

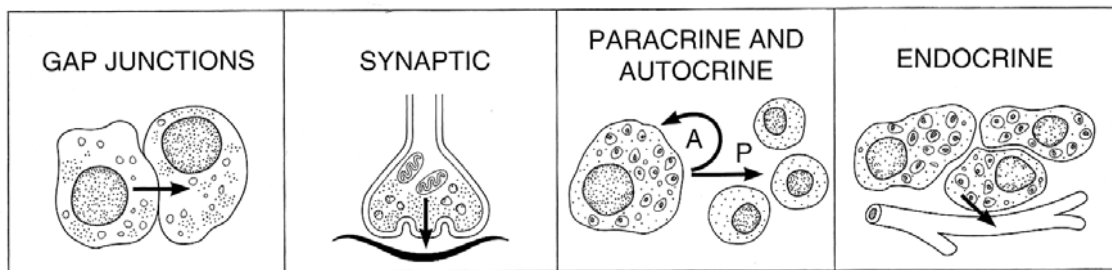
INTRODUCTION

A. Hormones/Endocrines

Hormones are substances secreted into the blood by specialized glands (endocrine glands) or specialized cells in other tissue.

Note: there are two types of glands: endocrine glands (described above) and exocrine glands. Exocrine gland secrete their products either onto the surface of the body (e.g. sweat glands) or into the alimentary tract (e.g. salivary glands of the oral cavity, acid-secreting glands of the stomach).

Note: There are several types of cell-to-cell chemical communication: gap junctions, synaptic transmission, paracrine/autocrine, and endocrine



	Gap Junctions	Synaptic	Paracrine & Autocrine	Endocrine
Chemical transmission	Direct from cell-to-cell	Diffuse across synaptic cleft	Diffusion through interstitial fluid	Transport by the circulation
Site of action	Adjacent cells	Postsynaptic cell	Nearby cells (P) or same cell (A)	General (target tissue)
Specificity due to	Anatomic location	Anatomic location & receptors	Receptors	Receptors

B. Characteristics of Hormones

1. Hormones circulate in the blood either in free form (dissolved) or bound to carrier proteins
2. Hormones have their effect by binding to receptors either on the cell membrane or within (cytosol or nuclear) their target organs or tissues.

Note: Trophic hormones are hormones whose target is another endocrine gland

3. Hormones are either peptides, proteins, steroids, or amines
4. Compared with the nervous system, hormone action is relatively slow (minutes to weeks)

MAIN ENDOCRINE GLANDS

PITUITARY GLAND (also called the Hypophysis)

Hormone	Actions
Anterior Pituitary	
Growth hormone (GH, GRH, somatotropin, STH)	Promotes body growth
Adrenocorticotrophic hormone (ACTH, corticotropin)	Promotes secretion of cortisol and related glucocorticoids from the adrenal cortex
Thyroid-stimulating hormone (TSH, thyrotropin)	Promotes synthesis and release of thyroid hormones and growth of the thyroid
Luteinizing hormone (LH) (gonadotropin)	Females: promotes ovulation and luteinization of ovarian follicles Males: promotes testosterone secretion
Follicle-stimulating hormone (FSH) (gonadotropin)	Females: promotes follicle growth Males: promotes spermatogenesis
Prolactin (PRL)	Females: stimulates milk secretion
Posterior Pituitary	
Antidiuretic hormone (ADH, Vasopressin)	Promotes water retention in the kidney
Oxytocin	Causes uterine contraction in pregnancy; promotes milk ejection

THYROID GLAND

Hormone	Actions
Triiodothyronine & Thyroxin (T3 & T4)	Cell metabolism, promote growth & development
Calcitonin (CT)	Reduce ECF (extracellular fluid) calcium levels (importance In humans is not clear)

PARATHYROID GLAND

Hormone	Actions
Parathyroid Hormone (PTH)	Regulate ECF calcium and phosphate levels by action on bone and kidney

PANCREAS (endocrine secretions; also digestive exocrine secretions)

Hormone	Actions
Insulin	Control glucose entry into many tissues; other metabolic actions
Glucagon	Increase ECF glucose

ADRENAL GLAND

Hormone	Actions
Adrenal Cortex	
Aldosterone	Promote Na retention and K excretion by the kidney
Cortisol	Response to stress; many metabolic actions
Posterior Pituitary	
Epinephrine (& norepinephrine)	Component of sympathetic nervous system

MAIN ENDOCRINE GLANDS (continued)

GONADS

<i>Hormone</i>	<i>Actions</i>
Testes (male)	
Addrogens	Sperm production; male secondary sex characteristics
Ovary (female)	
Estrogens	Ovulation; female secondary sex characteristics
Progesterone	Support reproduction

PINEAL GLAND

<i>Hormone</i>	<i>Actions</i>
Melatonin	Establish circadian (diurnal) rhythm

Other Endocrine Secreting Structures include

1. Kidney: Renin and Erythropoietin (control of red cell production)
2. Heart: Natriuretic Peptide
3. Hypothalamus: releasing and inhibiting factors