

Chemical Coordination: Endocrine System

• Hormonal Integration

1. Endocrine system composed of **Endocrine glands** which secrete hormones

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-small, well-vascularized ductless glands composed of groups of cells arranged in cords or plates which secrete **hormones**. . .

-chemical messengers transported by the blood to some part of body - "target cells" - where initiate definite physiological responses.

2. Gland types:

- **Endocrine** - ductless, carried by blood stream (ie. thyroid, pituitary, thymus, ovaries, etc.)
- **Exocrine** - have ducts, discharge onto free surface. (ie. sweat, sebaceous, salivary, pancreas, etc.)

3. Nervous system - response fast (fractions of seconds)

Endocrine system - response slower (several seconds)

Together they function as a single, united system.

4. I.D. Endocrinology

5. Indirect mechanism of hormone action - cell surface receptors

Direct mechanism of hormone action - cytoplasmic receptors

6. Hormone secretion rates controlled by "negative feedback systems"

• Invertebrate Hormones

7. Primary source - neurosecretory cells (neurosecretions, neurosecretory hormones)

8. Found in all larger invertebrate groups

9. In insects - growth and development (= molting, metamorphosis)

molting hormone (= ecdysone)

juvenile hormone

• Vertebrate Endocrine Glands and Hormones

Anterior pituitary	Thyroid stimulating hormone (TSH) Adrenocorticotrophic hormone (ACTH) Growth hormone (GH) Gonadotropic hormones- Follicle-stimulating hormone (FSH) Luteinizing hormone (LH) Prolactin (PRL)
Posterior pituitary	Antidiuretic hormone (ADH)-"vasopressin" Oxytocin
Hypothalamus	Releasing hormones
Thyroid	Thyroxin Calcitonin (CT)
Parathyroids	Parathyroid hormone (PTH)
Adrenal cortex	Glucocorticoids (cortisol) Mineralocorticoids
Adrenal medulla	Epinephrine (=adrenalin) Norepinephrine (=noradrenalin)
Pancreatic Islets (of Langerhans)	Insulin Glucagon

• Digestive Hormones

Endocrine cells throughout the "gut" (G.I. tract) gut hormones (ie. Gastrin, Cholecystokinin, Secretin)

• Sex Hormones

Ovaries	Estrogens Progesterone
Testes	Androgens (esp. Testosterone)

• **Hormones of Immune System**

Thymus gland

Thymosins