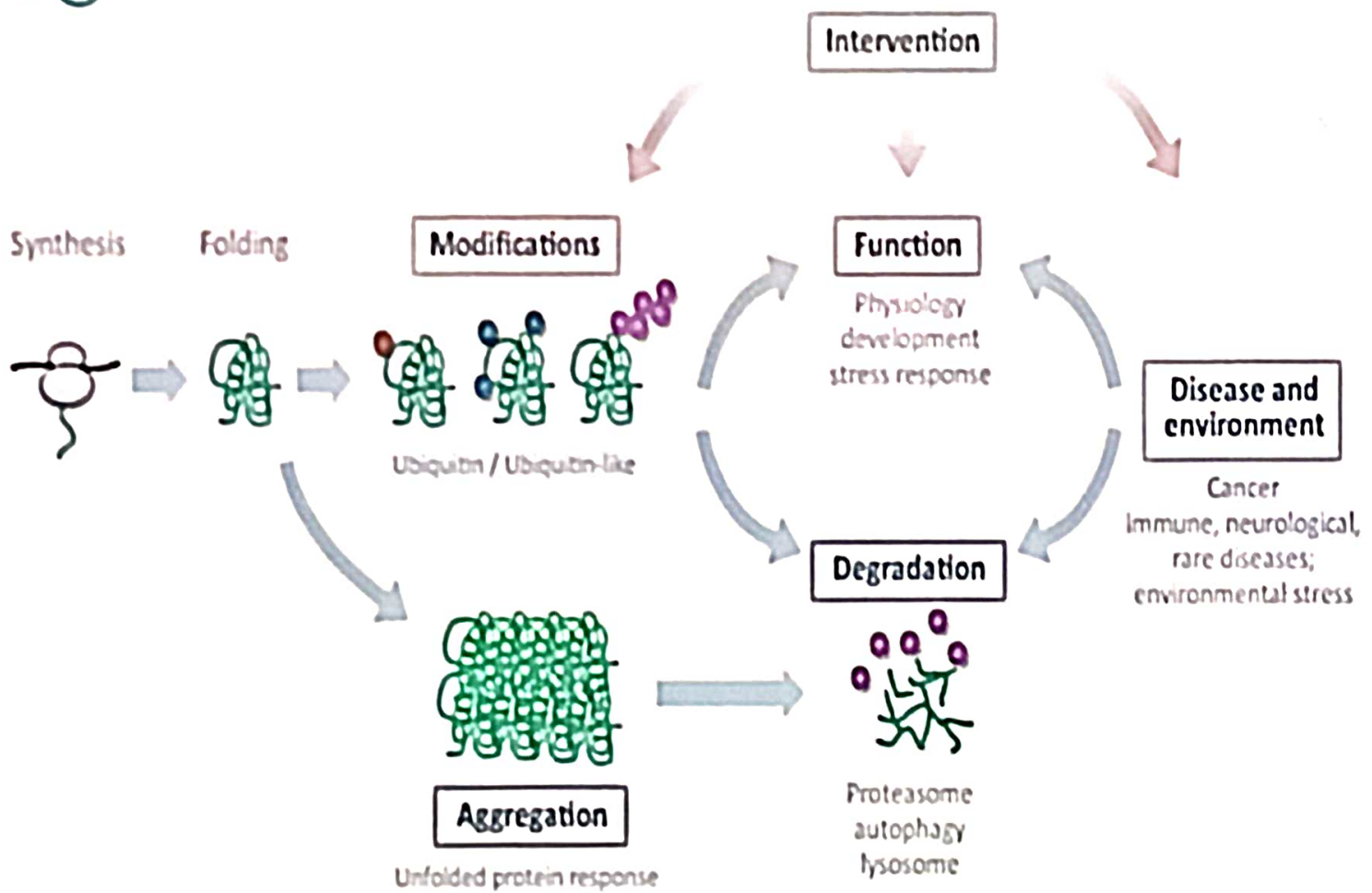




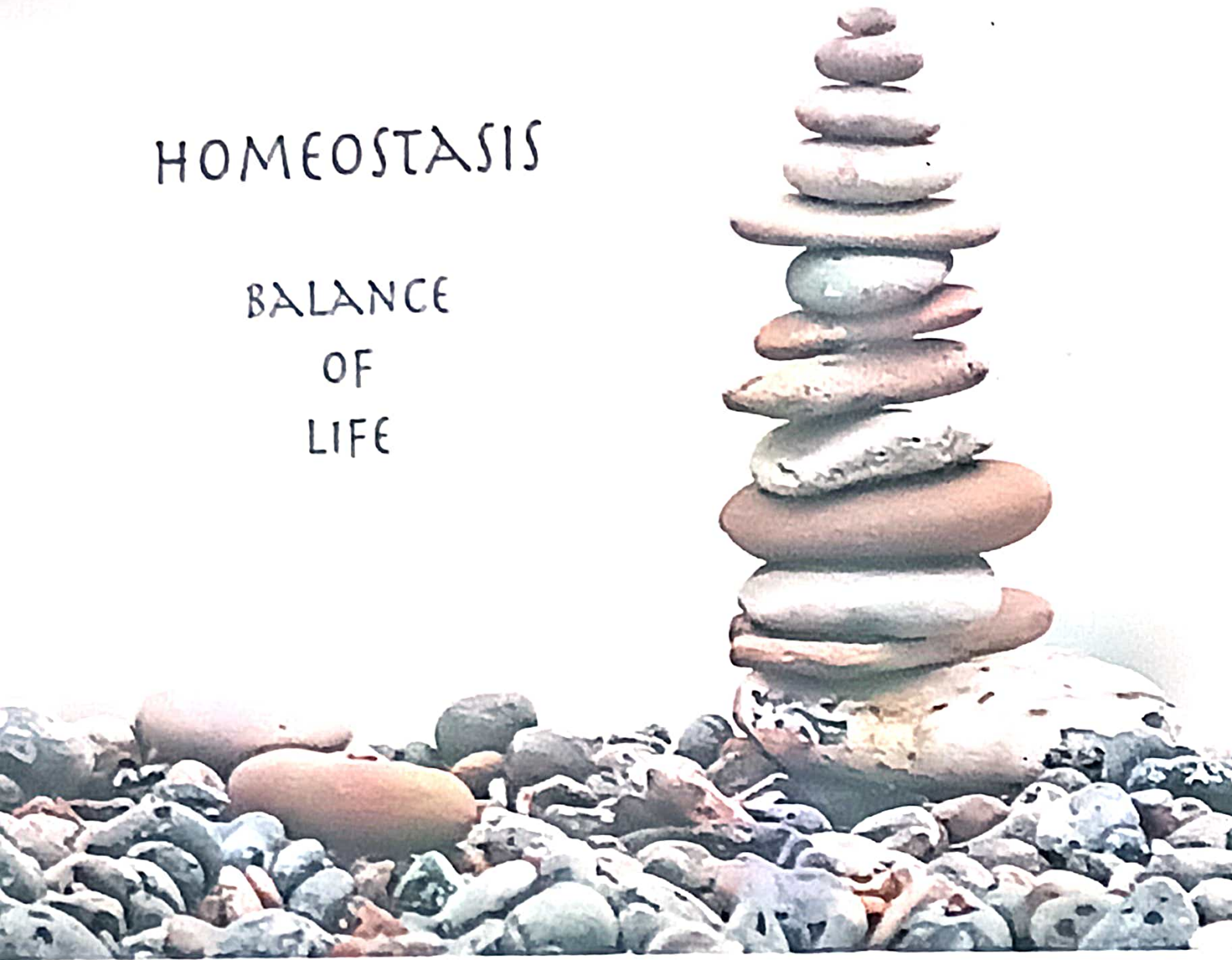
PROTEOSTASIS

Areas of study



HOMEOSTASIS

BALANCE
OF
LIFE



What is Homeostasis?

"Homeostasis is the state of steady internal chemical and physical conditions maintained by living systems."

Regulation of the Internal Milieu

What is Homeostasis?



Characteristics that are controlled include :

- Temperature – at 36.5- 37°C
- Blood glucose – 4–8 mmol/l
- pH of the blood – at 7.4.

What is Homeostasis?

- Refers to a state of constancy in a system.
 - In its normal, or resting, state, a system often is said to be in homeostasis.
 - When events occur that disrupt the normal state, the system is able to respond and restore homeostasis.
 - Physiologists use the term homeostasis to refer to maintaining a constant internal environment.
- A homeostatic system makes adjustments to lessen the internal impact of major external disturbances.
 - Example: During exercise, sweating increases to maintain a constant internal temperature.

The Internal Milieu

- The “internal milieu” is the internal environment of an organism, or the extracellular fluid environment.
 - The fluid environment surrounds cells, exchanges nutrients and wastes, and acts as a buffer.
- The cell is the simplest unit of life.
- Cells make up body systems; body systems maintain homeostasis; and homeostasis is necessary for healthy cells.
- Each cell contributes to the maintenance of homeostasis and each cell is dependent on the overall maintenance of homeostasis.
 - The cell needs a constant internal environment.
 - Cells obtain nutrients from, and remove wastes to, the internal milieu.
 - Cells have specialized functions that contribute to homeostasis.

History of Homeostasis

- Claude Bernard (1813-1878)
 - French physiologist
 - Developed the concept of the internal milieu.
 - Recognized that many animals regulate their internal environment even if the external environment changes.
- Walter Cannon (1871-1945)
 - Coined the term “Homeostasis” in 1926.
 - Realized the importance of the autonomic nervous system in maintaining a constant internal environment.

Homeostasis

- Organism's Internal Regulation
 - Examples of physiological conditions requiring homeostasis:
 - Temperature
 - Concentration of Waste Products
 - Gas Exchange
 - pH
 - Energy Requirements
 - Water/Ion balance
 - Volume/Pressure
 - "Regulators" use behavioral and physiological mechanisms to buffer external changes and thus, maintain a constant internal environment.
 - "Conformers" adjust the internal environment in reaction to external changes.



REGULATION OF BODY FUNCTIONS

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graph TD; A[REGULATION OF BODY FUNCTIONS] --> B[1) Nervous system:]; A --> C[2) Hormonal system of regulation:]; B --- D[ ]; C --- D;
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1) Nervous system:

- Sensory input: detect the state of the body, or the state of the surroundings, it comes through the sensory organs (the eyes, ears...)
- Central nervous system (CNS): determines the required reaction to response to the sensations, and produce a signal.
- MOTOR OUTPUT: Perform the desired action.
- Faster

2) Hormonal system of regulation:

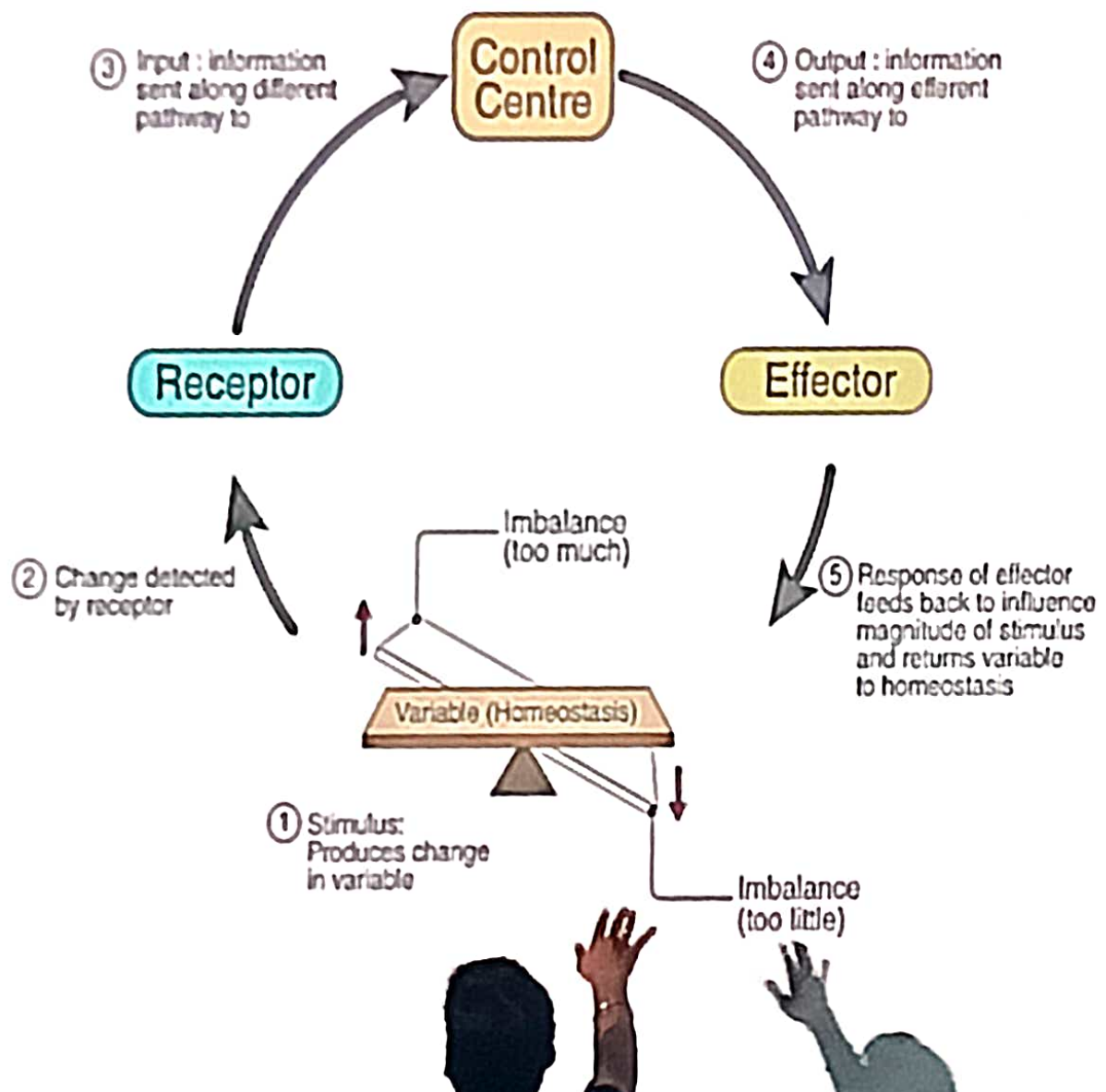
- Hormones are being secreted from the major 8 endocrine glands (pancreas, thyroid...) in the body to the extracellular fluid and then to all parts of the body to help regulate cellular functions.
- E.g. : insulin is secreted from the pancreas to help control glucose level.
- Slower

Negative Feedback loops:

Negative feedback loops are one of the primary mechanisms by which homeostasis is maintained in the body. They work by counteracting any deviations from the set point, thereby returning the system to its original state. For example, when body temperature rises above the normal range, negative feedback triggers mechanisms like sweating and vasodilation to cool the body down and restore the temperature to its optimal level.

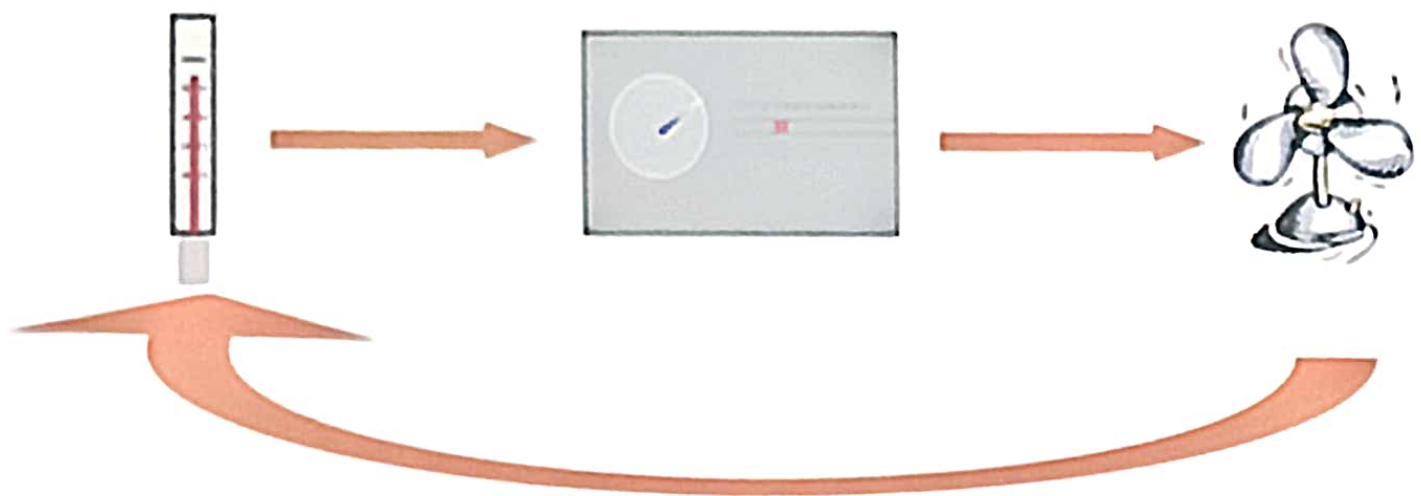


Homeostasis



Necessary Components of a Homeostatic System

- Receptor
- Control Center
- Effector



Disease is a state of disturbed homeostasis

