BioScience II

An Advanced Biology Course Manual

Unit 1: Biodiversity:
Life Functions and Taxonomy
1.1 – 1.3

A. **Organisms** (description) - a general term that refers to any life form that performs life functions and displays the characteristics of "living" that include: a common cell structure; a common biochemical composition; a constant energy requirement; a definite limit of size and shape; a life cycle that includes birth, growth, maturity, decline, and death; ability to respond to environmental changes; and the ability to continue their species through reproduction

B. **Organismic Life Functions** (description) - refers to the life processes that occur on the cellular and organismic levels

1. **nutrition** (definition) –

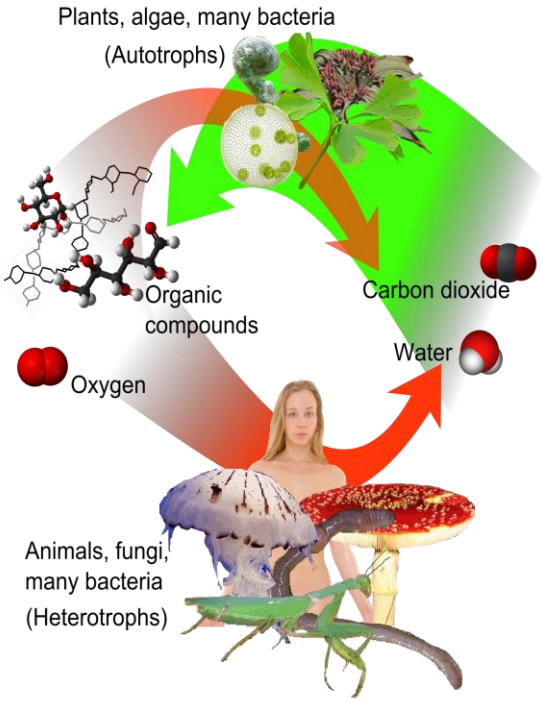
defined as the life process that involves the **taking in of organic food** molecules by **ingestion** or **making of organic food biosynthesis**

a. **heterotrophic nutrition** (description) –

refers to the form of nutrition in which preformed **organic food is ingested**

b. **autotrophic nutrition** (description) –

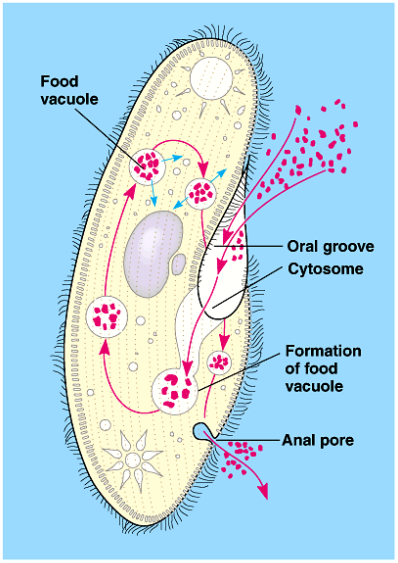
refers to the form of nutrition in which organic food is **synthesized by photosynthesis or chemosynthesis**

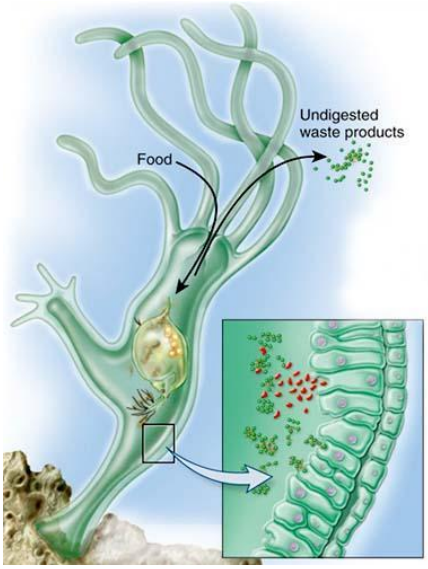


2. **digestion** (definition) –
defined as the life process that involves the **breakdown of complex food molecules** into simple and **usable nutrients**

a. **intracellular digestion** (description) –
refers to the breakdown of larger molecules **within the limits of a cell's membrane** such as in **vacuoles or cytoplasm**

b. **extracellular digestion** (description) –
refers to the breakdown of larger molecules in "**spaces" or "cavities" of structures outside the limits of a cell's membrane** such as in a **digestive organ or "cavity"**





3. **transport** (definition) –

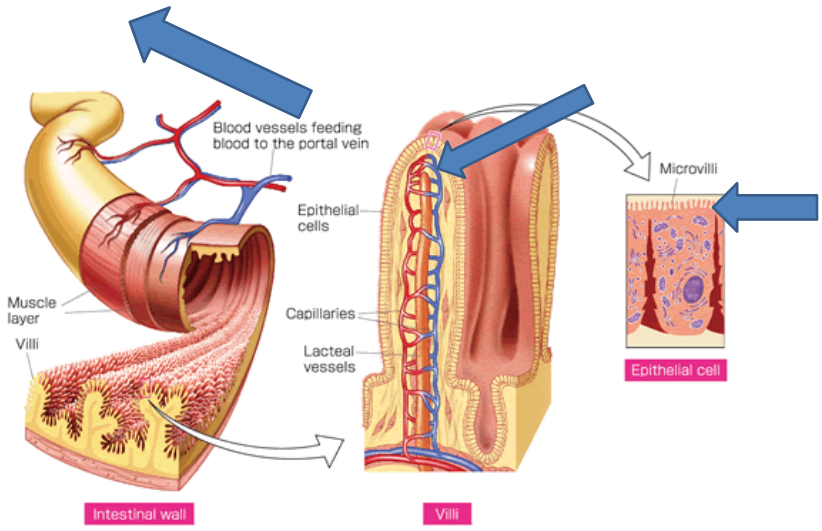
defined as the life process that involves both **absorption and circulation of molecules and materials** within and throughout organisms

a. **absorption** (description) –

refers to the processes in which molecules are transported **into a cell across the cell membrane** from the external environment

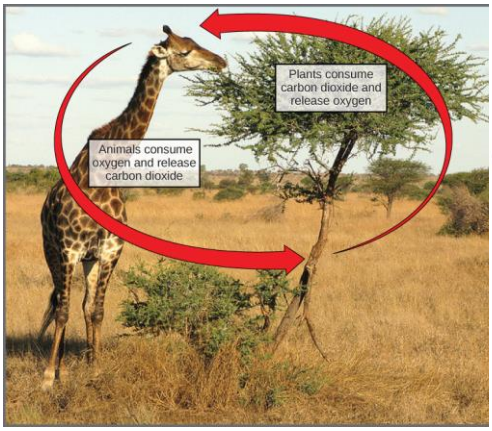
b. **circulation** (description) –

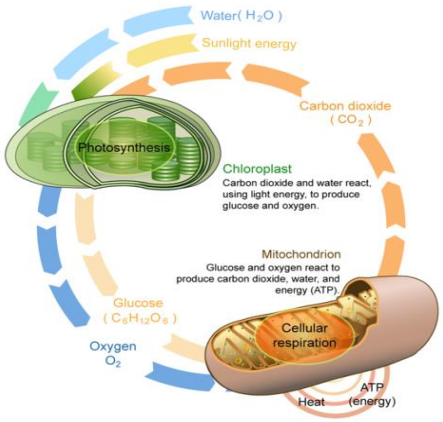
refers to the transport and **distribution** of **molecules and materials** around a cell or throughout an organism



4. **respiration** (definition) –

defined as the life processes that involve the **production of energy (ATP)** within organisms; also involves the **exchange of CO_2 and O_2 gases** between organisms and the environment



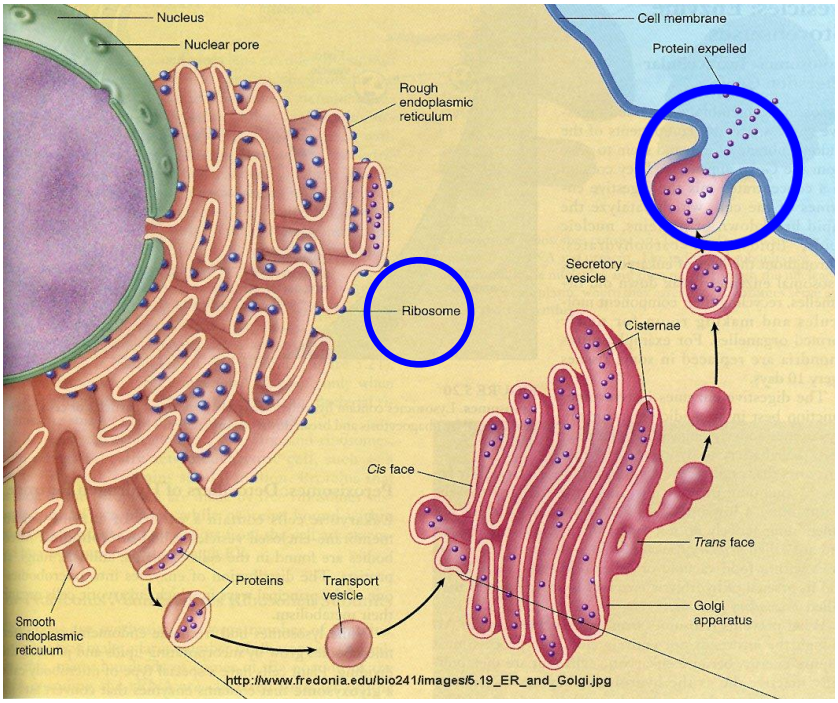


5. **synthesis** (definition) –

defined as the life process that involves **building complex molecules from smaller more simple molecules**; described as the opposite of digestion.

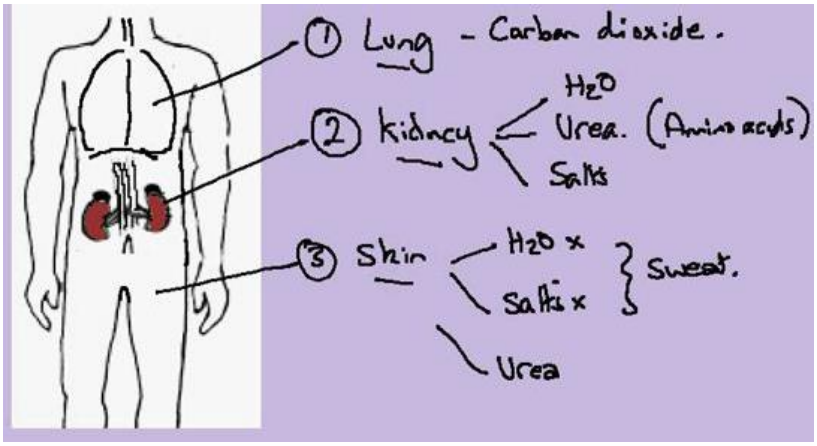
a. **secretion** (definition) –

defined as an aspect of **synthesis process** in which organisms **produce molecules** that are used for a **functional purpose** (eg. hormones, enzymes, mucus, etc...)



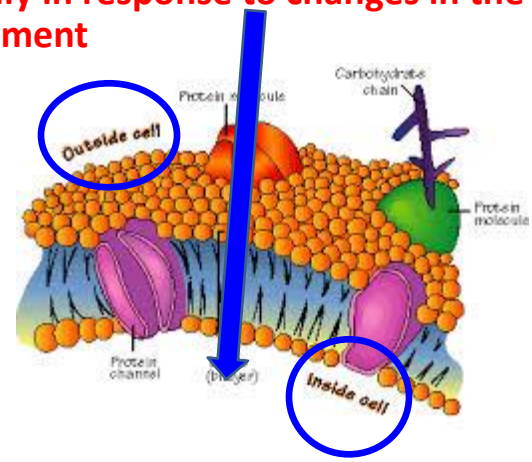
6. **excretion** (definition) –

defined as the life process that involves the removal or **elimination of chemical wastes** produced by **metabolism processes**; also called removal of metabolic wastes



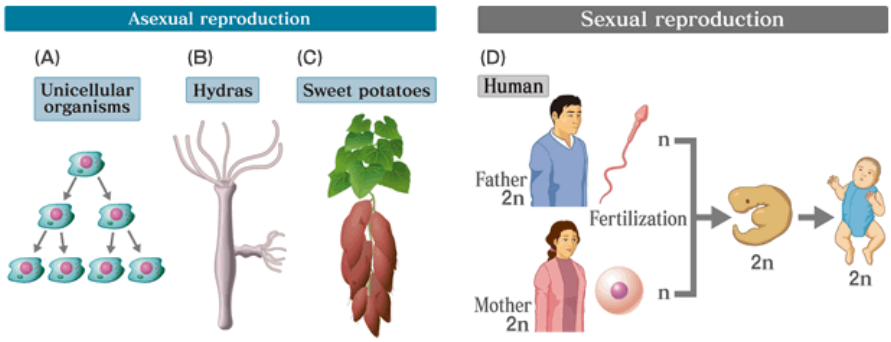
7. **regulation** (definition) –

defined as the life process that involves coordination of the life functions and **changes internally in response to changes in the environment**



8. **reproduction** (definition) –

defined as the life process that involves continuation of the organism by **producing more individuals of the same life form**; also refers to **cell division**



9. **locomotion** (definition) –

defined as the life process that involves **movement** of an organism from one location to another using its own structures or mechanisms

C. **Metabolism** (definition) – a general term that **refers to all of the life functions** of organisms; all the processes done by organisms that occur continually to sustain life; different types of organisms have life functions that relate to their cellular organization and biochemistry, and are specific or unique for their own survival; diverse types of organisms demonstrate similarities in metabolic functions

1. **anabolism** (definition) –

a term that refers to the sum of all metabolic functions in cells or organisms that are **involved in synthesis or building functions**; anabolic processes **require energy**

2. **catabolism** (definition) –

a term that refers to the sum of all metabolic functions in cells or organisms that are involved **in breakdown of larger molecules** into smaller molecules; catabolic processes **release energy** and provide raw materials needed for anabolic reactions

D. **Homeostasis** (definition) – may be defined as the **maintenance of internal functions of an organism within a "normal" range or level as the result of regulation processes**; results from the regulation of internal processes in response to changes inside or outside of an organism; described as the **maintenance of a "steady state" or balance** of an organism with its environment

1. **biological importance of homeostasis** –

all organisms must be able to maintain a balance of functions within their environment in order to survive; the mechanisms that regulate responses of the life functions to a changing environment and **enable an organism to adjust to different conditions;** organisms must maintain homeostasis to survive

2. **examples of homeostatic functions** - there are many examples on cell, organ, and organism levels; may include the following:

maintenance of temperature
maintenance of glucose levels
maintenance of blood and body fluid pressure
maintenance of blood and body fluid pH
maintenance of water & salt balance
maintenance of blood supply and heart rate
maintenance of oxygen supply and breathing rate
maintenance of chemical environment for enzyme activity
maintenance of chemical composition of cells