Endocrine System II - Solutions

Hormone	Source	Conditions that cause hormone release	Target Organ/Cells	Result
Oxytocin	- Produced by hypothalamus - Stored and released by the posterior pituitary gland	- Fetus stimulates cervix and vagina - Infant suckling the breast - Sexual arousal (in males)	- Uterus - Mammary glands - Glands in male reproductive system and sperm duct	- Stimulates smooth muscle contraction for labor and delivery - Promotes milk release - Possibly involved in ejaculation and sperm transport
Thyrotropin-releasing hormone (TRH)	- Hypothalamus	- Low levels of thyroid hormones	- Anterior pituitary gland	- Promotes secretion of thyroid-stimulating hormone (TSH) and prolactin (PRL)
Gonadotropin-releasing hormone (GnRH)	- Hypothalamus	- Low estrogen and progesterone levels in blood	- Anterior pituitary gland	- Promotes secretion of follicle-stimulating hormone (FSH) and luteinizing hormone (LH)
Corticotropin-releasing hormone (CRH)	- Hypothalamus	- Stimulated by nervous activity in the brain - Can increase with stress	- Anterior pituitary gland	- Promotes secretion of adrenocorticotropic hormone (ACTH)
Growth hormone-releasing hormone (GHRH)	- Hypothalamus	- Low levels of growth hormone in blood	- Anterior pituitary gland	- Promotes secretion of growth hormone (GH)
Prolactin-inhibiting hormone (PIH)	- Hypothalamus	- High levels of PRL in blood	- Anterior pituitary gland	- Inhibits PRL secretion
Somatostatin	- Hypothalamus	- High levels of GH and TSH in blood	- Anterior pituitary gland	- Inhibits GH and TSH secretion

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Antidiuretic hormone (ADH)	- Produced by hypothalamus - Stored and released by the posterior pituitary gland	- Low blood pressure or blood volume - Increase in angiotensin II	- Nephrons of the kidneys	- Increases water reabsorption
Follicle-stimulating hormone (FSH)	- Anterior pituitary gland	- Increase in GnRH levels	- Ovaries - Testes	- Growth of ovarian follicles and secretion of estrogen - Sperm production
Luteinizing hormone (LH)	- Anterior pituitary gland	- High GnRH levels	- Ovaries - Testes	- Ovulation; maintenance of corpus luteum and secretion of estrogen and progesterone - Testosterone secretion
Thyroid-stimulating hormone (TSH)	- Anterior pituitary gland	- Increase in TRH levels	- Thyroid gland	- Stimulates growth of thyroid gland and secretion of thyroid hormone (e.g. thyroxine and triiodothyronine)
Adrenocorticotropic hormone (ACTH)	- Anterior pituitary gland	- Increase in CRH levels	- Suprarenal cortex	- Promotes secretion of glucocorticoids (e.g. cortisol)
Prolactin (PRL)	- Anterior pituitary gland	- Increase in TRH levels	- Mammary glands	- Stimulates mammary gland development and milk production
Growth hormone	- Anterior pituitary gland	- Increase in GHRH	- All tissues; skeletal muscle cells and cartilage cells are particularly sensitive to GH	- Stimulates cell growth and replication
Estrogen	- Ovary	- Increase in FSH - Presence of corpus luteum; increase in LH	- Many tissues	- Stimulates female reproductive development and development of secondary sexual characteristics - Regulates the menstrual cycle
Progesterone	- Ovary	- Presence of corpus luteum; increase in LH	- Uterus	- Regulates the menstrual cycle - Inhibits GnRH release

Testosterone	- Testes	- Increase in LH	- Many tissues	- Stimulates male reproductive development, muscle growth, sperm production and development of secondary sexual characteristics
Thyroxine (T_4) and triiodothyronine (T_3)	- Thyroid gland	- Increase in TSH	- Many tissues	- Increase metabolic rate, heat production, oxygen consumption, growth and development
Cortisol	- Suprarenal cortex	- Increase in ACTH	- Most tissues	- Anti-inflammatory effects - Accelerates glucose synthesis, glycogen formation and breakdown of fats
Calcitonin	- Thyroid gland	- Increase in Ca^{2+} levels in blood	- Osteoclasts - Nephrons of the kidneys	- Osteoclasts are inhibited – no Ca^{2+} is released from bones - Less Ca^{2+} reabsorbed
Parathyroid hormone (PTH)	- Parathyroid gland	- Decrease in Ca^{2+} levels in blood	- Osteoclasts - Nephrons of the kidneys - Digestive tract	- Osteoclasts stimulated to release stored Ca^{2+} from bones - More Ca^{2+} reabsorbed - Increases Ca^{2+} absorption from the digestive system
Calcitrol	- Kidneys	- Decrease in Ca^{2+} levels in blood	- Digestive tract	- Increases Ca^{2+} absorption from the digestive system - Increases blood Ca^{2+} levels
Epinephrine and Norepinephrine	- Suprarenal medulla	- Stimulation from sympathetic nervous system	- Most tissues	- Increases cardiac activity, blood pressure, metabolism
Insulin	- Pancreas	- Increase in glucose levels in the blood	- Most cells	- Increases glucose uptake and usage and storage of lipids and glycogen - Decreases blood glucose levels
Glucagon	- Pancreas	- Decrease in glucose levels in the blood	- Liver - Adipose tissue	- Stimulates hydrolysis of glycogen – increases blood glucose levels - Increases metabolism of lipids

Erythropoietin (EPO)	- Kidneys	- Low oxygen levels in the blood	- Red bone marrow - Digestive tract	- Stimulates red blood cell production - Stimulates calcium and phosphate absorption
Aldosterone	- Suprarenal cortex	- Low blood pressure or blood volume - Increase in angiotensin II	- Nephrons of the kidneys	- Increases Na^+ reabsorption and K^+ secretion – Cl^- and water passively reabsorbed
Natriuretic peptides	- Heart	- High blood volume	- Kidneys	- Inhibits renin release – increases water loss at the kidneys