

# MODULE 1 L02

## Hormones Types and Their Target Cells

Dr. Lisa Brinn

[lbrinn@fiu.edu](mailto:lbrinn@fiu.edu)

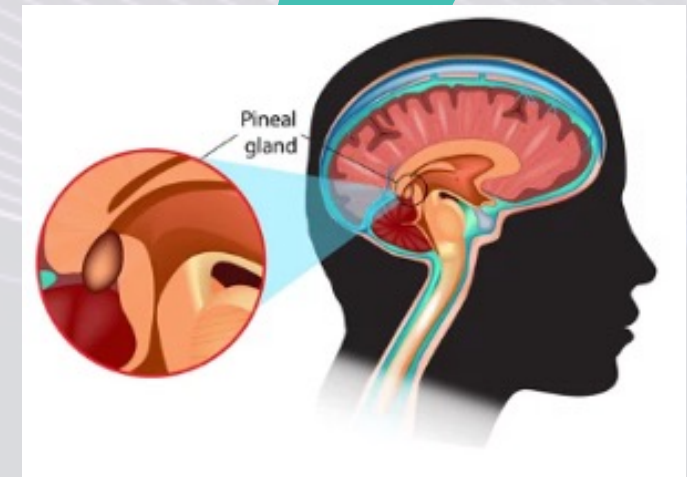
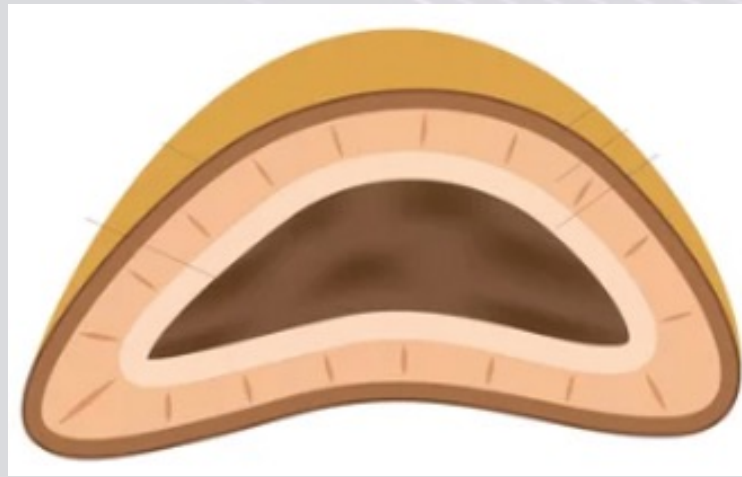


## 2. Major Chemical Classes of Hormones

- Hormones organized into four groups based on their chemical structures:
  - A. Amino acid derivatives
  - B. Peptide hormones
  - C. Steroid hormones
  - D. Eicosanoids

# A. Amino acid derivatives

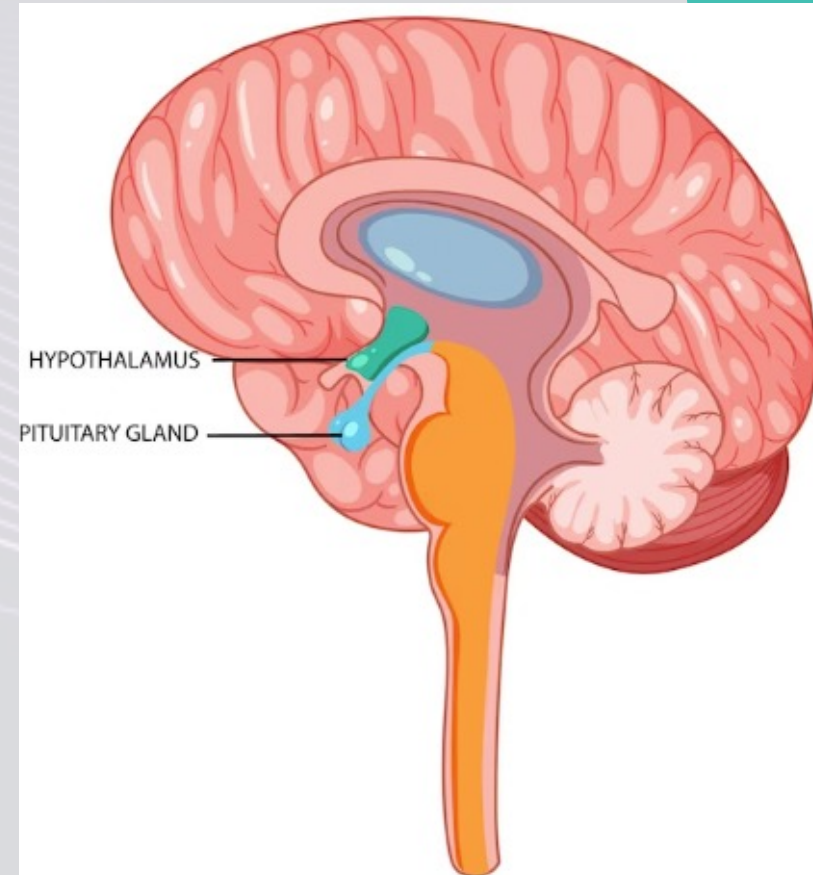
- Relatively small molecules
- Structurally similar to amino acids
  - ❖ Thyroid hormones – released by thyroid gland
  - ❖ Catecholamines – released by suprarenal medulla
  - ❖ Melatonin – synthesized by pineal gland



## B. Peptide Hormones

- Chains of amino acids
- Largest group of hormones – all pituitary gland hormones



- ❖ ADH
- ❖ Oxytocin
- ❖ TSH
- ❖ ACTH
- ❖ FSH
- ❖ LH
- ❖ Prolactin
- ❖ MSH
- ❖ GH





# C. Steroid Hormones

- Derived from cholesterol – released by reproductive organs and adrenal gland cortex

Adrenal Cortex	Ovaries	Testis
Glucocorticoids - cortisol	Estrogen - estradiol	Androgen - testosterone
Mineralcorticoids - aldosterone	Progestin - progesterone	
		

## D. Eicosanoids

- Small molecules (five-carbon ring at one end) – released by most cells
- Coordinate cellular activities and affect enzymatic process that occur in extracellular fluids
  - ❖ Induce labor
  - ❖ Induce swelling and inflammation at injury sites
  - ❖ Blood clotting
  - ❖ Cause asthma attacks

# Hormones Influence on Enzymes

- What are enzymes?
  - ❖ Substances that help facilitate biochemical reactions in our bodies
- Hormones influence cellular operations by changing:
  - ❖ Types
  - ❖ Activities
  - ❖ Quantities

} Key cytoplasmic enzymes

↓ Regulate metabolic operations

Target cells – peripheral cells that respond to hormones

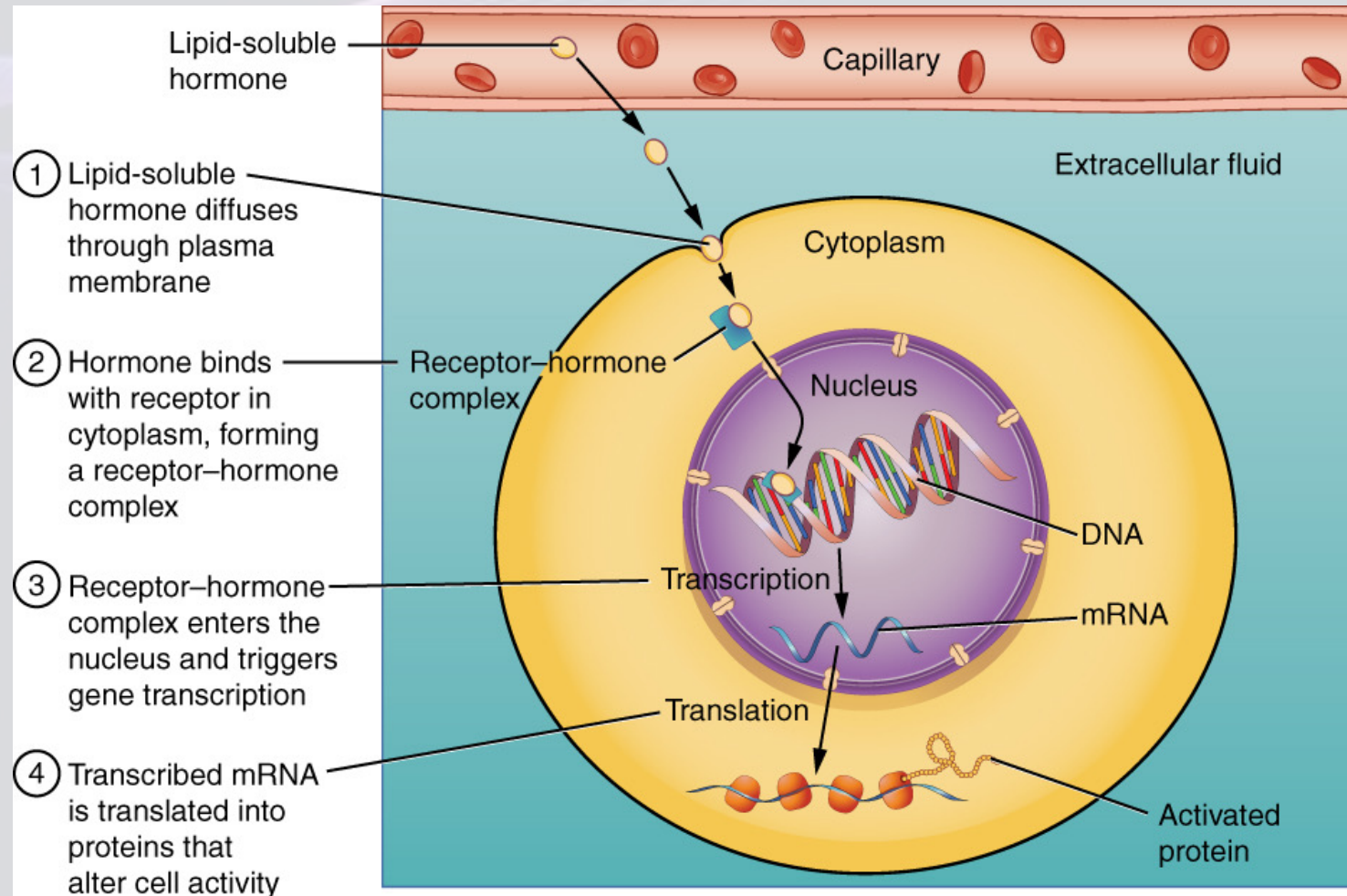
# Factors Affecting Target Cell Response

- Amount of hormone circulating:
  - ❖ Downregulation – target cells ↓ number of receptors
  - ❖ Upregulation – target cells ↑ number of receptors
- Number of receptors for that hormone
- Hormone interactions:
  - ❖ Permissive effect
    - presence of one hormone enables another hormone to act
  - ❖ Synergistic effect
    - two hormones with similar effects produce an amplified response
  - ❖ Antagonistic effect
    - two hormones have opposing effects



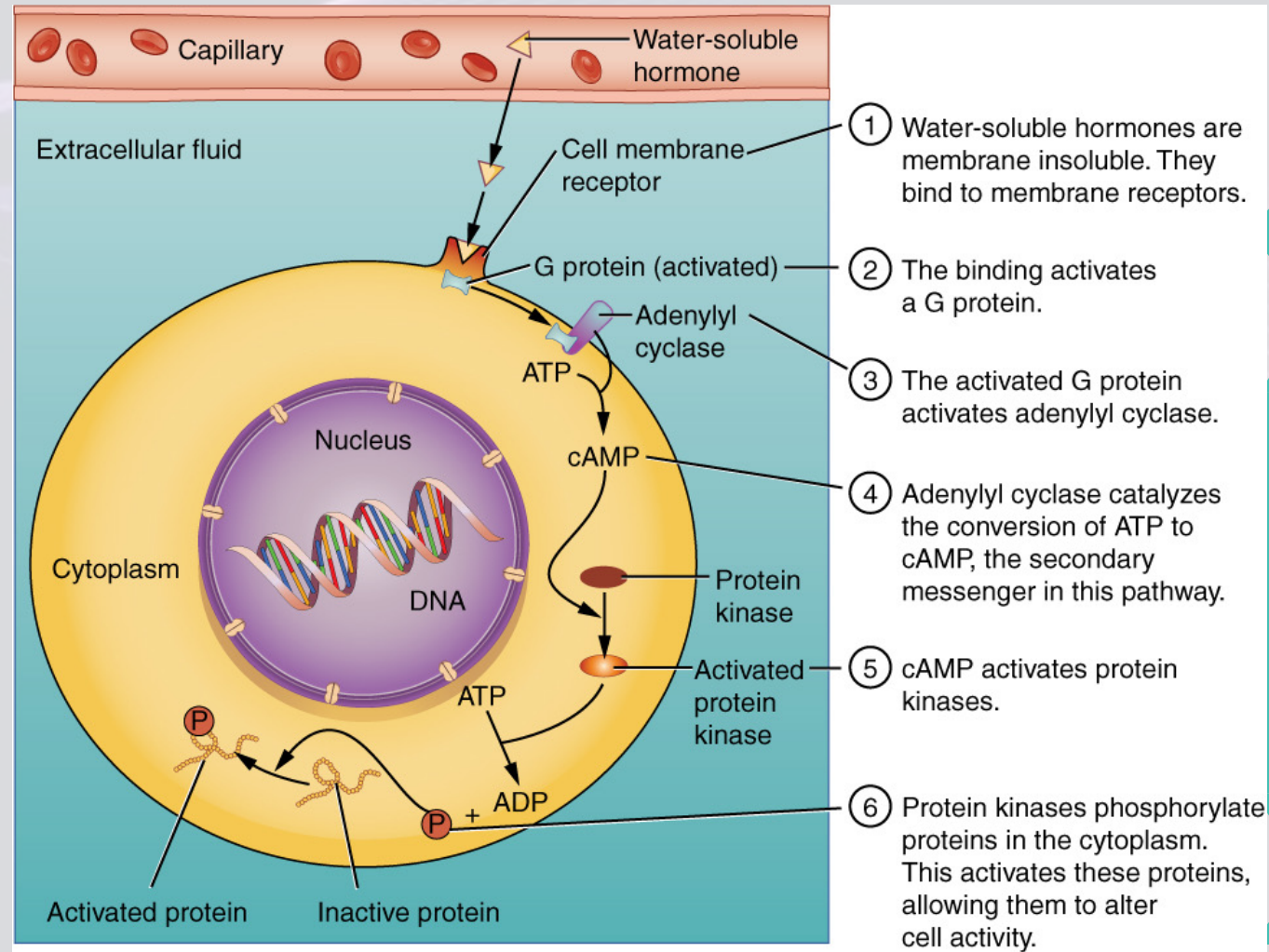
# Pathways of Hormone Action

## Binding of Lipid-Soluble Hormones



# Pathways of Hormone Action

## Binding of Water-Soluble Hormones



# Role of Endocrine Gland Stimuli

- Control endocrine activities
- Triggered by:
  - ❖ Humoral stimuli
    - Changes in the composition of the extracellular fluid
  - ❖ Hormonal stimuli
    - Arrival or removal of a specific hormone
  - ❖ Neural stimuli
    - Arrival of neurotransmitters at neuroglandular junctions
- Most cases regulated by negative feedback
- If by positive feedback
  - ❖ Processes that must be rushed to completion



# Regulation of Hormone Secretion

- Hormone levels are tightly controlled
  - ❖ Prevent abnormal hormone levels
    - Prevent potential disease state
- Role of Feedback Loops
  - ❖ Positive feedback loops
    - characterized by the release of additional hormone in response to an original hormone release.
  - ❖ Negative Feedback Loops
    - characterized by the inhibition of further secretion of a hormone in response to adequate levels of that hormone

