SNS COLLEGE OF NURSING

SARAVANAMPATTI,COIMBATORE-35

DEPARTMENT OF NURSING

COURSE NAME : BSC (NURSING) I YEAR

SUBJECT : APPLIED ANATOMY & PHYSIOLOGY

UNIT IV: ENDOCRINE SYSTEM

TOPIC : ENDOCRINE PHYSIOLOGY

INTRODUCTION

- The function of the endocrine system is to coordinate and integrate cellular activity within the whole body
- By regulating cellular and organ function throughout life and maintaining **homeostasis**.
- Homeostasis, or the maintenance of a constant internal environment, is critical to ensuring appropriate cellular function.

ENDOCRINE FUNCTIONS

- Regulation of sodium and water balance and control of blood volume and pressure
- Regulation of calcium and phosphate balance to preserve extracellular fluid concentrations required for cell membrane integrity and intracellular signaling

ENDOCRINE FUNCTIONS

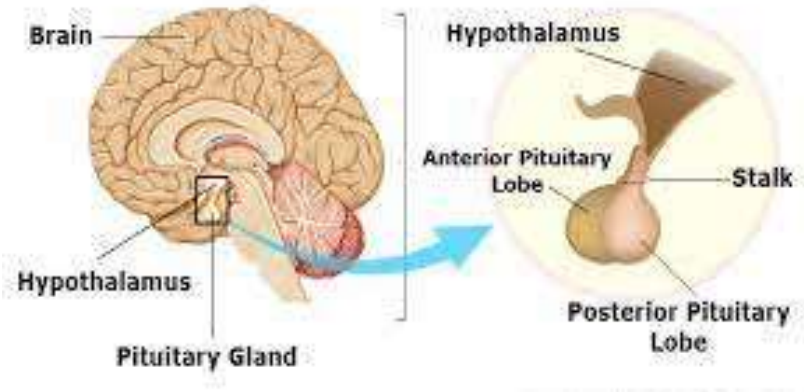
- Regulation of energy balance and control of fuel mobilization, utilization, and storage to ensure that cellular metabolic demands are met

- Coordination of the host hemodynamic and metabolic counter regulatory responses to stress

- Regulation of reproduction, development, growth, and senescence

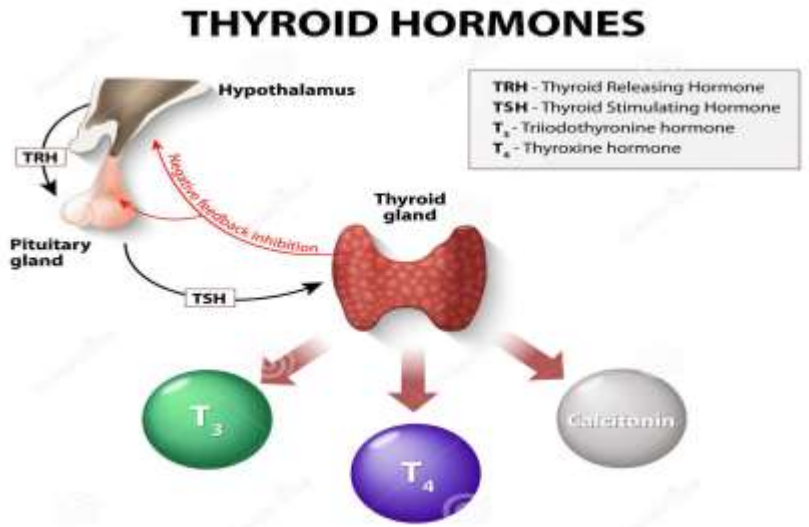
HYPOTHALAMUS

- **Mixed functions.** Although the function of some hormone-producing glands is purely endocrine, the function of others (pancreas and gonads) is mixed- both endocrine and exocrine.



THYROID GLAND

- Thyroid hormone controls the rate at which glucose is “burned” oxidized, converted to body heat and chemical energy
- It is also important for normal tissue growth and development.



ADRENAL GLAND

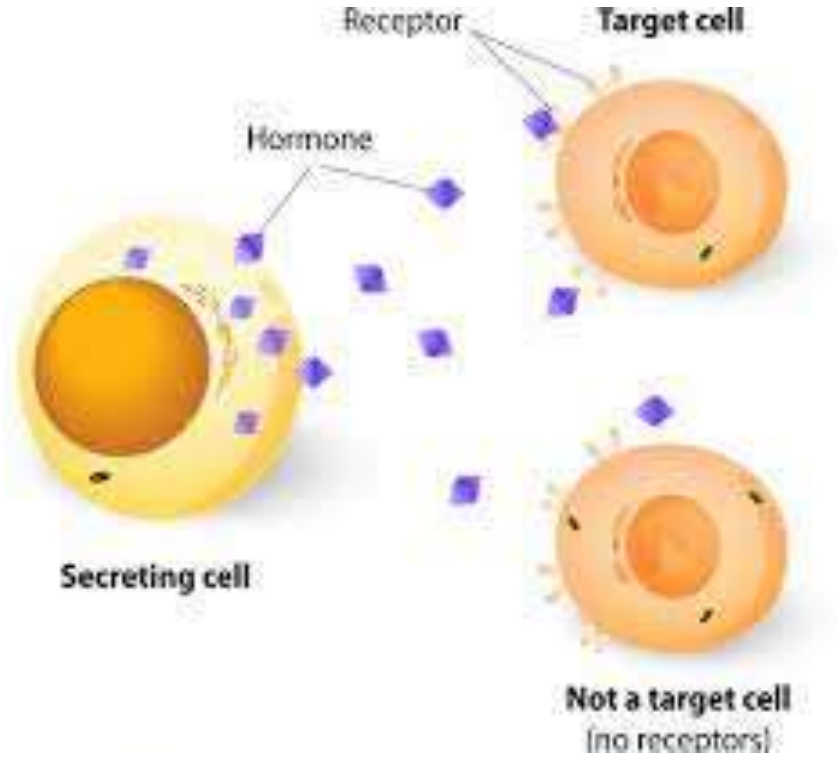
- **Function.**
- The Catecholamines increase heart rate, blood pressure, and blood glucose levels and dilate the small passageways of the lungs

- The catecholamines of the adrenal medulla prepare the body to cope with a brief or short-term stressful situation and cause the so-called **alarm stage** of the stress response.

MECHANISMS OF HORMONE ACTION

- **Target cells.**

- Specific protein receptors must be present on its plasma membrane or in its interior to which that hormone can attach
- Only when this binding occurs can the hormone influence the workings of cells.



MECHANISMS OF HORMONE ACTION

- **Function of hormones.**

- The hormones bring about their effects on, the body cells primarily by altering cellular activity

- That is, by increasing or decreasing the rate of a normal, or usual, metabolic process rather than stimulating a new one.

MECHANISMS OF HORMONE ACTION

- **Changes in hormone binding.**
- The precise changes that follow hormone binding depend on the specific hormone and the target cell type
- Changes in plasma membrane permeability or electrical state.
- Synthesis of protein or certain regulatory molecules (such as enzymes) in the cell.’
- Activation or inactivation of enzymes.
- Stimulation of mitosis.
- Promotion of secretory activity.

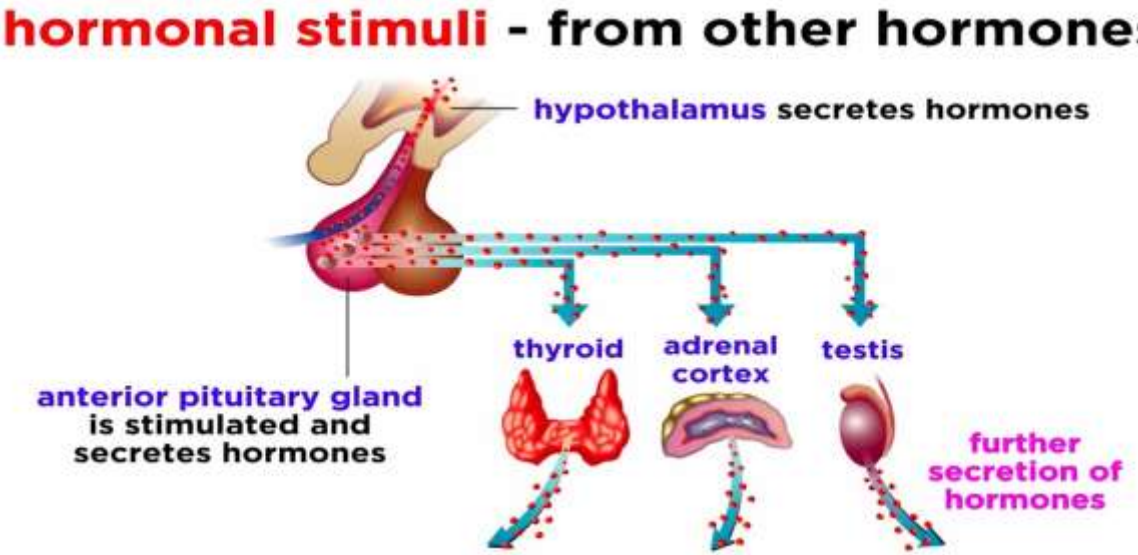
CONTROL OF HORMONE RELEASE

- **Negative feedback mechanisms.** Negative feedback mechanisms are the chief means of regulating blood levels of nearly all hormones.

- **Endocrine gland stimuli.** The stimuli that activate the endocrine organs fall into three major categories- **hormonal, humoral, and neural**.

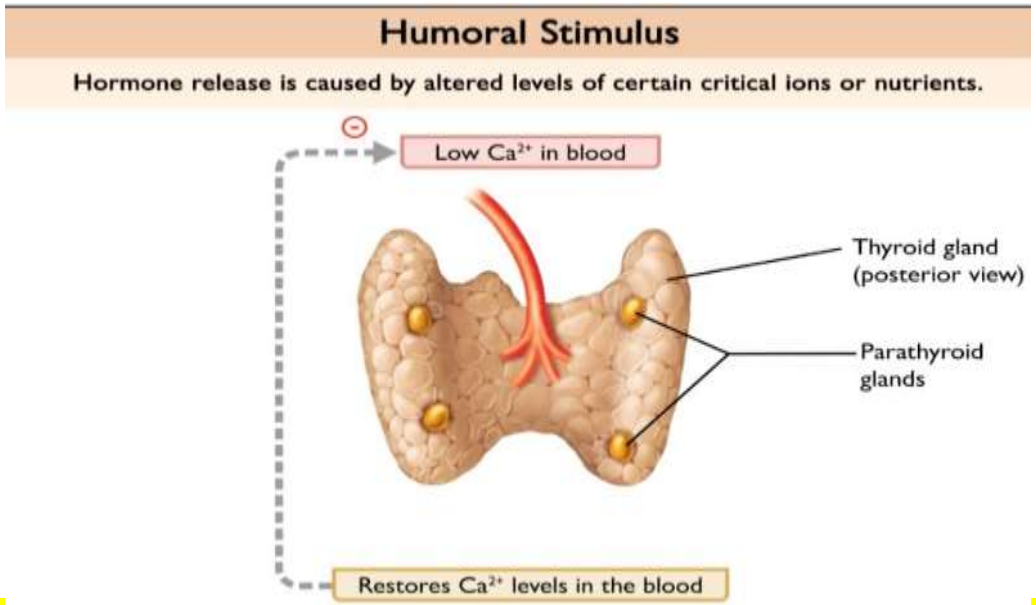
CONTROL OF HORMONE RELEASE

- **HORMONAL STIMULI.**
- The most common stimulus is a hormonal stimulus, in which the endocrine organs are prodded into action by other hormones



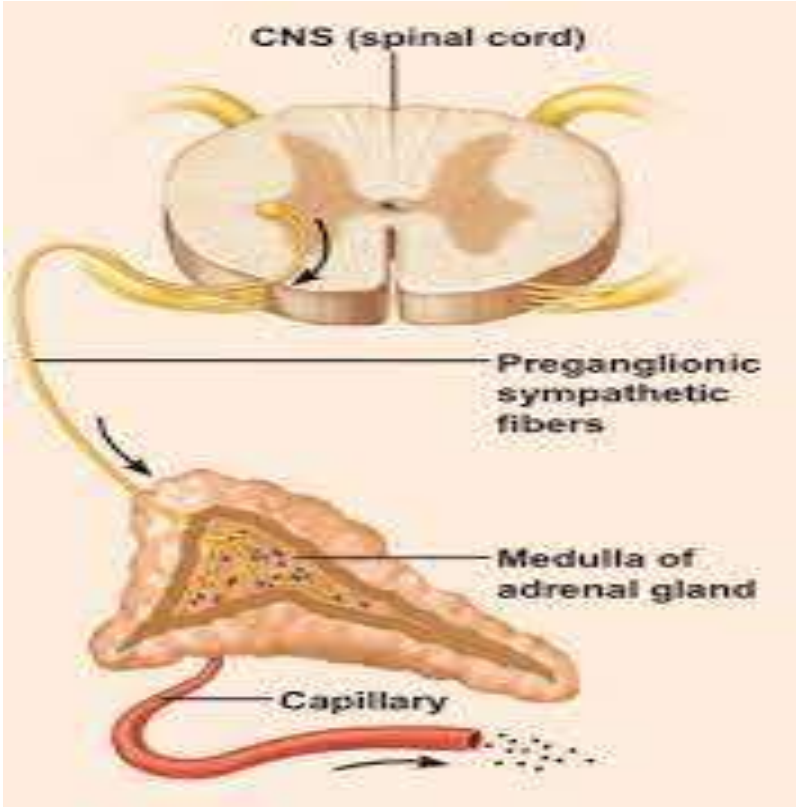
CONTROL OF HORMONE RELEASE

- **Humoral stimuli.**
- Changing blood levels of certain ions and nutrients may also stimulate hormone release, and this is referred to as humoral stimuli



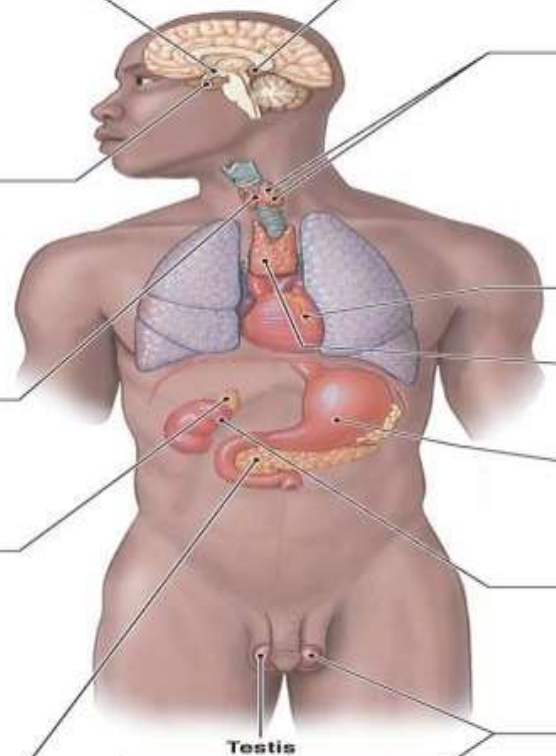
CONTROL OF HORMONE RELEASE

- **Neural stimuli.**
- The nerve fibers stimulate hormone release, and the target cells are said to respond to neural stimuli.



GLAND AND ITS FUNCTION

- Organs of the endocrine system (purple) and other organs containing tissues that secrete hormones (tan)



Hypothalamus

Secretes hormones involved with fluid balance, smooth muscle contraction, and the control of hormone secretion by the anterior pituitary gland

Pituitary Gland

Secretes multiple hormones that regulate the endocrine activities of the adrenal cortex, thyroid gland, and reproductive organs, and a hormone that stimulates melanin production

Thyroid Gland

Secretes hormones that affect metabolic rate and calcium levels in body fluids.

Adrenal Glands

Secrete hormones involved with mineral balance, metabolic control, and resistance to stress; the adrenal medullae release E and NE during sympathetic activation

Pancreas (Pancreatic Islets)

Secretes hormones regulating the rate of glucose uptake and utilization by body tissues

Pineal Gland

Secretes melatonin, which affects reproductive function and helps establish circadian (day/night) rhythms

Parathyroid Glands

Secrete a hormone important to the regulation of calcium ion concentrations in body fluids

Organs with Secondary Endocrine Functions

Heart: Secretes hormones involved in the regulation of blood volume

Thymus: Secretes hormones involved in the stimulation and coordination of the immune response

Digestive Tract: Secretes numerous hormones involved in the coordination of system functions, glucose metabolism, and appetite

Kidneys: Secrete hormones that regulate blood cell production and the rates of calcium and phosphate absorption by the intestinal tract

Gonads: Secrete hormones affecting growth, metabolism, and sexual characteristics, as well as hormones coordinating the activities of organs in the reproductive system

CONCLUSION

- The endocrine system, made up of all the body's different hormones.
- It regulates all biological processes in the body from conception through adulthood and into old age, including the development of the brain and nervous system, the growth and function of the reproductive system


Thank
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