

Organ	Function	Stimulated By	Inhibited By	Hyposecretion Effects	Hypersecretion Effects
	<ul style="list-style-type: none"> <li>Stimulates Uterine Contraction</li> <li>Stimulates release of milk from lactating breast</li> <li>Facilitates sperm transport in the male</li> <li>Plays a role in bonding ("love hormone")</li> </ul>	<ul style="list-style-type: none"> <li>Dilation of penis</li> <li>Decreases of breast</li> <li>Lackling of breasts</li> <li>Intercity</li> </ul>	None	<ul style="list-style-type: none"> <li>Difficulty with birthing and lactation</li> <li>Decreased sperm transport in male reproductive tract</li> </ul>	None
ADH / Vasopressin	<ul style="list-style-type: none"> <li>Regulates blood osmolarity (most important function)</li> <li>Regulates transport of water into the blood by kidneys</li> <li>Regulates water retention (water balance)</li> <li>Regulates transport of water into the blood by kidneys</li> <li>Regulates blood vessel tone</li> </ul>	<ul style="list-style-type: none"> <li>Low blood osmolarity</li> <li>Low blood volume / low blood pressure</li> <li>Stress</li> </ul>	<ul style="list-style-type: none"> <li>Low blood osmolarity</li> <li>High blood volume / high blood pressure</li> </ul>	<ul style="list-style-type: none"> <li>Diabetes insipidus</li> <li>Small volume of water is transported into blood</li> <li>Large amount of blood osmolarity</li> <li>Large decrease in blood volume / blood pressure</li> </ul>	<ul style="list-style-type: none"> <li>Edema (swelling)</li> <li>Large volume of water transported into blood</li> <li>Large decrease in blood osmolarity</li> <li>Large increase in blood volume / blood pressure</li> </ul>
Luteinizing Hormone (LH)	<ul style="list-style-type: none"> <li>Stimulates testosterone production</li> <li>Indirectly stimulates sperm production</li> <li>Helps regulate the menstrual cycle</li> </ul>	<ul style="list-style-type: none"> <li>GnRH</li> <li>Low blood testosterone</li> </ul>	<ul style="list-style-type: none"> <li>Low GnRH</li> <li>High blood testosterone</li> <li>Stress (via inhibition of GnRH)</li> </ul>	<ul style="list-style-type: none"> <li>Low blood testosterone (decreases sperm production)</li> <li>Decreased libido</li> <li>Erectile dysfunction</li> <li>Amenorrhea</li> </ul>	<ul style="list-style-type: none"> <li>High blood testosterone</li> <li>Amenorrhea (lack of menstrual cycle)</li> </ul>
Follicle Stimulating Hormone (FSH)	<ul style="list-style-type: none"> <li>Stimulates sperm production</li> <li>Stimulates estrogen production</li> <li>Helps regulate the menstrual cycle</li> </ul>	<ul style="list-style-type: none"> <li>GnRH</li> <li>High blood estrogen</li> <li>Low blood estrogen (in females)</li> <li>Low blood testosterone (males)</li> </ul>	<ul style="list-style-type: none"> <li>High blood estrogen</li> <li>Inhibits / hormone released from testes and ovaries</li> <li>Low GnRH</li> <li>Stress (via inhibition of GnRH)</li> </ul>	<ul style="list-style-type: none"> <li>Low blood estrogen</li> <li>Amenorrhea</li> <li>Decreased sperm production</li> </ul>	<ul style="list-style-type: none"> <li>High blood estrogen</li> <li>Amenorrhea</li> </ul>
Prolactin	<ul style="list-style-type: none"> <li>Stimulates milk production in lactating females</li> <li>Stimulates breast development</li> <li>Modulates the production of other hormones in males and thus sperm production</li> </ul>	<ul style="list-style-type: none"> <li>Estrogen</li> <li>Surge of breast milk</li> <li>Decreased levels of TRH</li> </ul>	<ul style="list-style-type: none"> <li>TRH (continually inhibits prolactin)</li> </ul>	<ul style="list-style-type: none"> <li>Features a lack of milk production during lactation</li> <li>Decreased libido</li> <li>Decreased sperm production</li> </ul>	<ul style="list-style-type: none"> <li>Inhibits GnRH effects via LH and FSH</li> <li>Low GnRH</li> <li>Low testosterone</li> <li>Low testosterone</li> <li>Decreased libido</li> <li>Erectile dysfunction</li> <li>Galactorrhea (spontaneous milk production)</li> </ul>
Growth Hormone	<ul style="list-style-type: none"> <li>Stimulates and regulates growth and repair of tissues</li> <li>Stimulates amino acids uptake and thus protein synthesis</li> <li>Increases blood fatty acids via lipolysis</li> <li>Increases blood glucose via gluconeogenesis</li> </ul>	<ul style="list-style-type: none"> <li>GnRH</li> <li>Deep sleep (highest level during deep sleep)</li> <li>Low blood glucose (hypoglycemia)</li> <li>High blood fatty acids (especially arginine)</li> <li>Low blood fatty acids</li> <li>Exercise</li> </ul>	<ul style="list-style-type: none"> <li>GnRH</li> <li>High blood glucose (hypoglycemia)</li> <li>Low blood amino acids</li> <li>Deep/wake transition (awake level just before waking)</li> </ul>	<ul style="list-style-type: none"> <li>Pituitary Dwarfism</li> <li>Decreased growth hormone level during adulthood</li> <li>Proportioned but small stature</li> <li>Can treat with human growth hormone</li> <li>Must be done prior to growth plate ossifying</li> <li>Account for approximately 20% of dwarfism</li> <li>Other 70% is due to idiopathic dwarfism</li> <li>Decreased growth hormone during adulthood</li> </ul>	<ul style="list-style-type: none"> <li>Acromegaly (gigantism)</li> <li>Increased growth hormone level during adulthood</li> <li>Caused by other due to benign tumor of the anterior pituitary</li> <li>Acromegaly</li> <li>Increased growth hormone during adulthood</li> </ul>
Thyroid Stimulating Hormone (TSH)	<ul style="list-style-type: none"> <li>Stimulates thyroid hormone (thyroxine and triiodothyronine)</li> </ul>	<ul style="list-style-type: none"> <li>TRH</li> <li>Low thyroxine and triiodothyronine</li> </ul>	<ul style="list-style-type: none"> <li>Low TRH</li> <li>High thyroxine and triiodothyronine</li> <li>Stress</li> </ul>	<ul style="list-style-type: none"> <li>Decreased levels of thyroxine and triiodothyronine</li> </ul>	<ul style="list-style-type: none"> <li>Increased levels of thyroxine and triiodothyronine</li> </ul>
Adrenocorticotropic Hormone (ACTH)	<ul style="list-style-type: none"> <li>Stimulates all adrenal cortex hormones (especially cortisol)</li> <li>Stimulates melanocyte production</li> </ul>	<ul style="list-style-type: none"> <li>CRH</li> <li>Inflammation</li> <li>Hypoglycemia</li> <li>Deep/wake transition (highest level just before waking)</li> <li>Low aldosterone, low cortisol, low GnRH</li> </ul>	<ul style="list-style-type: none"> <li>Low CRH</li> <li>Deep sleep / low blood glucose</li> <li>High aldosterone, high cortisol, high GnRH</li> </ul>	<ul style="list-style-type: none"> <li>Low level of adrenal cortex hormones (especially cortisol)</li> </ul>	<ul style="list-style-type: none"> <li>High level of adrenal cortex hormones (especially cortisol)</li> <li>Darkened skin</li> </ul>
TSH and TRH	<ul style="list-style-type: none"> <li>Regulate metabolism</li> <li>Help regulate body temperature (via metabolic regulation)</li> <li>Protein synthesis</li> <li>Glucose transport via gluconeogenesis and glycogenolysis</li> <li>Decrease plasma cholesterol</li> </ul>	<ul style="list-style-type: none"> <li>TRH / Thyroglobin</li> <li>Increased blood volume</li> <li>Hypoglycemia</li> <li>Cold</li> </ul>	<ul style="list-style-type: none"> <li>Decreased levels of TSH</li> <li>Decreased blood volume</li> <li>Hyperglycemia</li> <li>Stress (via inhibition of TRH)</li> </ul>	<ul style="list-style-type: none"> <li>Cold intolerance</li> <li>Dry skin and hair</li> <li>Increased plasma cholesterol</li> <li>Low heart rate</li> <li>Decreased ventilation</li> <li>Lethargy</li> <li>Constipation</li> <li>Globin # due to primary hypothyroidism</li> </ul>	<ul style="list-style-type: none"> <li>Excess sweating</li> <li>Heat intolerance</li> <li>Weight loss</li> <li>High heart rate</li> <li>Increased ventilation</li> <li>Hyperreflexia</li> <li>Diarrhea</li> <li>Exophthalmos (protruding of the eyes)</li> <li>Globin</li> </ul>
Calcitonin	<ul style="list-style-type: none"> <li>Thyroid hormone not involved with metabolism</li> <li>Produced by parafollicular cells / calcitonin secreting cells</li> <li>Function is unclear based on physiological assays</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>
Parathyroid Hormone (PTH)	<ul style="list-style-type: none"> <li>Regulates blood calcium and blood phosphate</li> <li>Regulates release of calcium from bone</li> <li>Regulates reabsorption of calcium by kidneys</li> <li>Regulates conversion of vitamin D into its active form</li> <li>Ca<sup>2+</sup> inhibits its secretion</li> <li>Act in absorption of calcium in the gut</li> <li>Regulates release of phosphate from bones</li> <li>Regulates secretion of phosphate by kidneys</li> </ul>	<ul style="list-style-type: none"> <li>Low blood calcium</li> <li>High blood phosphate</li> </ul>	<ul style="list-style-type: none"> <li>High blood calcium</li> <li>Low blood phosphate</li> </ul>	<ul style="list-style-type: none"> <li>Low blood calcium / hypercalcemia</li> <li>Caused by: <ul style="list-style-type: none"> <li>Dehydration</li> <li>Muscle spasms</li> </ul> </li> <li>Caused by: <ul style="list-style-type: none"> <li>Accidental removal during thyroidectomy</li> <li>Adenoma</li> <li>Tumors</li> <li>Idiopathic</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Over-mineralization of connective tissue leading to osteoporosis</li> <li>Muscle weakness</li> <li>Lethargy</li> <li>High blood pressure</li> <li>Caused by: <ul style="list-style-type: none"> <li>Primary hyperparathyroidism</li> <li>Approximately 90% caused by tumor</li> <li>Approximately 10% are idiopathic</li> </ul> </li> <li>Secondary hyperparathyroidism <ul style="list-style-type: none"> <li>Caused by conditions that reduce blood calcium</li> <li>Leads to release of parathyroid hormone</li> <li>eg. hypokalemic distal renal tubular acidosis</li> <li>eg. inadequate levels of vitamin D3</li> </ul> </li> </ul>
Epinephrine / Norepinephrine	<ul style="list-style-type: none"> <li>Increase metabolism (especially skeletal and cardiac muscles)</li> <li>Increase heart rate</li> <li>Increase blood pressure</li> <li>Increase blood glucose via gluconeogenesis</li> <li>Increase blood fatty acids via lipolysis</li> <li>Glucose uptake</li> </ul>	<ul style="list-style-type: none"> <li>Sympathetic nervous system: <ul style="list-style-type: none"> <li>Inflammation</li> <li>Physical activity</li> <li>Very low blood pressure</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>No inhibitory input (low basal levels)</li> </ul>	<ul style="list-style-type: none"> <li>None (low basal levels)</li> </ul>	<ul style="list-style-type: none"> <li>High blood pressure</li> <li>Increased heart rate</li> <li>Hyperglycemia</li> <li>Hyperlipidemia</li> <li>Excess sweating</li> </ul>
Mineralocorticoids (Aldosterone)	<ul style="list-style-type: none"> <li>Regulates blood pressure</li> <li>Regulates Na<sup>+</sup> transport into blood by kidneys</li> <li>Water balance via osmosis</li> <li>Regulates transport of K<sup>+</sup> out of the blood by kidneys</li> <li>Regulates transport of 2<sup>+</sup> out of the blood by kidneys</li> </ul>	<ul style="list-style-type: none"> <li>Renin (An enzyme) is released from the kidneys</li> <li>Renin converts angiotensinogen into angiotensin I</li> <li>Angiotensin I is converted into angiotensin II</li> <li>Angiotensin II stimulates aldosterone</li> <li>Secreted in response to: <ul style="list-style-type: none"> <li>Decreased blood pressure / blood volume</li> <li>Low blood sodium (hyponatremia)</li> <li>High blood potassium (hyperkalemia)</li> </ul> </li> <li>Stress (via hypothalamic)</li> <li>ACTH (minor role)</li> </ul>	<ul style="list-style-type: none"> <li>Increased blood pressure / blood volume</li> <li>High blood sodium (hypernatremia)</li> </ul>	<ul style="list-style-type: none"> <li>Low blood pressure / blood volume</li> <li>Hypernatremia</li> <li>Low blood potassium (hypokalemia)</li> <li>Low blood pH (acidosis)</li> <li>Caused by: <ul style="list-style-type: none"> <li>Addison's disease</li> <li>Adrenal cortex destruction of adrenal cortex</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>High blood pressure / blood volume</li> <li>Low blood potassium (hypokalemia)</li> <li>High blood pH (alkalosis)</li> <li>Primary aldosteronism <ul style="list-style-type: none"> <li>Caused by adrenal cortex tumor</li> <li>Caused by overproduction of aldosterone</li> </ul> </li> <li>Secondary aldosteronism <ul style="list-style-type: none"> <li>Caused by low levels to retain production</li> <li>Can also be caused by increased ACTH</li> <li>Caused to not determined</li> </ul> </li> </ul>
Glucocorticoids (Cortisol)	<ul style="list-style-type: none"> <li>Anti-inflammatory</li> <li>Increases energy / growth hormone</li> <li>Decreases number of white blood cells</li> <li>Inhibits release of insulin from pancreas</li> <li>Maintains a glucose reserve in liver</li> <li>Increase blood glucose via gluconeogenesis</li> <li>Glucose made from amino acids</li> <li>Cortisol stimulates protein catabolism</li> <li>Helps the body deal with stress</li> </ul>	<ul style="list-style-type: none"> <li>Stress</li> <li>Inflammation</li> <li>Low blood glucose</li> <li>Deep/wake transition</li> <li>ACTH</li> </ul>	<ul style="list-style-type: none"> <li>Deep sleep</li> <li>Low TRH</li> </ul>	<ul style="list-style-type: none"> <li>Ability to deal with stress (life threatening)</li> <li>Caused by: <ul style="list-style-type: none"> <li>Primary adrenal insufficiency</li> <li>Depletion of adrenal cortex due to Addison's</li> <li>Results in high blood ACTH</li> <li>Regulate feedback from low cortisol</li> <li>Could have diabetes due to secondary adrenal insufficiency</li> <li>Irreversible reduction of ACTH</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Hyperglycemia (diabetes mellitus)</li> <li>Hypernatremia (due to loss of water from body)</li> <li>Mineralocorticoid (water balance)</li> <li>Mineralocorticoid ("Water over")</li> <li>Thinning of skin / loss of protein - collagen</li> <li>Low blood glucose</li> <li>Fair appears red and stress seen mainly on abdomen</li> <li>Edema (from loss of protein in blood causing hypernatremia)</li> <li>High blood pressure</li> <li>High blood glucose</li> <li>Caused by: <ul style="list-style-type: none"> <li>Cushing's Syndrome</li> <li>Due to adrenal tumor</li> <li>Due to prolonged corticosteroid use</li> <li>Results in low blood ACTH</li> <li>Regulate feedback from high cortisol</li> </ul> </li> <li>Cushing's Disease <ul style="list-style-type: none"> <li>Caused by increased ACTH</li> <li>Negative feedback from high cortisol</li> </ul> </li> </ul>
Androgens (released in very small amounts)	<ul style="list-style-type: none"> <li>Dehydroepiandrosterone (DHEA)</li> <li>Male androgen released</li> <li>Converted to testosterone in males and females</li> <li>Water balance via osmosis</li> <li>Androstenedione <ul style="list-style-type: none"> <li>Converted to testosterone</li> </ul> </li> <li>Affects only one significant in humans</li> <li>Plays a large role in libido</li> </ul>	<ul style="list-style-type: none"> <li>ACTH</li> </ul>	<ul style="list-style-type: none"> <li>Low blood ACTH</li> </ul>	<ul style="list-style-type: none"> <li>Decreased libido in females</li> </ul>	<ul style="list-style-type: none"> <li>Masculinizing effects of females</li> <li>Increased libido in females</li> <li>Early secondary sex characteristics if occurs prior to puberty</li> <li>Short stature if occurs prior to puberty</li> <li>Antiandrogenic effects if occurs prior to birth</li> <li>Caused by: <ul style="list-style-type: none"> <li>Adrenal androgen production</li> <li>Caused by inability to produce cortisol and aldosterone</li> <li>Increased ACTH to release androgen</li> <li>Leads to increased levels of androgen</li> </ul> </li> </ul>
Insulin	<ul style="list-style-type: none"> <li>Regulates blood glucose (main function)</li> <li>Regulates cellular glucose transport from the blood</li> <li>Decreases blood glucose</li> <li>Regulates cellular transport of fatty acids from the blood</li> <li>Increases lipogenesis</li> <li>Regulates cellular transport of amino acids from the blood</li> <li>Increases protein synthesis</li> </ul>	<ul style="list-style-type: none"> <li>High blood glucose (main stimulus)</li> <li>High blood fatty acids</li> <li>High blood amino acids</li> <li>Glucose dependent endocrine pathway</li> </ul>	<ul style="list-style-type: none"> <li>Low blood glucose</li> <li>Low blood fatty acids</li> <li>Low blood amino acids</li> <li>Stress</li> </ul>	<ul style="list-style-type: none"> <li>Due to type 1 diabetes mellitus (~1% of cases)</li> <li>Autoimmune destruction of beta cells results in no insulin produced</li> <li>Also known as insulin dependent diabetes mellitus</li> <li>Must be done insulin daily treatment</li> </ul>	<ul style="list-style-type: none"> <li>Low blood glucose (hypoglycemia)</li> <li>Low blood amino acids</li> <li>Excess fat production and storage</li> <li>Increase in protein synthesis</li> <li>Can treat with type 2 diabetes mellitus - 90% of cases</li> <li>Due to beta cells usually but not always to failure</li> <li>Constant insulin hypersecretion leads to insulin resistance / insulin resistance</li> <li>Insulin resistance <ul style="list-style-type: none"> <li>Insulin glucose regulation is lost</li> <li>Insulin is needed to break blood glucose</li> <li>Insulin production is usually fine (can decrease in later stages)</li> <li>Type 2 diabetes is manageable with positive charge insulin</li> <li>Needs (eg. metformin, insulin) might also be needed</li> </ul> </li> </ul>
Glucagon	<ul style="list-style-type: none"> <li>Raises blood glucose via gluconeogenesis and glycogenolysis</li> <li>Raises blood fatty acids via lipolysis</li> <li>Increases by alpha cells of islet Langerhans cells (~20% of cells)</li> </ul>	<ul style="list-style-type: none"> <li>Low blood glucose (main stimulus)</li> <li>Increased blood fatty acids</li> <li>Low blood gluconeogenesis</li> <li>Sympathetic</li> </ul>	<ul style="list-style-type: none"> <li>High blood glucose</li> </ul>	<ul style="list-style-type: none"> <li>Low blood glucose (however, other hormones can raise blood glucose)</li> </ul>	<ul style="list-style-type: none"> <li>High blood glucose</li> </ul>