

Endocrine System– Introduction

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Introduction

- ▶ Endocrine system maintains homeostasis
 - ▶ Endocrine glands are ductless glands which secrete secretions, hormones directly into the blood stream
 - ▶ Hormones are chemical substances that transfer information from one set of cells into the other.
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Introduction

- ▶ The word hormone is derived from a Greek word “Hormaein” – to excite or set in motion
 - ▶ The term “Hormone” was first used by E.H.Starling in 1905 to describe **Secretin**
 - ▶ Target organs: express receptors that bind the specific hormones to initiate a cellular response
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- ▶ In the dark ages, victors of battle used to eat the organs (brain, heart, gonads) as they considered them to have powers.
 - ▶ Aristotle noted the behavioral and physical effects of castration of roosters
 - ▶ Charles Brown Sequard, French physician gave the concept of endocrine replacement therapy
 - ▶ Bayliss and Starling, first described hormone - Secretin
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Functions of hormones

- ▶ Change in cell function
 - ▶ Control of growth and development
 - ▶ Alteration in body mass and its composition
 - ▶ Reproductive functions
 - ▶ Digestion, utilization and storage of nutrients
 - ▶ Regulation of volume and composition of fluid compartments
 - ▶ Behavioral changes
 - ▶ Control of senescence
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Types of hormones

▶ **Proteins or peptides:**

- Insulin
- IGF (Insulin like Growth Factors)
- LH
- FSH
- TSH
- HCG
- GH
- Prolactin
- HPL
- PTH
- Secretin
- Glucagon
- VIP
- GIP
- ANP
- Calcitonin
- CCK
- ADH
- Inhibin
- Somatostatin
- ACTH

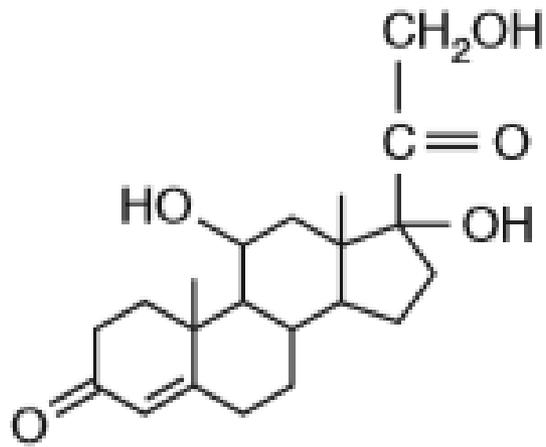
Types of hormones

▶ **Amino Acid derivatives:**

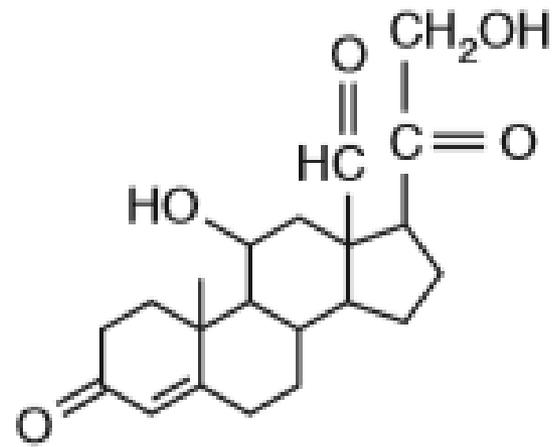
- ▶ Epinephrine
- ▶ Norepinephrine
- ▶ Dopamine
- ▶ Serotonin
- ▶ Thyroxine (T4)
- ▶ Tri-iodothyronine (T3)

▶ **Steroid Hormones:**

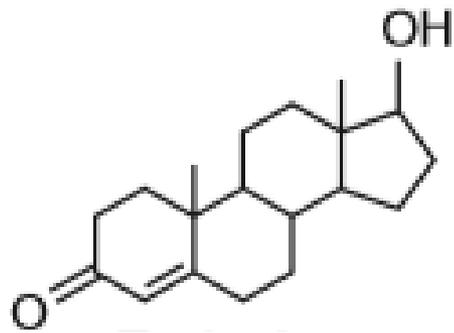
- ▶ Glucocorticoids
- ▶ Mineralocorticoids
- ▶ Estrogen
- ▶ Progesterone
- ▶ Testosterone
- ▶ 1,25-Dihydroxycholecalciferol



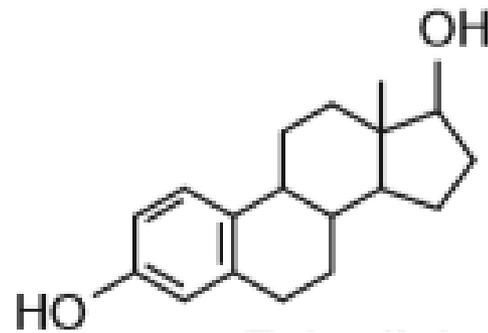
Cortisol



Aldosterone



Testosterone



Estradiol

Regulation of hormone secretion

- ▶ Feedback control
 - ▶ Neural control
 - ▶ Rhythmic or chronotropic control
 - ▶ Humoral control
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Hypothalamus

Hypothalamic
hormones (RH/IH)

Ant. Pituitary

Trophic
hormones

Target organ

Physiological
effects