Hormones

Hormones and the endocrine system

Endocrine glands that make up the endocrine system[1] are not connected, unlike components of other body systems. They secrete hormones into the bloodstream.

Hormones have a key role in regulating body processes. For example, they control growth and reproduction. They regulate the composition of body fluids and stabilise the water content of the body. They control blood circulation and the digestion, absorption and assimilation of food, and trigger adaptations to stress.

Examples of hormones

Endocrine gland	Hormones	Target cells	Functions
Anterior pituitary	TSH (thyroid stimulating hormone)	Thyroid follicular cells	Thyroxine production
	ACTH (adrenocorticotrophic hormone)	Zona fasciculata and zona reticularis of adrenal cortex	Cortisol secretion
	GH (growth hormone)	Bone, soft tissues	Growth of bones and soft tissues
	FSH (follicle stimulating hormone)	Female: ovarian follicles	Follicle growth, oestrogen secretion
		Male: seminiferous tubules of testes	Sperm production
	LH (luteinising hormone, in males called ICSH interstitial cell stimulating hormone))	Female: ovarian follicles and corpus luteum	Ovulation, development of corpus luteum, oestrogen and progesterone secretion
		Male: interstitial cells of Leydig in testes	Testosterone secretion
	Prolactin	Mammary glands	Breast development, milk secretion
Posterior pituitary	ADH (antidiuretic hormone, vasopressin)	Kidney tubules	Increases water reabsorption
		Arterioles	Vasoconstriction
	Oxytocin	Uterus	Increased contractility
		Mammary glands	Ejection of milk
Hypothalamus	Releleasing and inhibiting hormones, such as gonadotrophin releasing hormone (GnRH)	Anterior pituitary	Release of anterior pituitary hormones
Thyroid	Thyroxine	Most cells	Increases metabolic rate, essential for normal growth and nerve development

[1] See *Endocrine system.*

	Calcitonin	Bone	Decreases plasma calcium concentration
Adrenal cortex	Aldosterone	Kidney tubules	Increased Na^+ reabsorption and K^+ secretion
Adrenal medulla	Adrenaline, noradrenaline	Sympathetic receptor sites	Enhance sympathetic nervous system responses, blood pressure regulation, local blood flow
Pancreas (islets of Langerhans)	Insulin (from β cells)	Most cells	Increased respiration using glucose
		Liver cells, muscle cells	Promotes cellular uptake, use and storage of glucose
		Adipose cells	Conversion of glucose to fat
	Glucagon (from α cells)	Liver cells	Promotes conversion of glycogen to glucose
Parathyroid	PTH (parathyroid hormone)	Bones, kidneys, intestine	Increases plasma Ca^+ concentration, stimulates vitamin D activation
Gonads **Female: ovaries** **Male:** **testes**	Oestrogen	Female sex organs	Development of uterus and breasts, follicles
		Whole body	Secondary sexual characteristics
		Bone	Completes bone growth
	Progesterone	Uterus	Preparation for pregnancy
	Testosterone	Male sex organs	Sperm production
		Whole body	Secondary sexual characteristics
		Bone	Enhances pubertal growth spurt, completes bone growth
Placenta	Oestrogen Progesterone	Female sex organs	Maintains pregnancy, preparation of breasts for lactation
Kidneys	Renin	Activates angiotensin which acts on the zona glomerulosa of adrenal cortex	Aldosterone secretion
	Erythropoietin	Bone marrow	Red blood cell production
Stomach	Gastrin	Exocrine glands and smooth muscle of gut; pancreas, liver, gall bladder	Control of peristalsis and secretion to coordinate digestion and absorption
Duodenum	Secretin Cholecystokinin		
Liver	Thrombopoietin	Bone marrow	Platelet production
Skin	Vitamin D	intestine	Increased absorption of Ca^+
Thymus	Thymosin	T-lymphocytes	Proliferation and development of T-lymphocytes