INTRODUCTION TO ZOOLOGY

The Science of Zoology

- **Zoology** is the study of *animal* life.
- Zoologists strive to understand:
  - The origin of animal diversity.
  - How animals perform basic life processes.
  - How they are able to inhabit various ecosystems.

The Uses of Principles

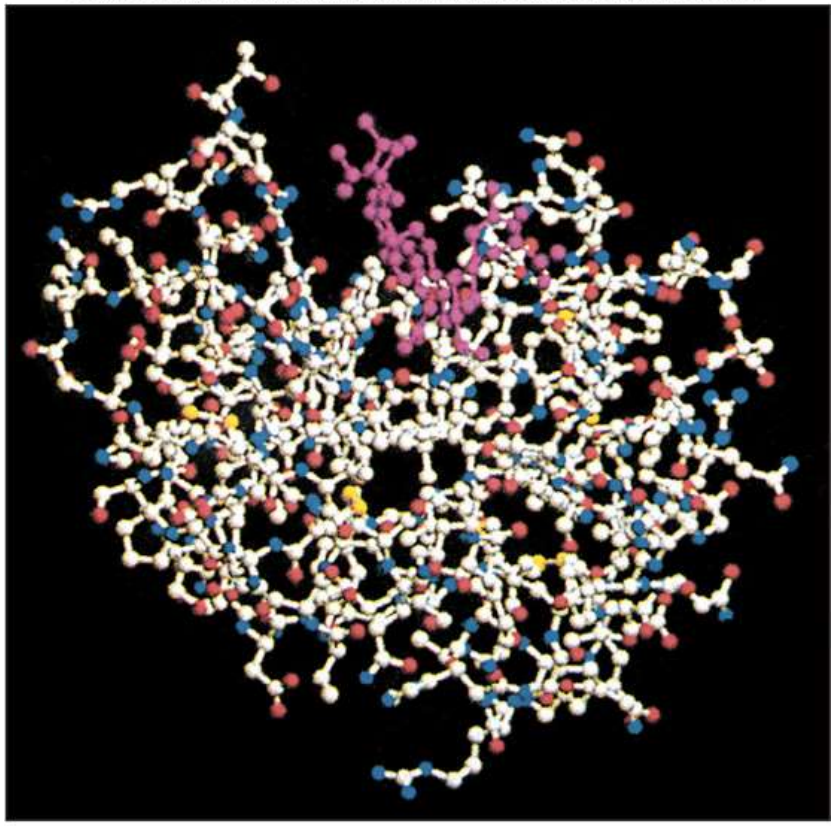
- Principles of modern zoology are derived from:
  - Laws of physics and chemistry
  - Scientific method
- Because life shares a common evolutionary origin, principles learned from the study of one group often pertain to other groups as well.

Properties of Life

- Does Life Have Defining Properties?
  - What is life?
    - No simple definition.
    - The history of life shows extensive and ongoing change called **evolution.**
    - Answer must be based on the **common history** of life on earth.

Properties of Life

- **Chemical Uniqueness**
  – Living systems demonstrate a unique and complex molecular organization.



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Chemical Uniqueness

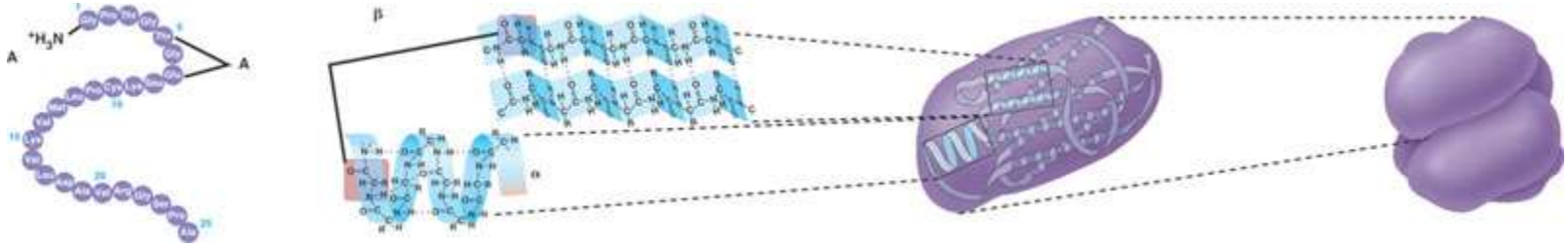
- Living organisms assemble large molecules – **macromolecules** – that are more complex than molecules found in nonliving matter.
  - Same chemical laws apply.
  - Four categories of biological macromolecules:
    - **Nucleic acids**
    - **Proteins**
    - **Carbohydrates**
    - **Lipids**

Chemical Uniqueness

- These 4 groups differ in their:
  - Components
  - Types of bonds holding them together
  - Functions
- Macromolecules evolved early in the history of life.
- Found in every form of life today.

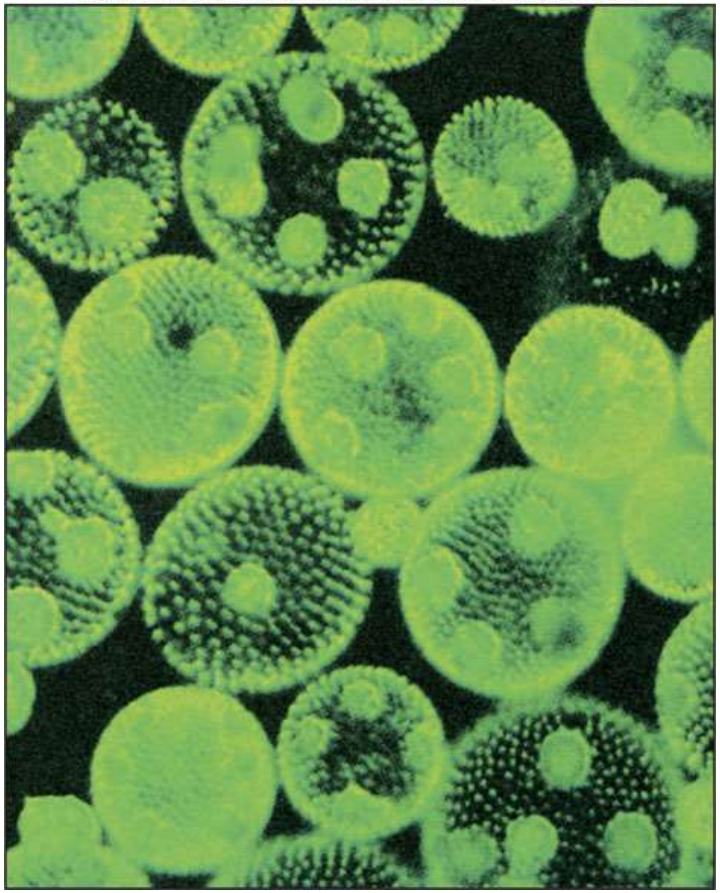
Chemical Uniqueness

- **Proteins** are made up of 20 different amino acid subunits.
- Enormous variability allows for the diversity of proteins and consequently of living forms.
- **Nucleic acids**, **carbohydrates** & **lipids** are also organized in a way that gives living systems a large potential for diversity.



Properties of Life

- **Complexity and Hierarchical Organization** – Molecules are organized into patterns in the living world that do not exist in the nonliving world.



Complexity and Hierarchical Organization

- New characteristics can appear at any level of organization – **emergent properties**.
- Emergent properties depend upon the characteristics found at lower hierarchical levels – to some extent.
  - The development of spoken language requires hearing.
  - But, many different languages have arisen.

Properties of Life

- **Reproduction** – Living systems can reproduce themselves!

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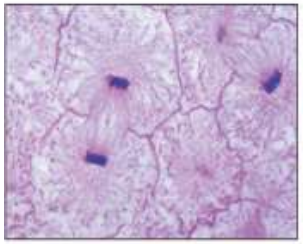

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