Physiology is the study of bodily functions. 

**How** does the body do that? 

**Why** does the body do that? 

Our physiology follows the basic laws of science: 

- **Physics** - laws of energy and matter 
- **Chemistry** - behavior of chemicals 
- **Biology** - physics, chemistry of living things 

**What is living?** 

Living things are organized containers of chemicals that take energy and nutrients from the environment for their own use. 

Living organisms use the natural behavior of chemicals: 

- to build larger molecules 
- as a source of energy 
- to repair structures 
- to reproduce 

**Organ Systems** – Review fig 1.3 pg 6-7 

**Concepts in Physiology** 

- Structure aids function: Chemicals, cells, organs 
- Cell theory: All life requires one or more cells 
- Energy processing: Food, oxygen, ATP 
- Information flow: DNA – RNA – proteins, intercellular (nerve, hormones) 
- Homeostasis: Maintain optimum functioning 
- Evolution: Genetic response to environment 

**Homeostasis** 

- Maintaining normal conditions 
- Stressor: A change from normal conditions 
- Homeostasis: To return to normal conditions (functions) 
  - Refers to an organ’s response to stressor 

- This requires: 
  - Recognize changes: Sensory functions 
  - Respond to change: Motor functions 
  - Integration: Connects sensory to motor 

Sensory changes lead to appropriate motor activity 

**Physiologic reflex:** 

- **Sensory change** → **Motor response** 

- **Set point:** “Normal” level of function or condition 
- **Stimulus:** Change in conditions / not normal 
- **Receptor:** Notices change; eg. neurons, endocrine glands 
- **Sensory pathway:** From receptor to control center; eg. sensory neuron, endocrine glands 
- **Integration center:** Connects sensory to motor response; eg. brain, spinal cord, endocrine gland 
- **Motor pathway:** To effector; eg. motor neuron, hormones 
- **Effector:** Organ that responds; eg. muscles, glands
Response is opposite to the change
Response brings body functions back to normal

Response (return to normal) - shuts off the response

- eg. normal temperature shuts off the heater
- eg. normal glucose level shuts off insulin production

Homeodynamics

- Maintaining normal conditions
- Optimum function for current condition
- Optimum function for survival

Allows temporary change of functions, even if normal

- Danger: increase glucose, HR, BP
- Exercise: increase glucose, HR, BP
- Infection: raise temperature

Is homodynamics really homeostasis?

- Homeostasis of Respiratory Rate?
- Homeostasis of oxygen to brain, muscles?

Eg - Respiratory Rate goes up during exercise

Eg - If low BP - response is to maintain normal BP:

- Increase heart contractility: heart
- Increase water absorption: hormone
- Decrease urine production: kidney
- Thirst: behavior
- Vasoconstrict blood vessels: nerve + hormones

Physiology integrates several organs/systems to achieve optimum functioning.