



General Biology Lecture - 4

Kidney Dialysis Techniques Department

Characteristics of Living Organisms: organization,



Nutrition, Respiration, Metabolism, Excretion a Homeostasis.

Characteristics of Living Organisms:

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Introduction

All living organisms share a set of fundamental characteristics that distinguish them from non-living matter. These traits are indicators of "life". ▶▶ المصدر : Campbell Biology, 12th Edition (2022).

Organization:

Living things exhibit structural organization, from simple to complex. Composed of cells—the basic unit of life.

Can be unicellular (e.g., bacteria) or multicellular (e.g., humans)

Nutrition

- Acquisition (الاستحواذ) of energy and nutrients for growth and maintenance.
- **Types: Autotrophic (e.g., plants via photosynthesis) and Heterotrophic (e.g., animals consuming food).**

Respiration:

****The process of converting chemical energy in food into usable energy (ATP). Can be aerobic (with oxygen) or anaerobic (without oxygen).**



Metabolism

****The sum of all chemical reactions within a cell.**

****Includes anabolism (building molecules) and catabolism (breaking down molecules). **Example:** Building proteins from amino acids (anabolism) versus digesting food (catabolism).**

Excretion

Removal of toxic metabolic wastes (e.g., CO₂, urea).

Mechanisms vary by organism (kidneys, gills, stomata in leaves).

Fact: The accumulation of waste leads to cellular poisoning.

Homeostasis

The ability to maintain a stable internal environment despite external changes.

Examples: Thermoregulation, blood glucose control, water balance. Mechanism: often through negative feedback

Summary

Living organisms are characterized by:

Cellular Organization

Nutrition

Respiration

Metabolism

Excretion

Homeostasis

"Life is not defined by one trait, but by the integration of all these processes".-----▶▶ Campbell Biology

Reference:

***Campbell Biology, 12th Edition (2022) – Pearson.**

****OpenStax Biology 2e (2021) – Free online textbook.**

*****Khan Academy: "Characteristics of Life".**

******Nature Education Scitable: <https://www.nature.com/scitable>.**