SNS COLLEGE OF PHARMACY AND HEALTH SCIENCES

Affiliated To The Tamil Nadu Dr. MGR Medical University, Chennai
Approved by Pharmacy Council of India, New Delhi. Coimbatore -641035

COURSE NAME: HUMAN ANATOMY & PHYSIOLOGY

(BP301 T)

YEAR : I SEM/I YEAR

TOPIC 3 : BASIC LIFE PROCESS

DESIGN THINKING IN LIFE PROCESSES

•**Empathize (Understand the Needs)**: Living organisms must sense and respond to their environment to survive, which is the essence of sensitivity

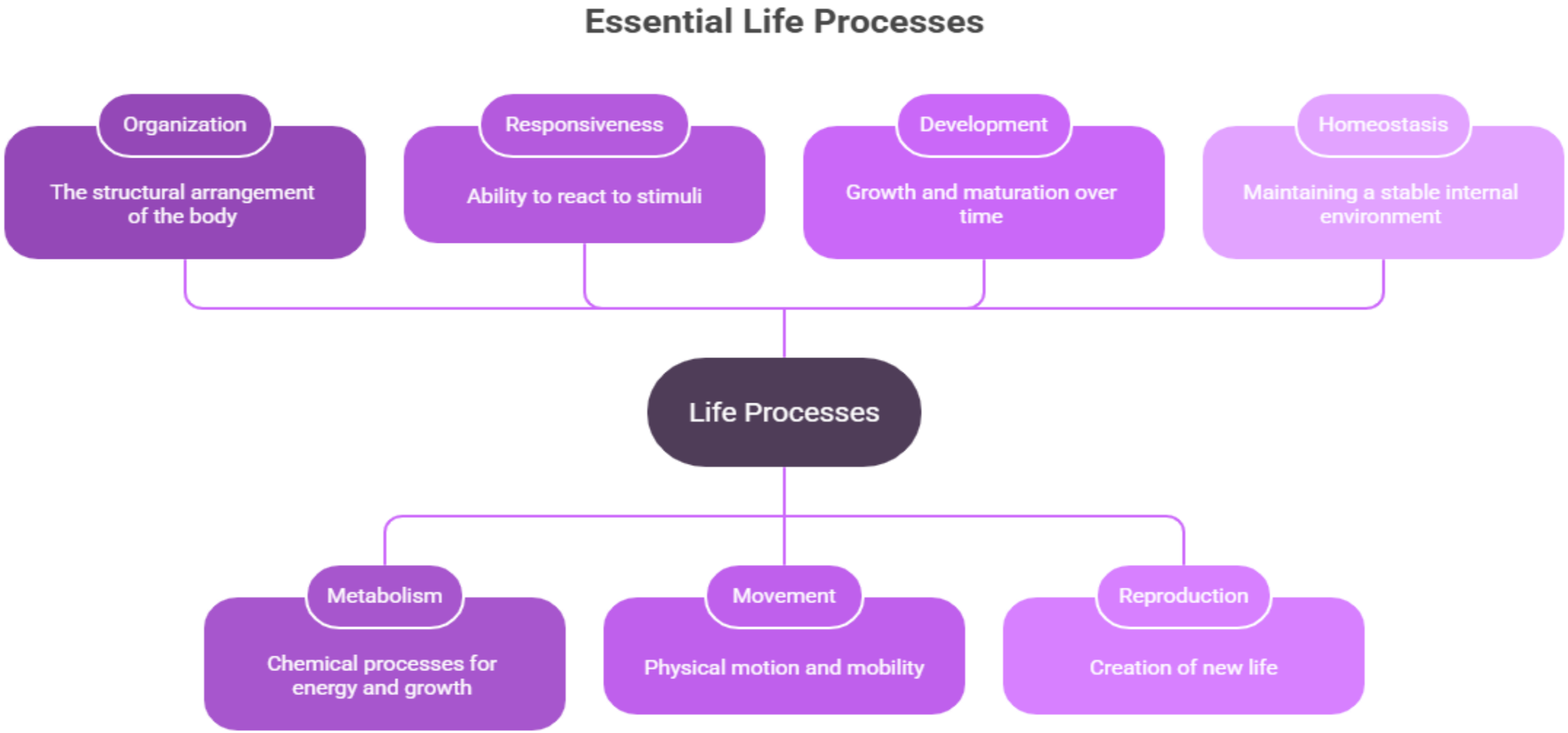
•**Define (Clarify the Problem)**: Organisms require energy to function, which is addressed through nutrition. This process defines the need for acquiring nutrients

•**Ideate (Generate Solutions)**: Respiration provides a solution for converting nutrients into usable energy.

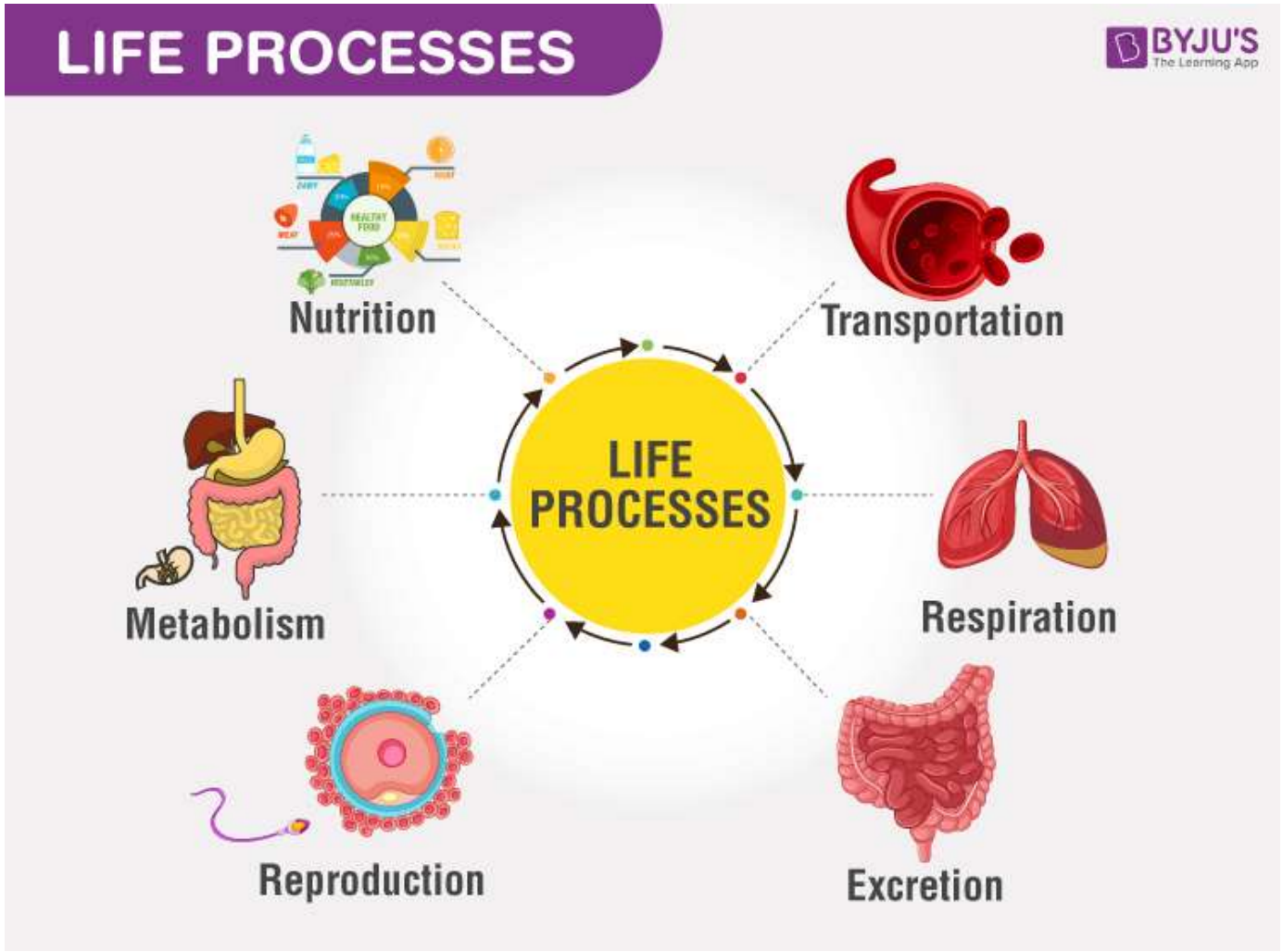
•**Prototype (Develop Functional Systems)**: Homeostasis acts as a prototype for maintaining internal stability.

•**Test (Implement and Refine)**: Reproduction tests the organism's ability to sustain its species.

MINDMAP


Essential Life Processes
Organization
The structural arrangement of the body
Responsiveness
Ability to react to stimuli
Development
Growth and maturation over time
Homeostasis
Maintaining a stable internal environment
Life Processes
Metabolism
Chemical processes for energy and growth
Movement
Physical motion and mobility
Reproduction
Creation of new life

INTRODUCTION



BASIC LIFE PROCESSES

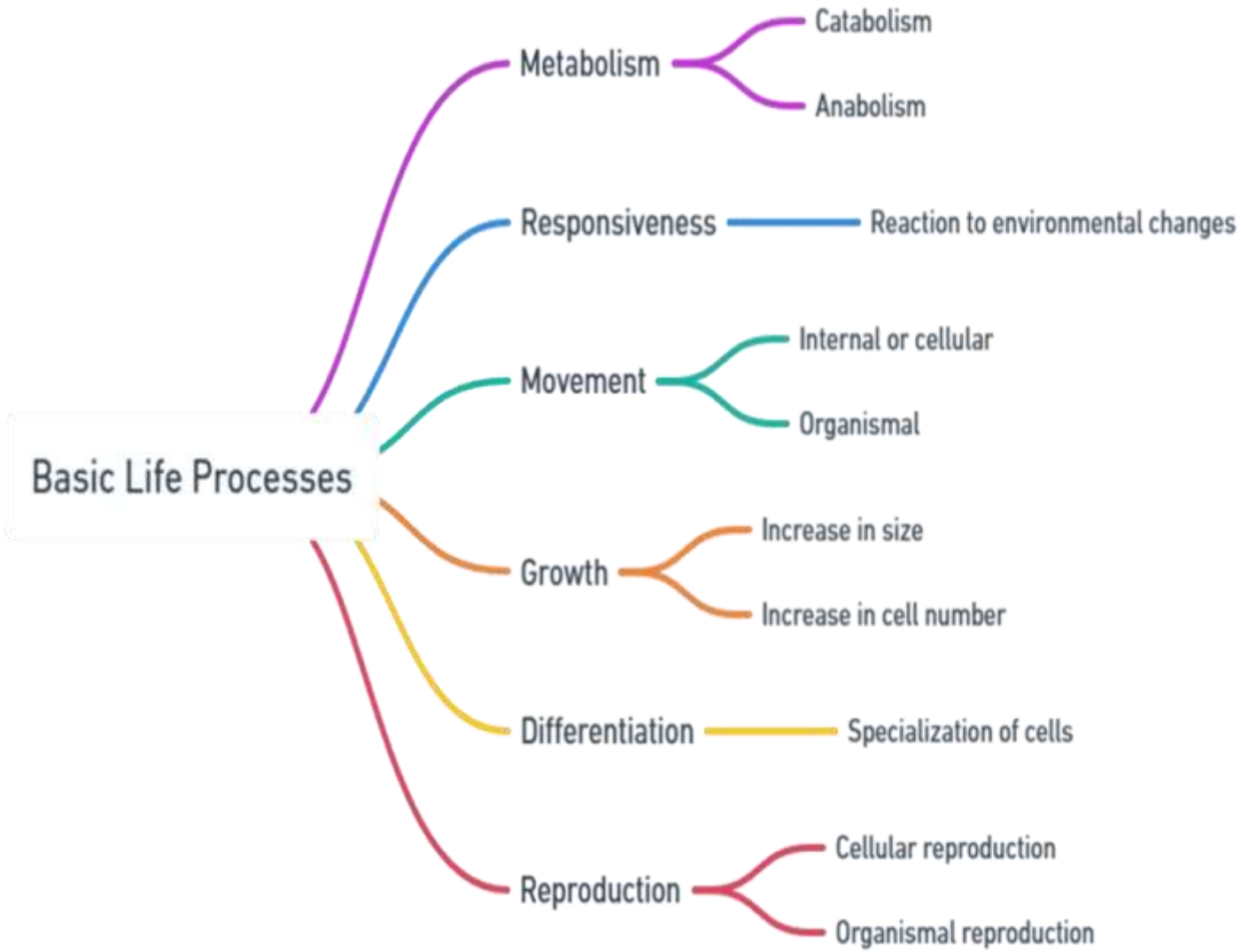
- There are 6 most important life processes of human body are :

1. **Metabolism:** It is the sum of all chemical processes that occurs in the body.

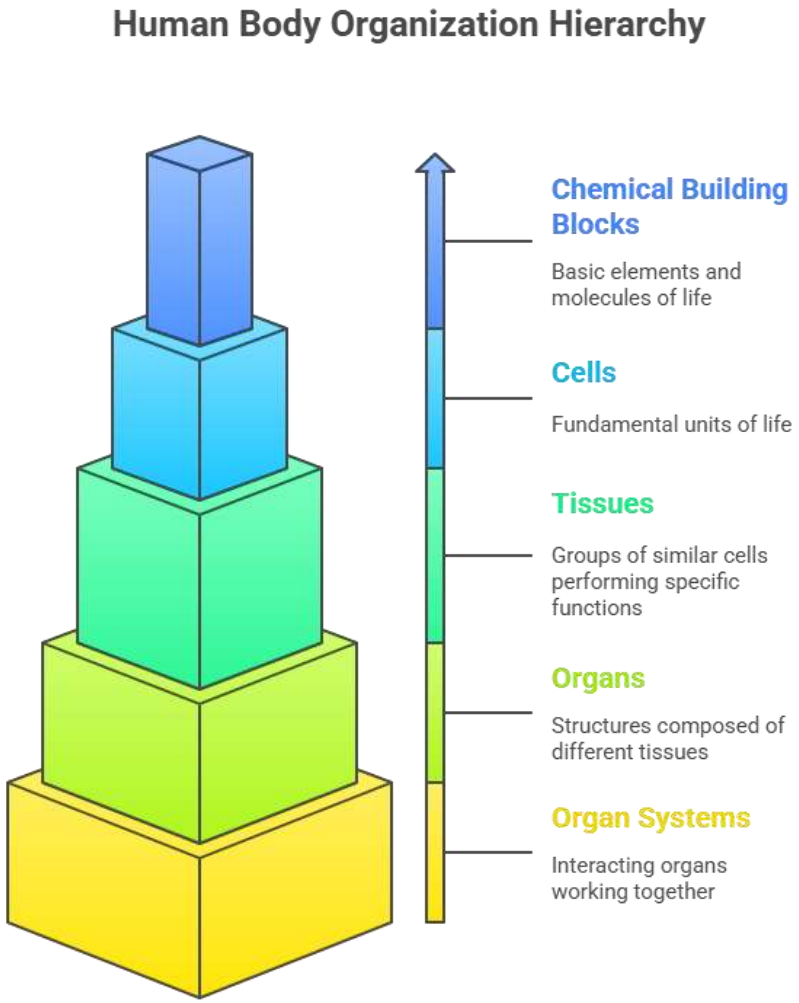
a) **Catabolism:** breakdown of complex chemical substance into simpler components e.g. digestion of protein into amino acids.

b) **Anabolism:** building up of complex chemical substance from smaller, simpler components e.g. use of amino acids to build new proteins of the body.

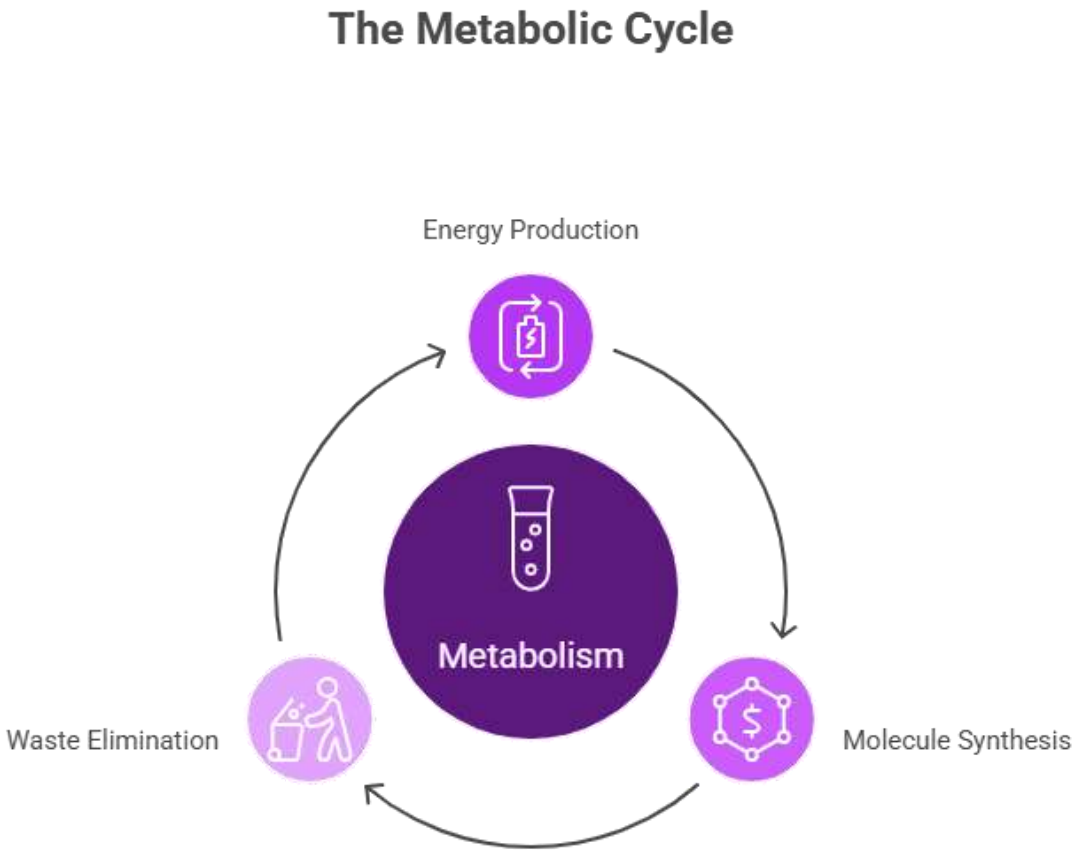
2. **Responsiveness:** It is the body's ability to detect and respond to changes.
3. **Movement:** It includes motion of the whole body, individual organs, single cells etc.
4. **Growth:** It is an increase in body size and weight
5. **Differentiation:** It is the development of a cell from an unspecialized to a specialized state.
6. **Reproduction:** formation of new cells or to the production of a new individual.


Basic Life Processes
Metabolism
Catabolism
Anabolism
Responsiveness
Reaction to environmental changes
Movement
Internal or cellular
Organismal
Growth
Increase in size
Increase in cell number
Differentiation
Specialization of cells
Reproduction
Cellular reproduction
Organismal reproduction

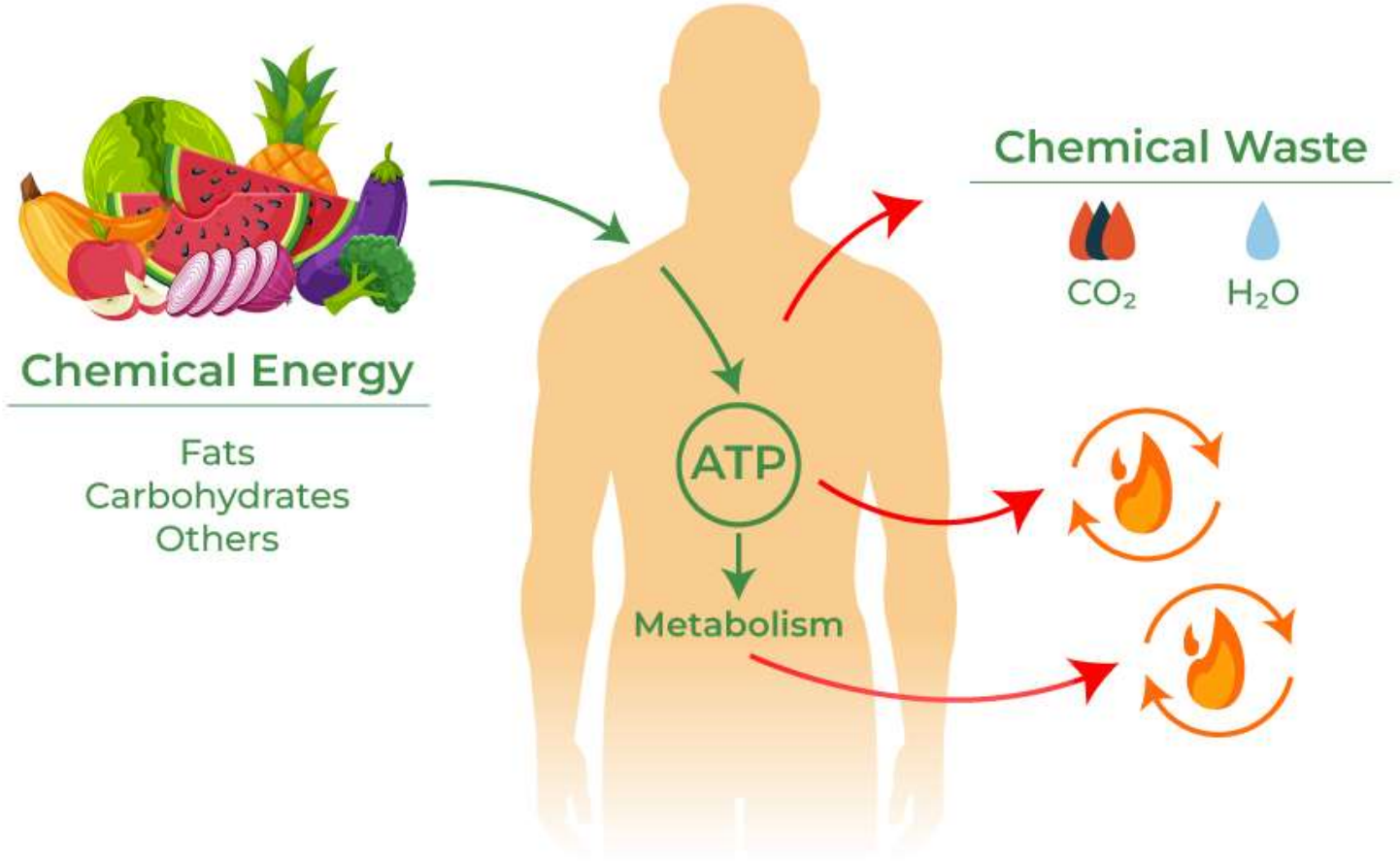
ORGANIZATION



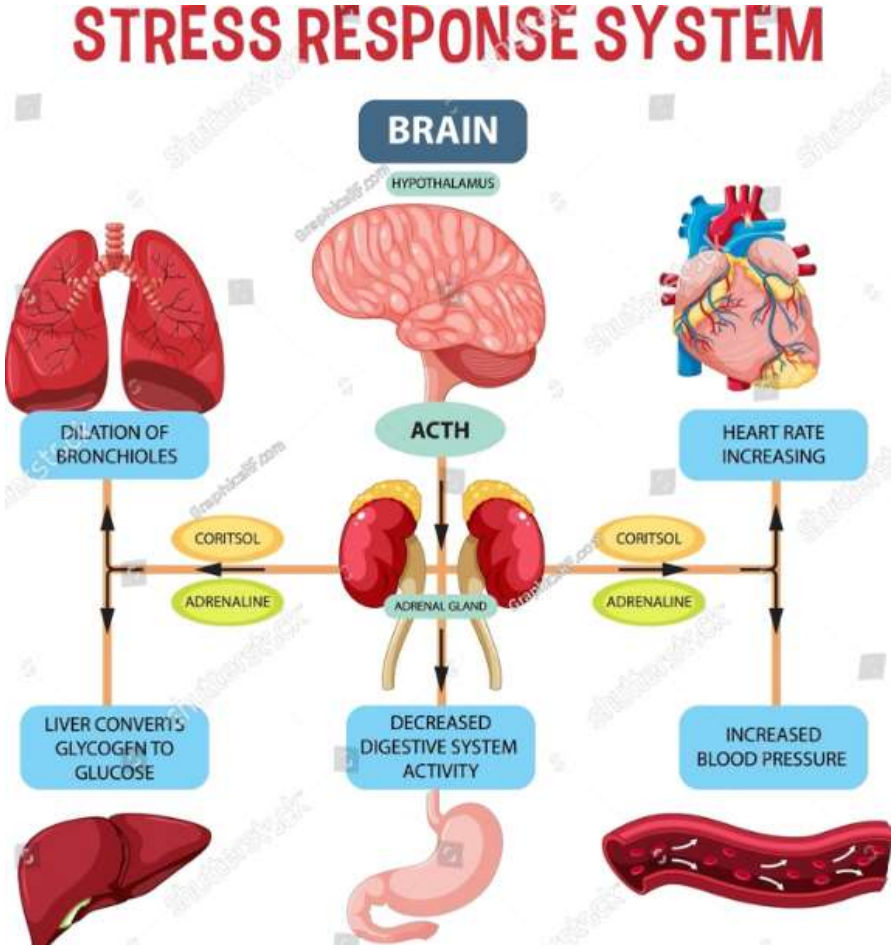
METABOLISM


The Metabolic Cycle
Energy Production
Metabolism
Waste Elimination
Molecule Synthesis

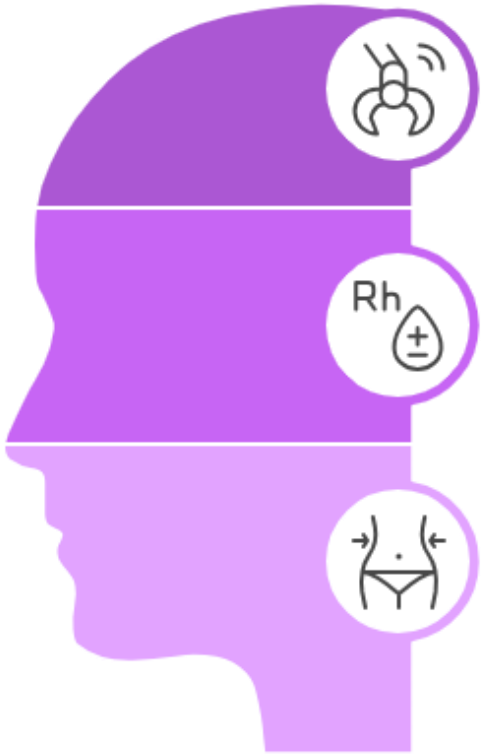
METABOLISM


Chemical Waste
CO_2
H_2O
Chemical Energy
Fats
Carbohydrates
Others
ATP
Metabolism

RESPONSIVENESS



Components of Body Responsiveness



Nervous System Responses

Rapid communication via electrical signals

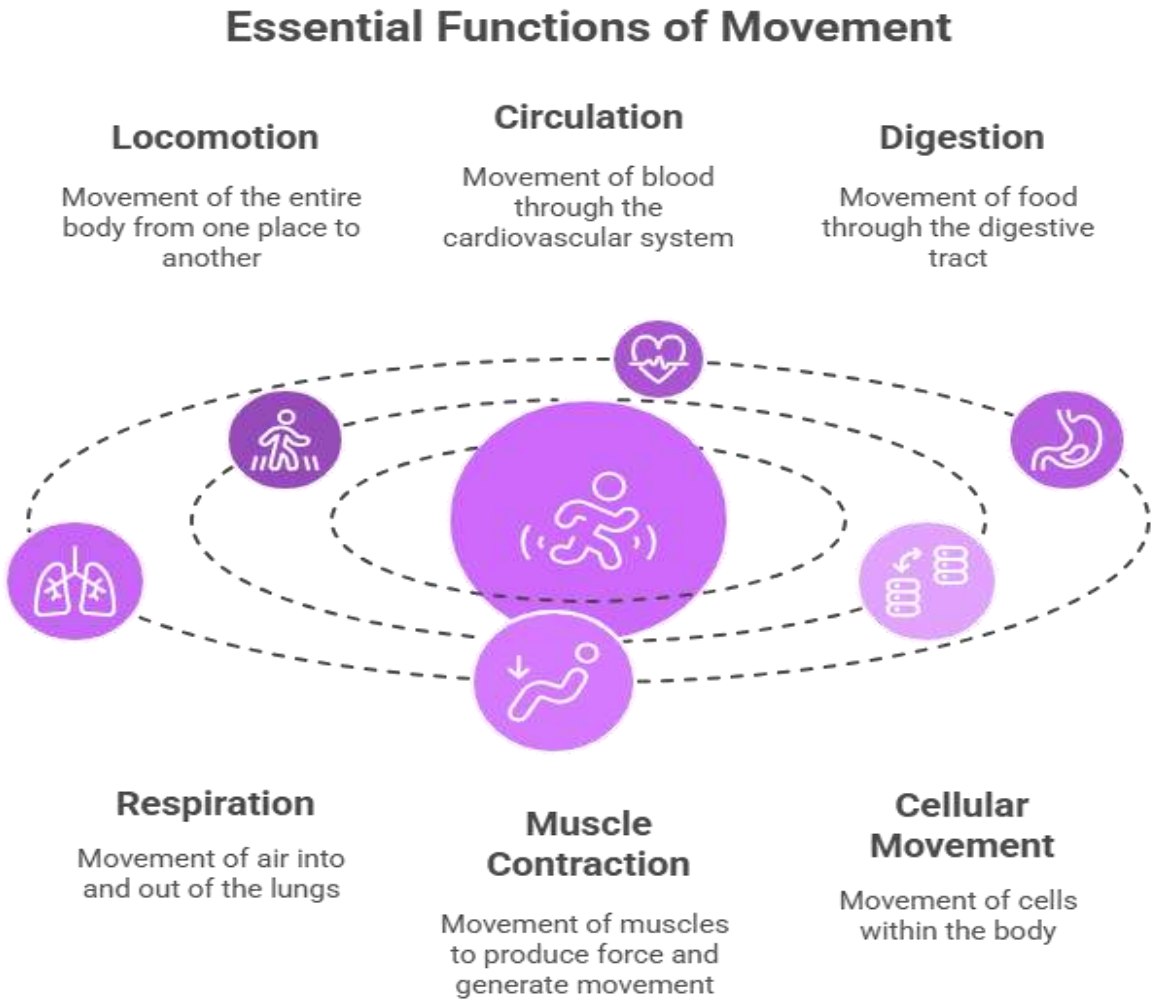
Endocrine System Responses

Slower regulation through hormones

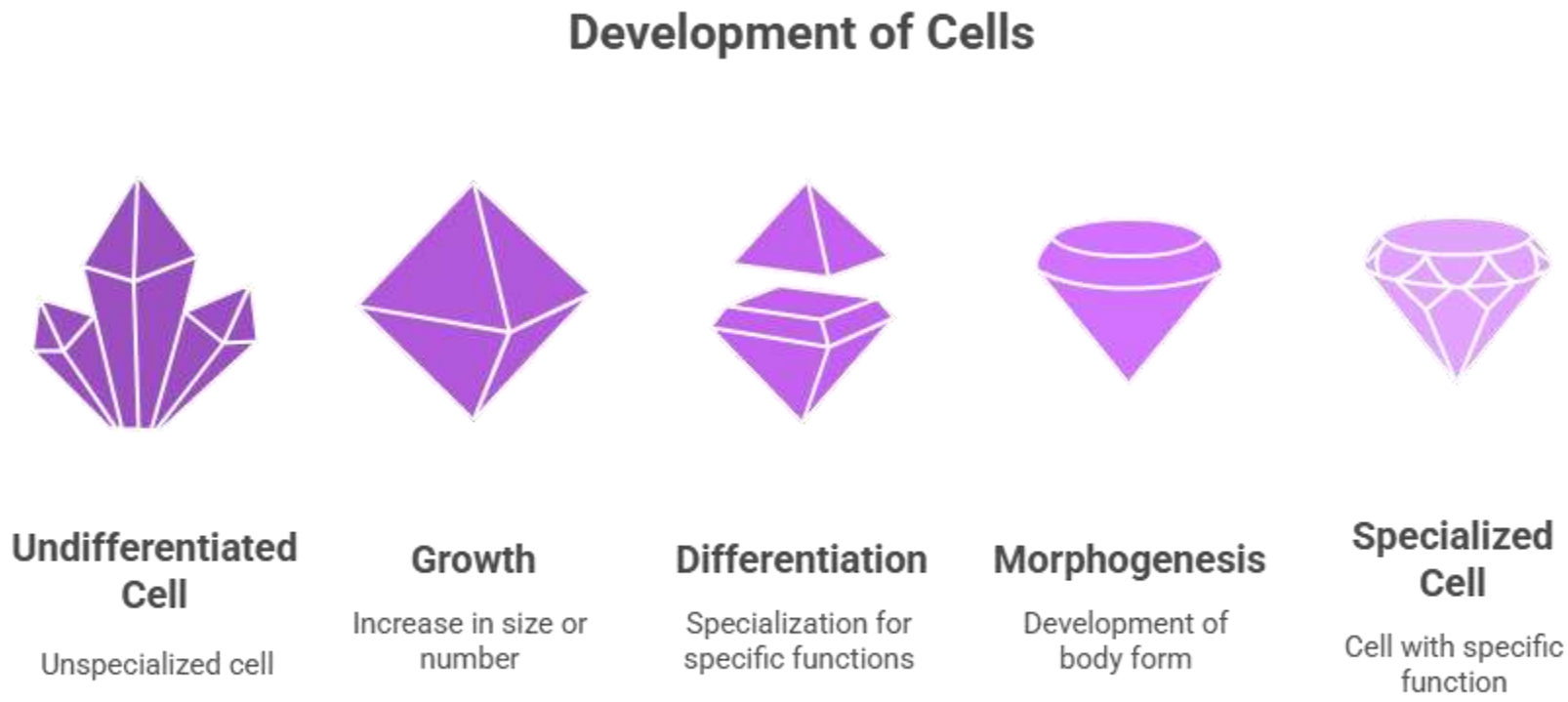
Other Responses

Physiological adjustments to stimuli

MOVEMENT


Essential Functions of Movement
Locomotion
Movement of the entire body from one place to another
Circulation
Movement of blood through the cardiovascular system
Digestion
Movement of food through the digestive tract
Respiration
Movement of air into and out of the lungs
Muscle Contraction
Movement of muscles to produce force and generate movement
Cellular Movement
Movement of cells within the body

DEVELOPMENT



REPRODUCTION

Sexual vs. Asexual Reproduction

What is sexual reproduction?

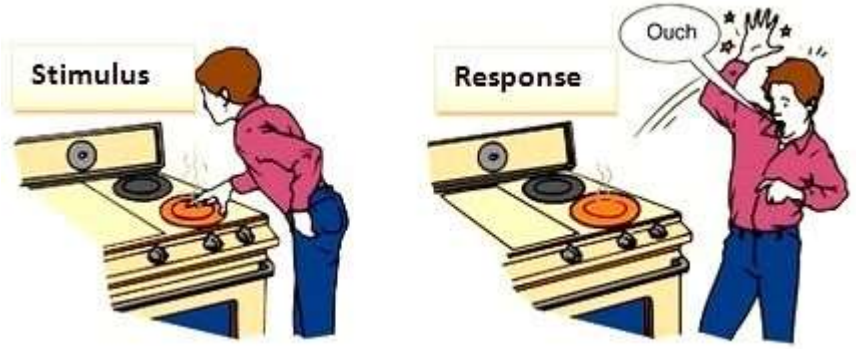
It involves the fusion of gametes (sperm and egg) from two parents, resulting in offspring with a combination of genetic material from both parents.

What is asexual reproduction?

It involves the production of offspring from a single parent, resulting in offspring that are genetically identical to the parent. This does not occur in humans.

CLASS ASSESSMENTS

- ✓ During a sudden loud noise, a person instinctively turns their head toward the sound, and their heart rate increases to prepare for potential action. Meanwhile, their body continues to break down glucose to fuel this response. Identify the two life processes involved.



SUMMARY

Living organisms perform essential life processes to survive.

- ✓ Nutrition provides energy and nutrients
- ✓ Respiration releases energy from food.
- ✓ Movement enables internal or external motion
- ✓ Excretion removes metabolic wastes.
- ✓ Growth and development involve size increase and specialization
- ✓ Reproduction ensures species continuity,
- ✓ Sensitivity allows response to stimuli
- ✓ Homeostasis maintains internal balance.

These processes sustain life across all organisms.

REFERENCE

- ✓ Essentials of Medical Physiology, K. Sembulingam & P. Sembulingam (Jaypee Brothers Medical Publishers)
- ✓ A Textbook of Human Anatomy and Physiology-I, SIA Publishers
- ✓ Human Anatomy & Physiology Gerard J. Tortora & Bryan H. Derrickson (Wiley)
- ✓ Ross and wilson anatomy and physiology in health and illness, Anne Waugh &Allison Grant.


Thank You