

## UNIT 3

Maintaining the Internal Environment of the body is “HOMEOSTASIS”

Operating or Set points: values, or optimal levels of bodily functions.

Error signal is a correction, not a stimulus, body has to be regulated with a little flexibility.

Know that the most important ERROR is fixed 1<sup>st</sup>. Body has a Hierarchy.

Example is that body temp is fixed before blood pressure.

Regulations have “gain values” the higher the gain value the more important the prob.

Acclimation is the ability to adapt to environmental changes, EX. Warm climate to cold climate, seasonal shock.

Receptor Adaption, affects homeostatic response: there are two types:

PHASIC: when receptors do not send signals, ex. Smell adaption

TONIC : keep sending signals, PAIN, HUNGER, HEADACHE

Homeostatic responses are divided into three classes

\* Negative feedback: most common, reverses direction of stimulus. If there is an increase in your body temp., body will attempt to lower.

\* Positive feedback: stimulus goes in the same direction, destabilizes system.

Examples are blood clotting, breast feeding, and sexual response.

\* Feedforward: Anticipates, or prepares for a stimulus, smelling food, body thinks it will eat and produces Gastric Acid, HCL.

Homeostatic response IN = OUTPUT

Output is more important because you can control your input. If there is a sudden change body can quickly correct itself.

Physical parameters, like temperature, can not be stored.

Chemical parameters can be stored. Called POOLS

Homeostatic responses are like the reflex arc, stimulus and ends with response

**Stimulus, receptors, Afferent route, Integrating centers, Efferent routes, Effectors, response** they occur involuntarily through ANS.

CHEMICAL MESSENGERS: Primary chemical messengers PCM, and Secondary chemical messengers SCM.

PCM, carry message extracellularly. Chemicals released into ECF. (NO GAP JUNC.)

SCM, created after PCM in bonded to a receptor. Will carry a message intracellularly.

This process is called SIGNAL TRANSDUCTION.

Know the chemicals moved. Can find in notes.

There are several characteristics to a “receptor”.

Know that SATURATION is just the # of receptors on a membrane.

Know Specificity, affinity.

Competition is where receptor binds more than one chemical.

Agonist: binds to receptor, gives response.

Antagonist: binds receptor, gives no response.

Regulating receptor activity

Down regulation: a decrease in receptors (antagonists)

Up regulation: increase in receptors (agonists)

Know that membrane receptors use second chemical messengers inside cell.

Know that cytosol receptors do not use SCM.

Nervous System, communication is very fast.

Endocrine system, communication is slow. Transported through blood.

Hormones are organic compounds, mainly → C,H,O

Secreted into blood, and transported to targets. May require energy “active transport like”

Glands, or endocrine glands, are functionally named, not anatomically.

Steroids: secreted from gonads, adrenal cortex, corpus luteum, and placenta.

\* mineralcorticoids: control electrolyte levels. (aldosterone)

\* glucocorticoids: glucose metabolism (Cortisol) also works with stomach fat.

\* gonadocorticoids: control sexual response.

Circadian hormones are on a 24 hour pattern.

One gland can secrete many hormones, this is important to know where hormones are release and where, and so one hormone can come from many glands, like sex hormones.

TROPIC hormones have the function to stimulate another gland to produce another.

Tropic hormones are ALL APG, except prolactin.

Every gland and muscle has neurons to trigger stimulus release, or down regulation.

Pituitary gland is pea sized, and located in the mid brain. Controls most hormonal actions throughout the body.

Posterior Pituitary gland, has Oxytocin, and ADH (Anti-diuretic hormone) important in renal physiology.

Anterior Pituitary gland secretions are controlled by 2 hypothalamic hormones.

**GH → GHRH AND GIH OR SOMATOSTANIN**

Removing Anterior Pituitary will increase the release of Prolactin, but inhibit the release of all other APG hormones.

**READ HYPO AND HYPER RESPONSIVENESS TO HORMONES!!!** Know the levels of diagnosis, and the concept of primary and secondary.