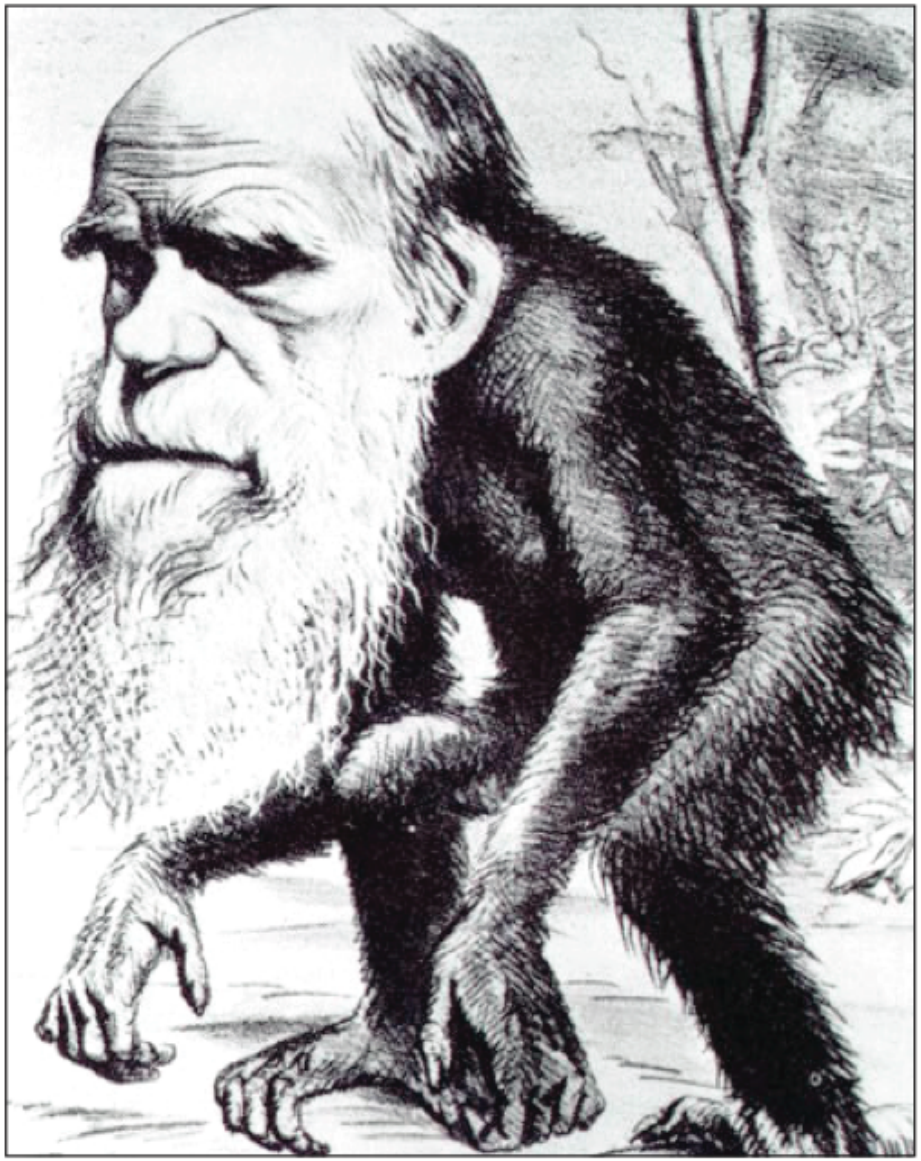


Fig. 4.2

Political Satire of Darwin



ELSI Fig. 4.1

Why are religion and evolution often pitted against each other?