Homeostasis and Hormones

Bio 11

homeostasis

- A steady state of body functioning - I.e. the body keeps a constant environment no matter what is happening in the external environment.
- Example is temperature

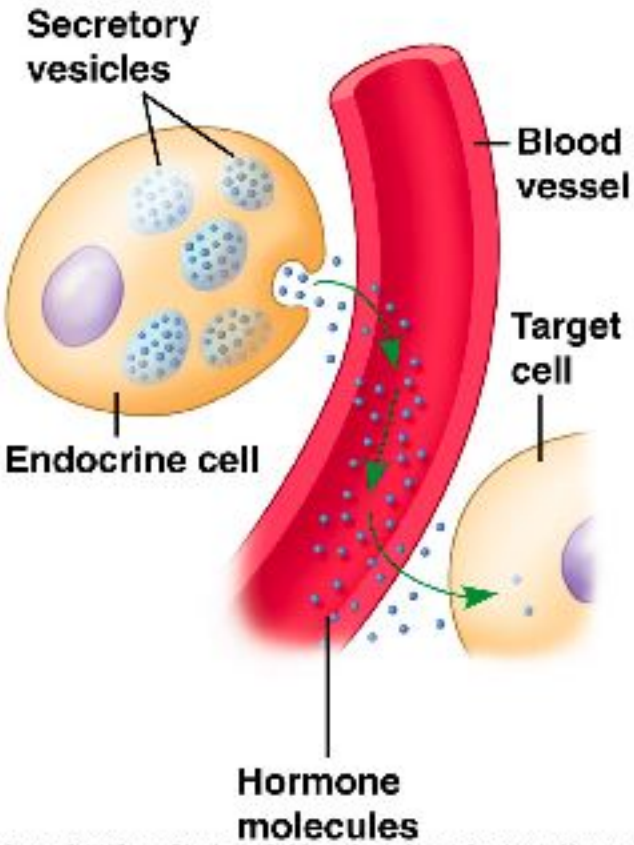
Homeostasis

- Dynamic equilibrium
- Feedback systems
- Negative feedback seen in shivering when the body reaches temp - stop shivering
- Positive feedback seen in labor

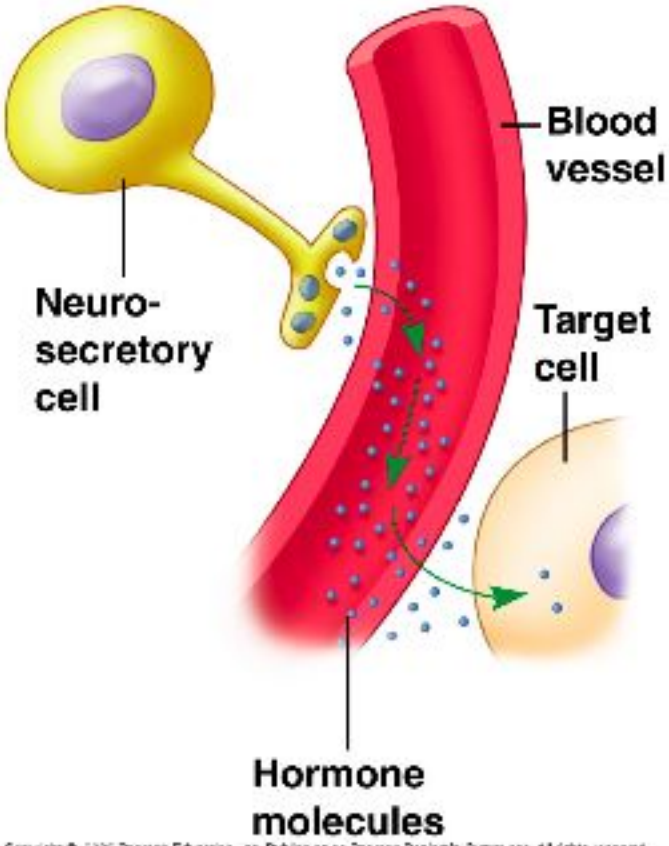
Hormones

- Chemical signals that is carried by the circulatory system.
- Secreted by endocrine glands which make up the endocrine system.
- Target cells

Hormones to target cell - target cell can be anywhere in body



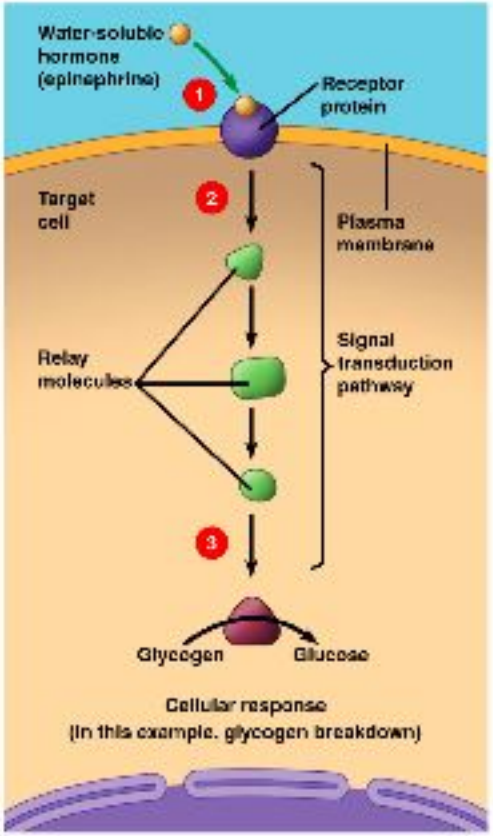
Neurosecretory cells - both nerve impulses and hormone release



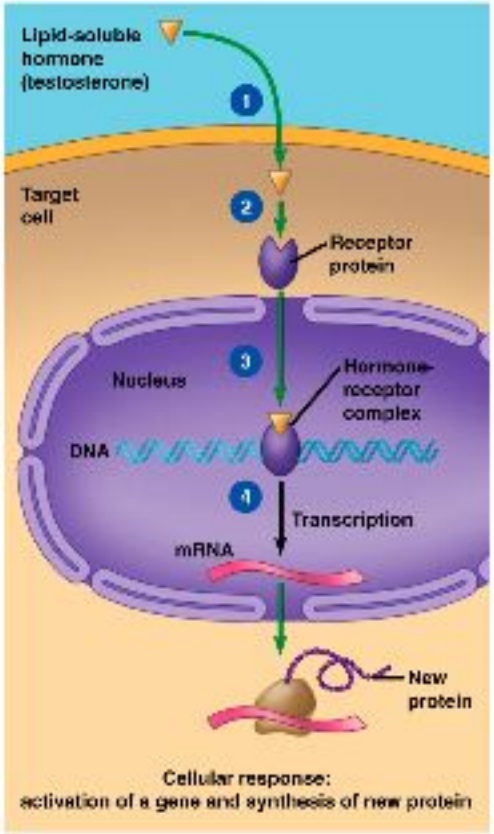
Hormones

- Protein and peptides - 3 to 30 amino acids
- Amines - derived from amino acids
- steriods

Water soluble hormones and their receptors



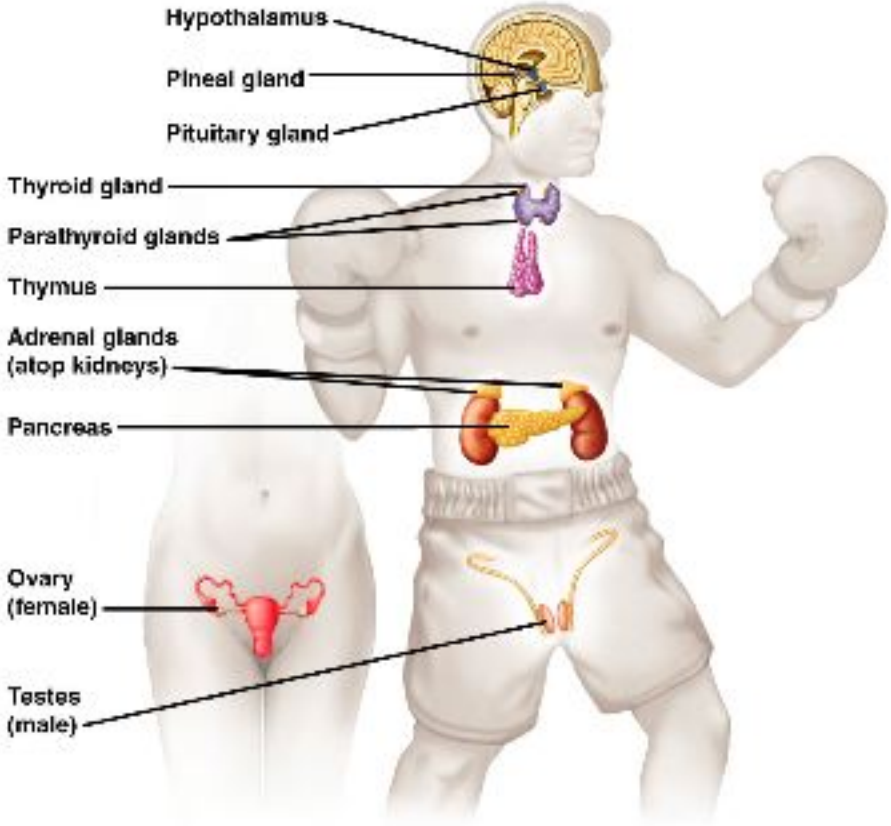
Steriod hormones and their receptors



Hormones

- Different target cells may have different responses
- Example epinephrine effects on cardiac and liver tissue

Some of the hormone secreting glands

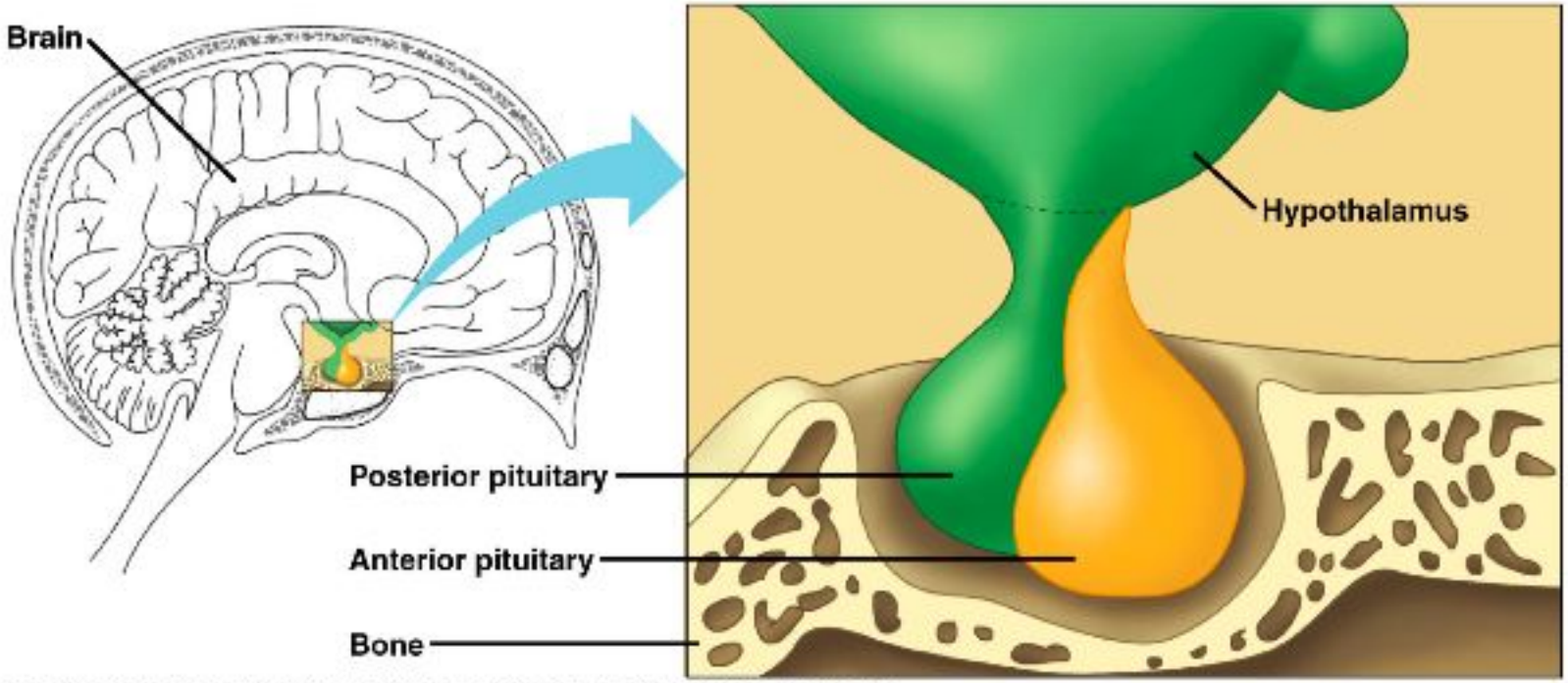


Short list of hormones produced

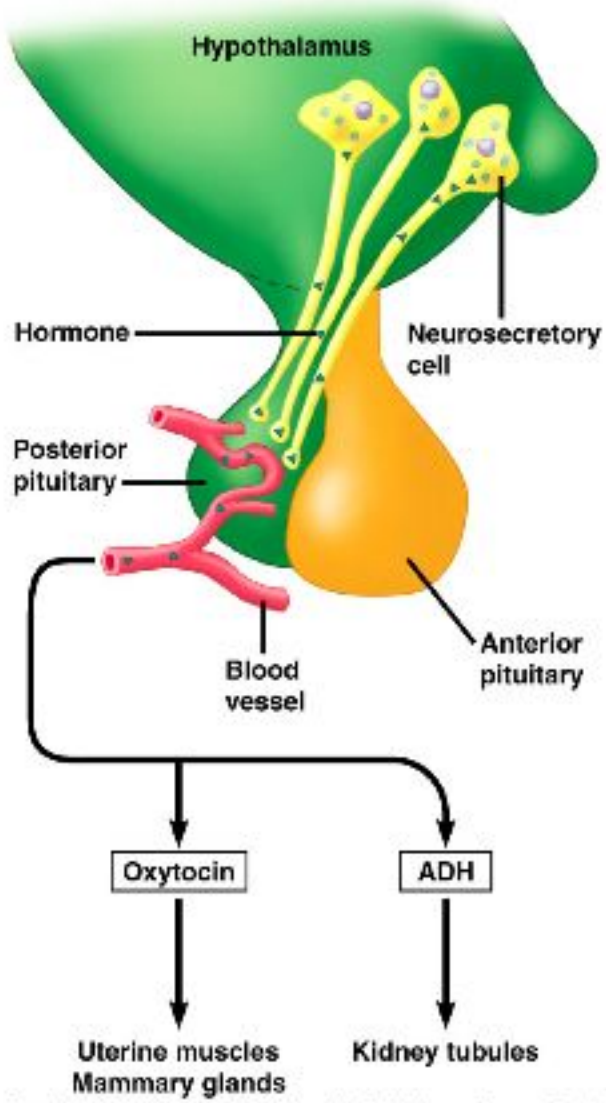
TABLE 26.3 MAJOR HUMAN ENDOCRINE GLANDS AND SOME OF THEIR HORMONES

Gland	Hormone	Chemical Class	Representative Actions	Regulated by
Hypothalamus	Hormones released by the posterior pituitary and hormones that regulate the anterior pituitary (see below)			
Pituitary gland				
Posterior lobe (releases hormones made by hypothalamus)	Oxytocin	Peptide	Stimulates contraction of uterus and mammary gland cells	Nervous system
	Antidiuretic hormone (ADH)	Peptide	Promotes retention of water by kidneys	Water/salt balance
Anterior lobe	Growth hormone (GH)	Protein	Stimulates growth (especially bones) and metabolic functions	Hypothalamic hormones
	Prolactin (PRL)	Protein	Stimulates milk production	Hypothalamic hormones
	Follicle-stimulating hormone (FSH)	Protein	Stimulates production of ova and sperm	Hypothalamic hormones
	Luteinizing hormone (LH)	Protein	Stimulates ovaries and testes	Hypothalamic hormones
	Thyroid-stimulating hormone (TSH)	Protein	Stimulates thyroid gland	Thyroxine in blood, hypothalamic hormones
	Adrenocorticotropic hormone (ACTH)	Protein	Stimulates adrenal cortex to secrete glucocorticoids	Glucocorticoids, hypothalamic hormones
Pineal gland	Melatonin	Amine	Involved in rhythmic activities (daily and seasonal)	Light/dark cycles
Thyroid gland	Thyroxine (T_4) and triiodothyronine (T_3)	Amine	Stimulate and maintain metabolic processes	TSH
	Calcitonin	Peptide	Lowers blood calcium level	Calcium in blood
Parathyroid glands	Parathyroid hormone (PTH)	Peptide	Raises blood calcium level	Calcium in blood
Thymus	Thymosin	Peptide	Stimulates T cell development	Not known
Adrenal glands				
Adrenal medulla	Epinephrine and norepinephrine	Amine	Increase blood glucose; increase metabolic activities; constrict certain blood vessels	Nervous system
Adrenal cortex	Glucocorticoids	Steroid	Increase blood glucose	ACTH
	Mineralocorticoids	Steroid	Promote reabsorption of Na^+ and excretion of K^+ in kidneys	K^+ in blood
Pancreas	Insulin	Protein	Lowers blood glucose	Glucose in blood
	Glucagon	Protein	Raises blood glucose	Glucose in blood
Testes	Androgens	Steroid	Support sperm formation; promote development and maintenance of male secondary sex characteristics	FSH and LH
Ovaries	Estrogens	Steroid	Stimulate uterine lining growth; promote development and maintenance of female secondary sex characteristics	FSH and LH
	Progesterone	Steroid	Promotes uterine lining growth	FSH and LH

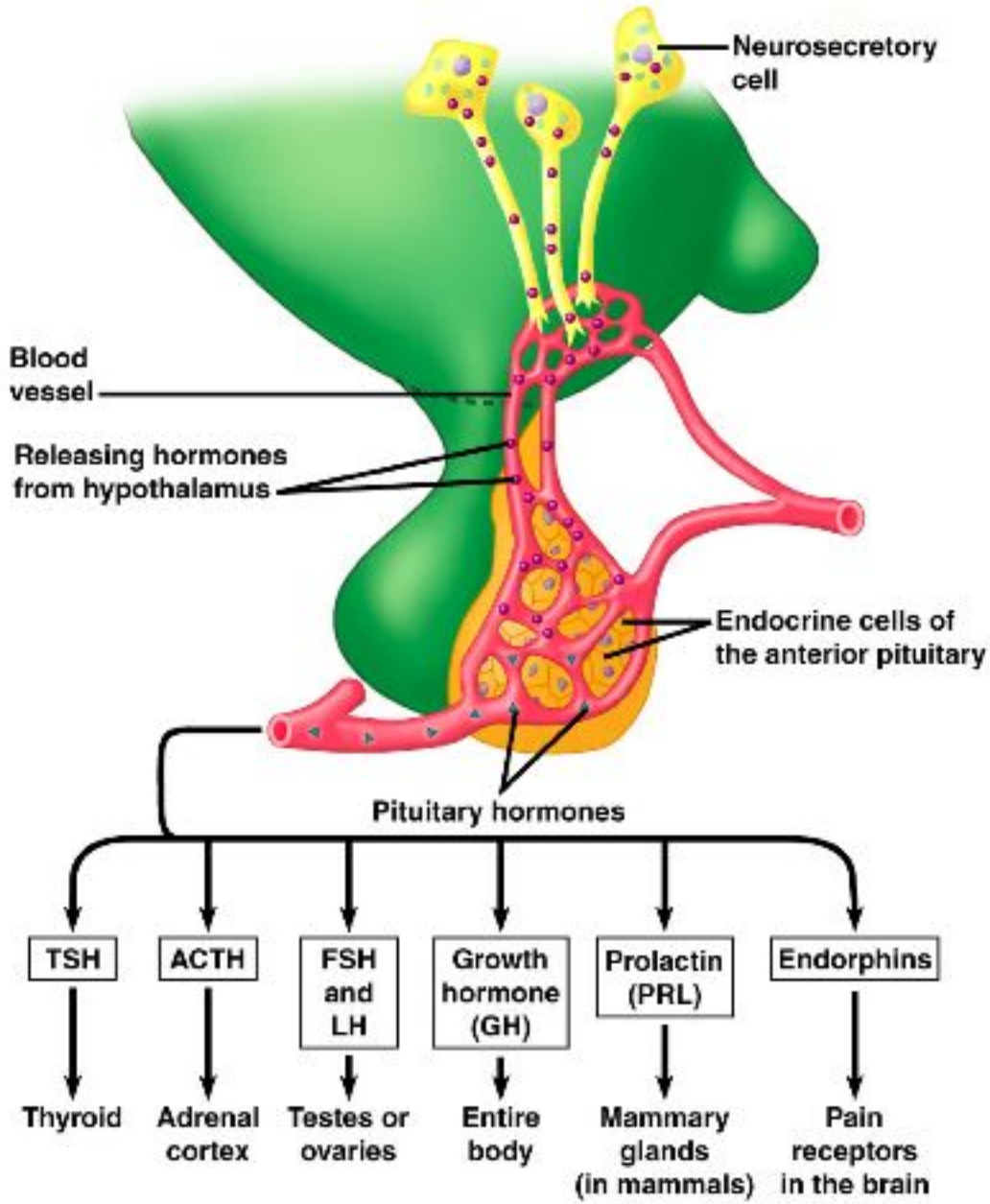
Hypothalamus and pituitary



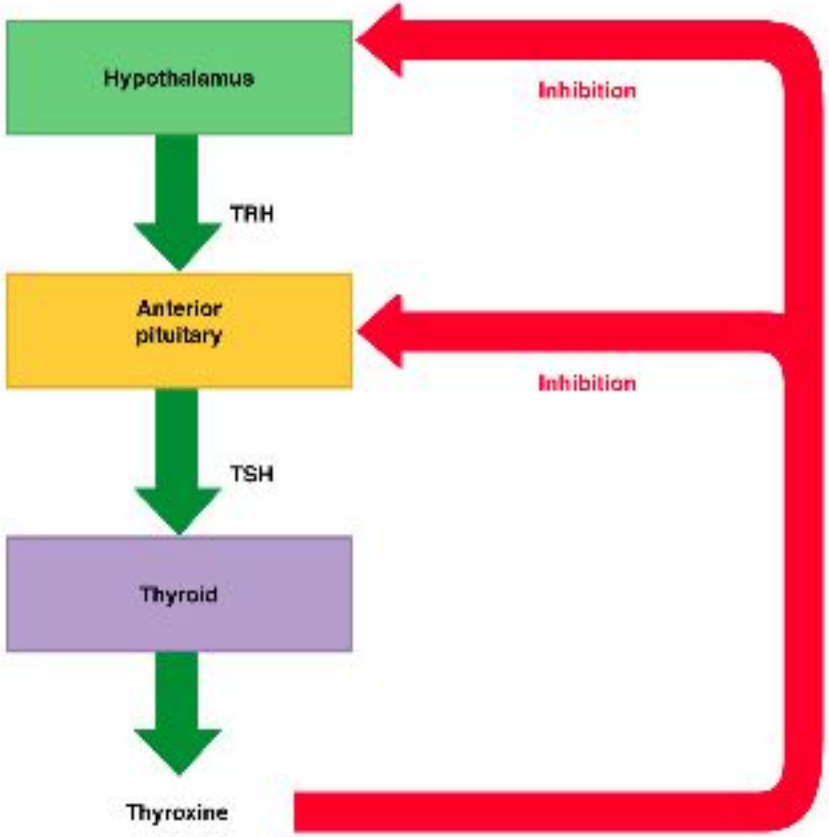
Two hormones made by hypothalmus and secreted by putuitary

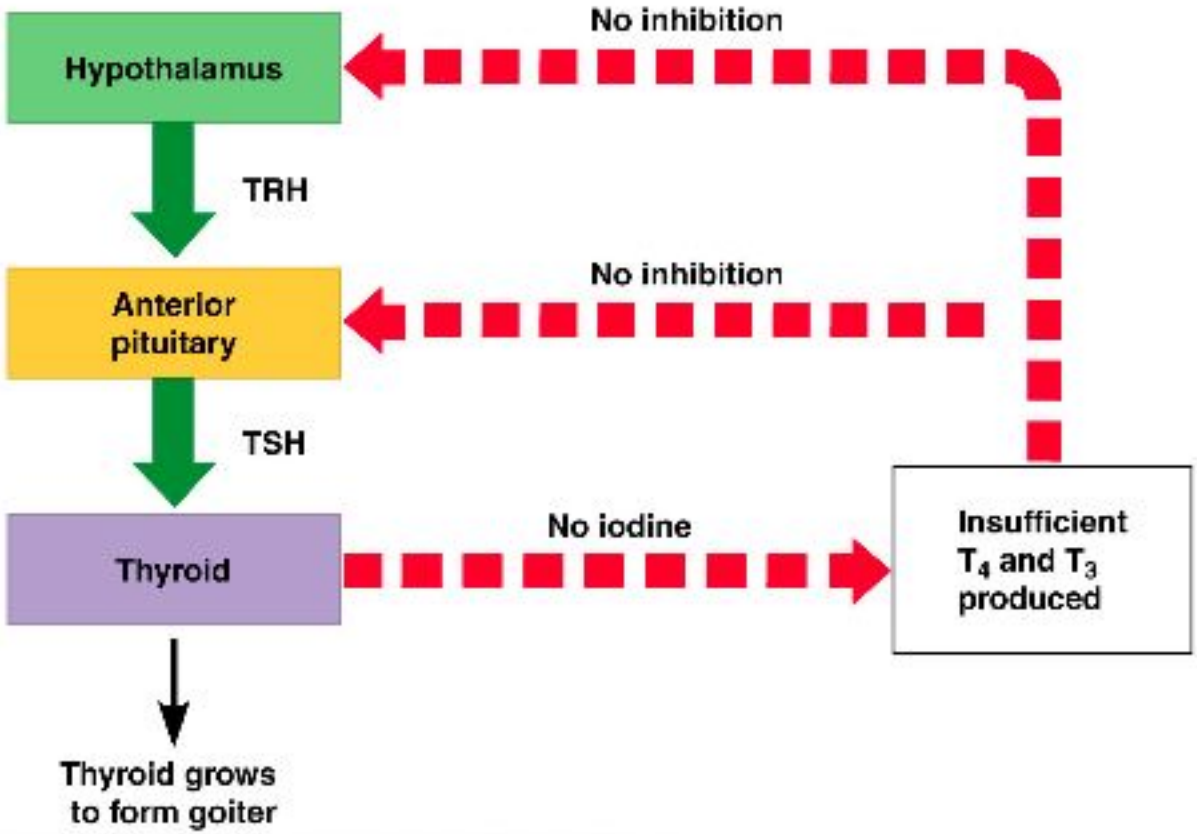


Anterior pituitary-regulated by hypothalmas -produces releasing and inhibiting hormones



Negative feedback of thyroxine





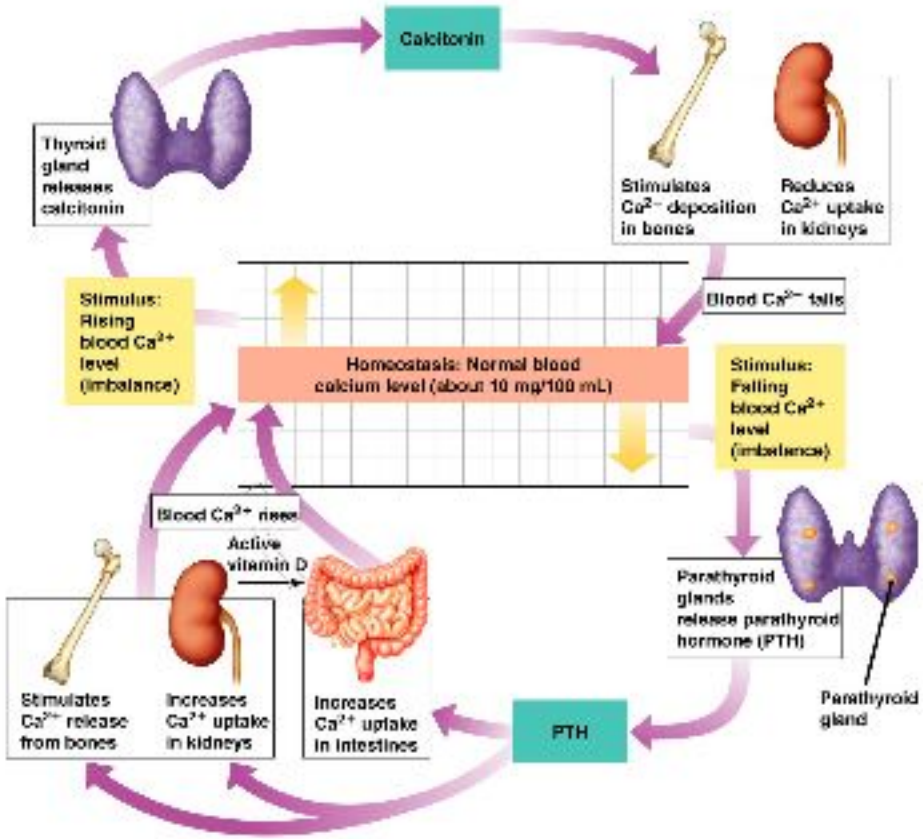
Thyroid

- Thyroxine - T4 (4 iodines)
- Triiodothyronine - T3 (3 iodines)

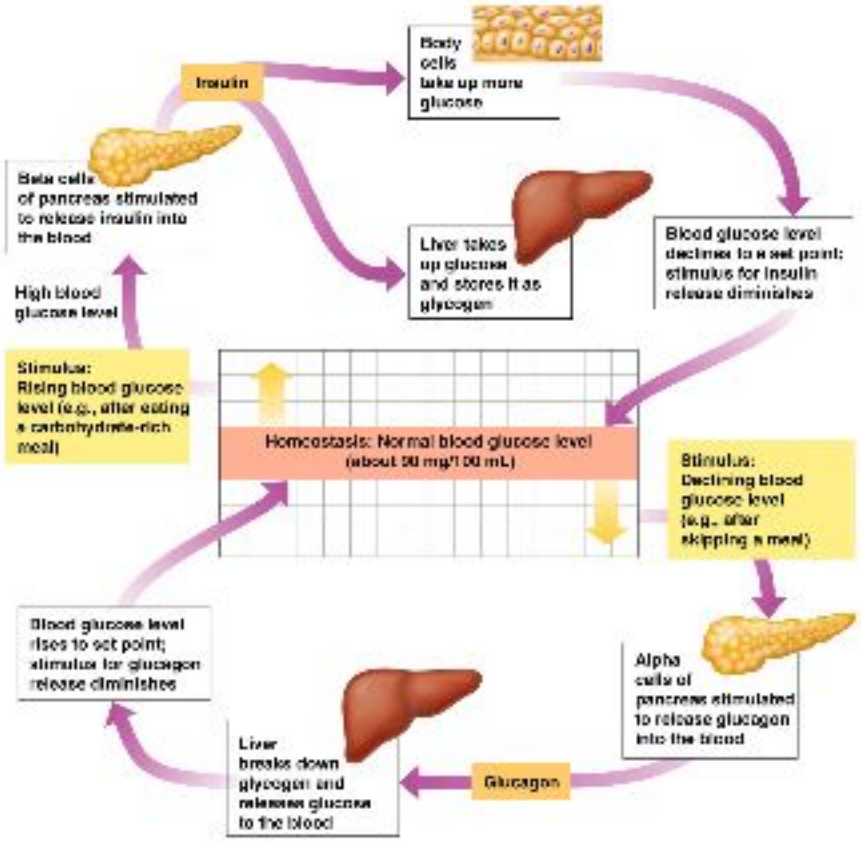
Calcium regulation

- Parathyroid glands (4)
- Parathyroid hormone (PTH)
- Calcitonin (thryroid)
- Antagonistic hormones

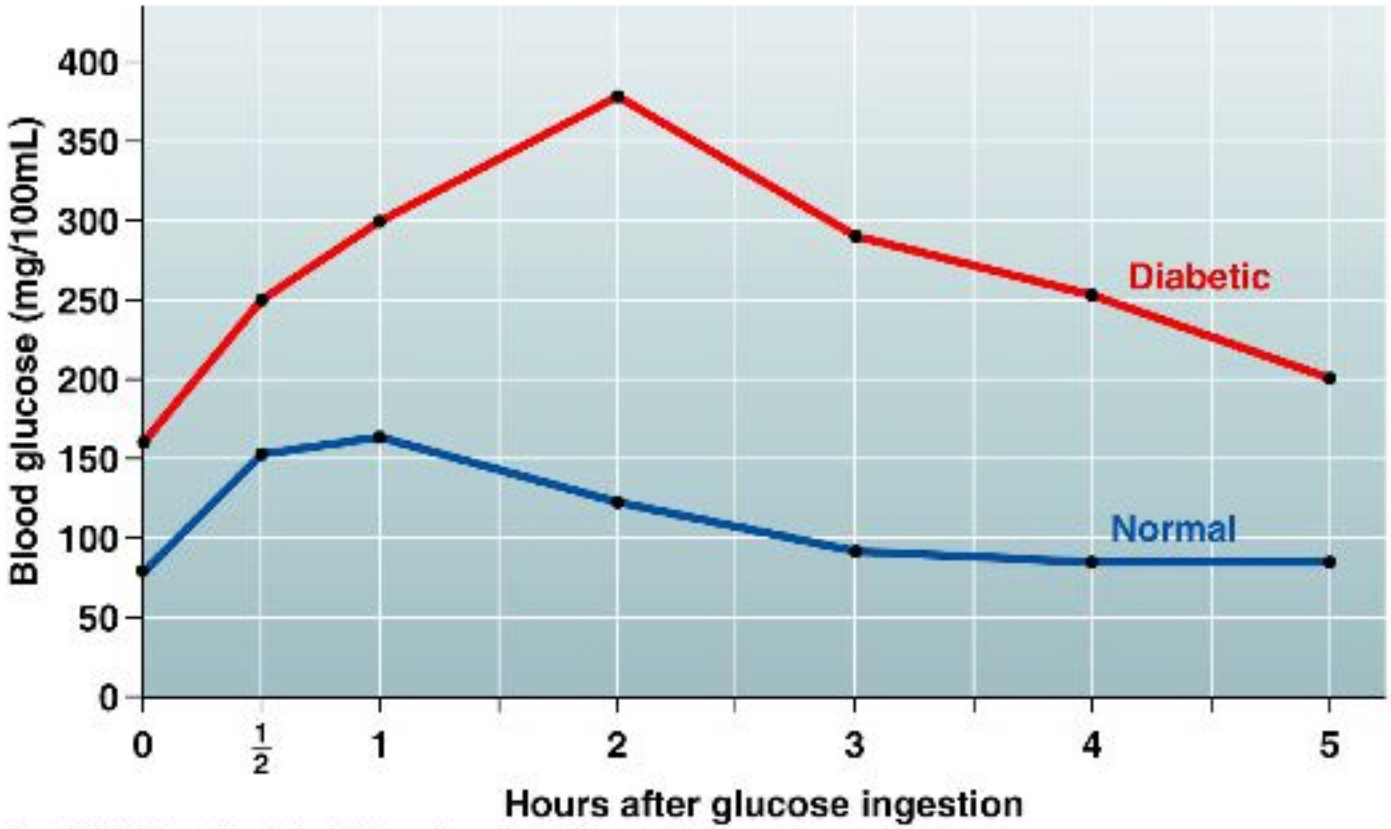
Calcium regulation



Blood glucose levels



Sugar uptake



Adrenal glands