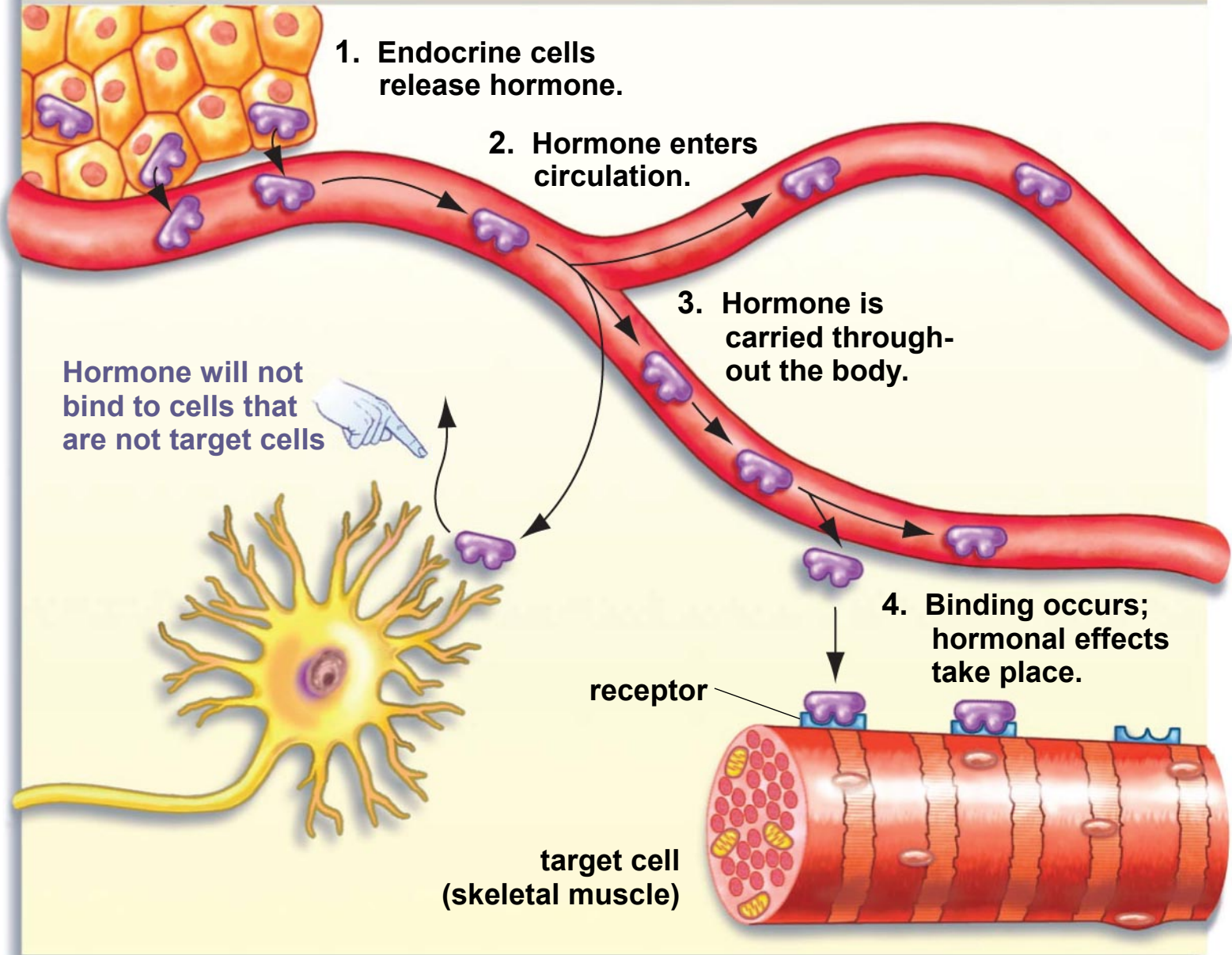
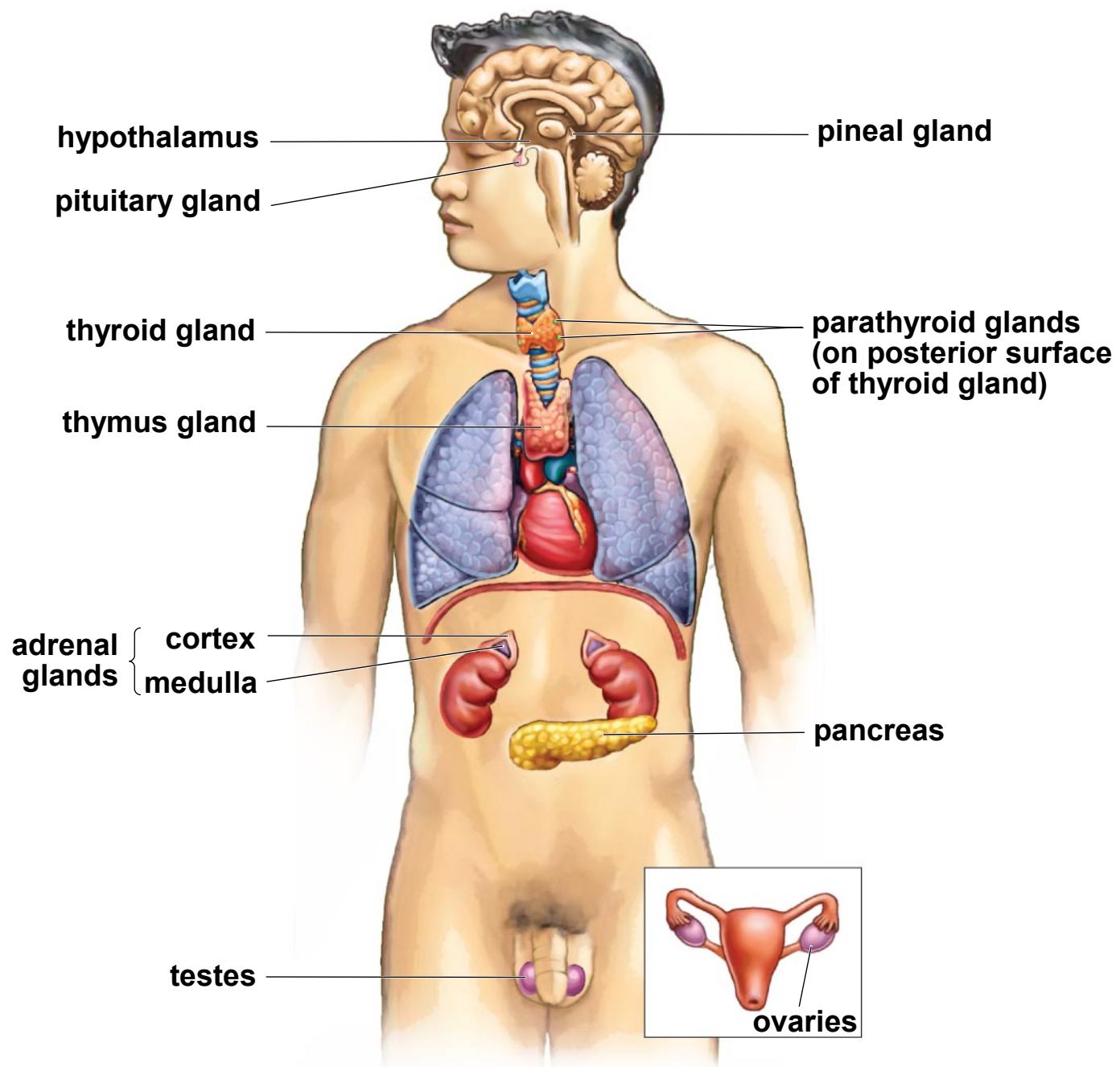
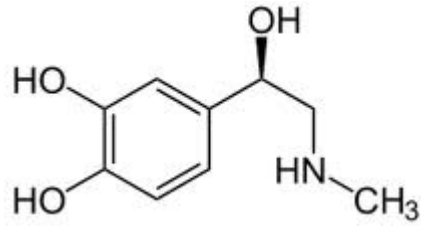


Hormones and Target Cells

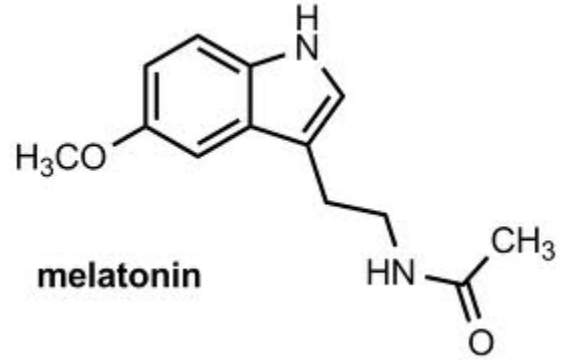




Hormones

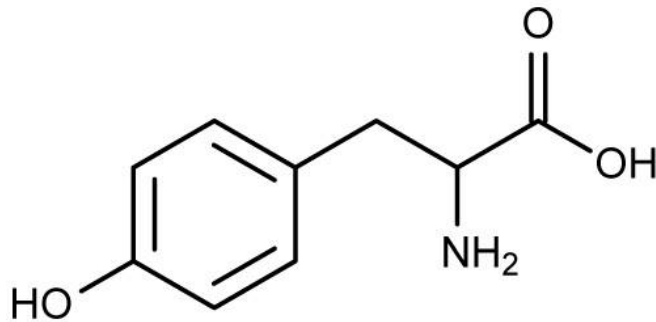


Adrenaline

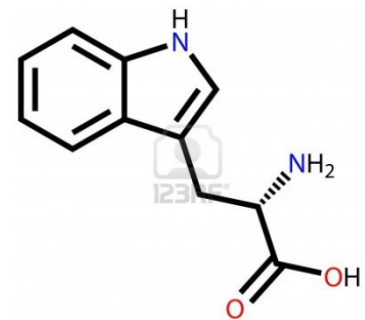


melatonin

Amino acids

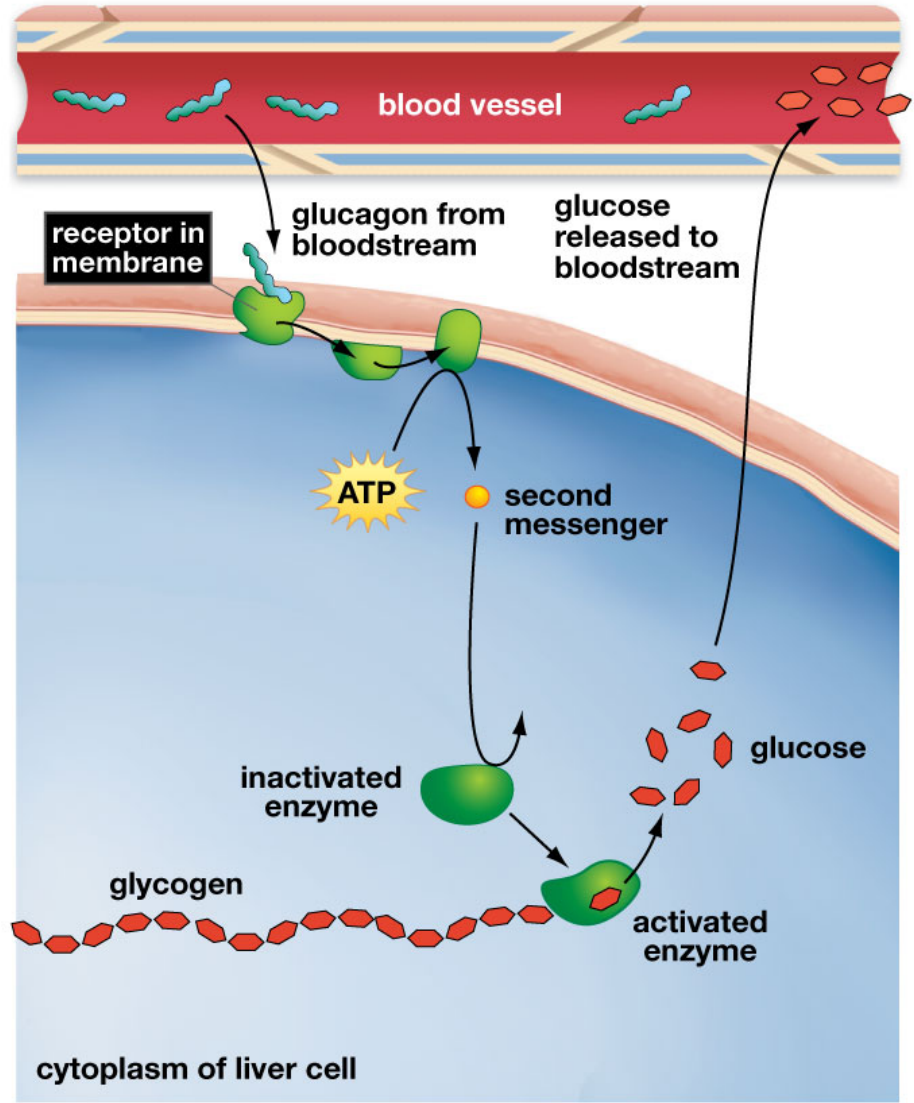


Tyrosine

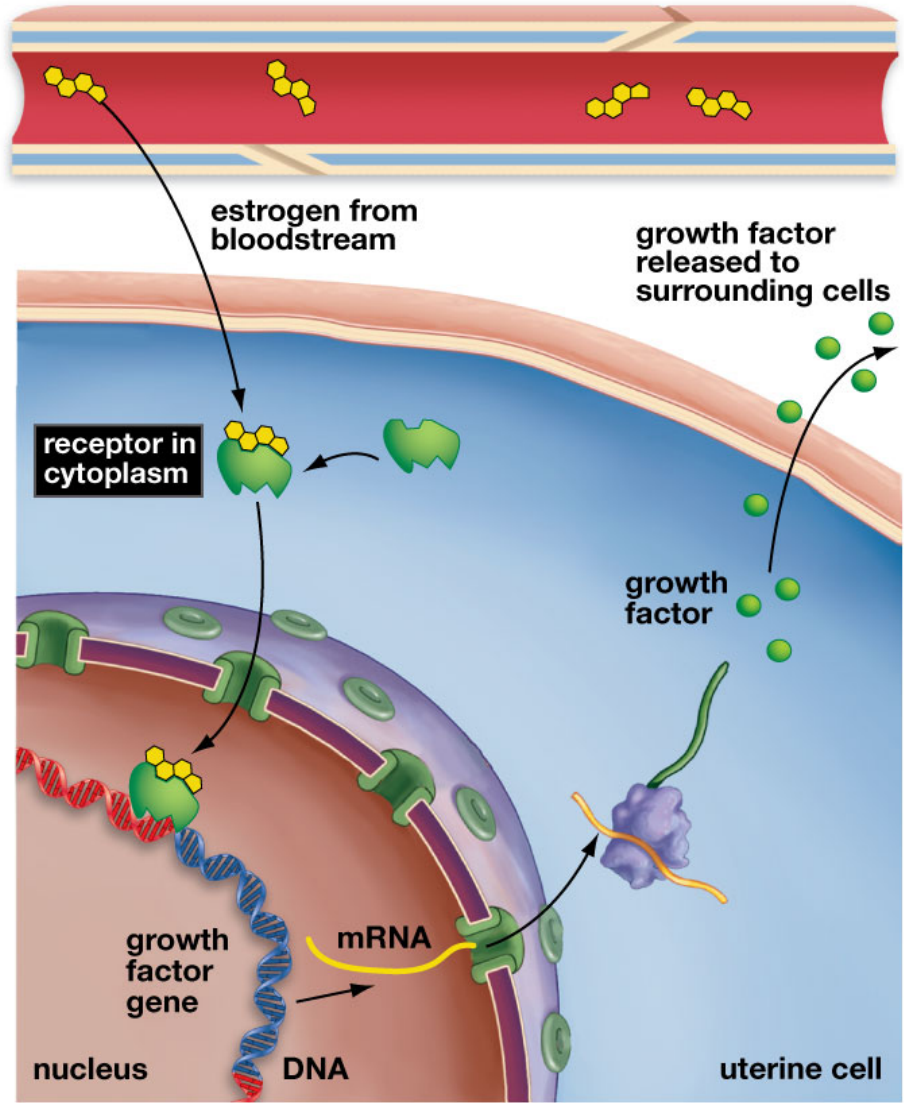


Tryptophan

(a) Peptide hormone: Glucagon



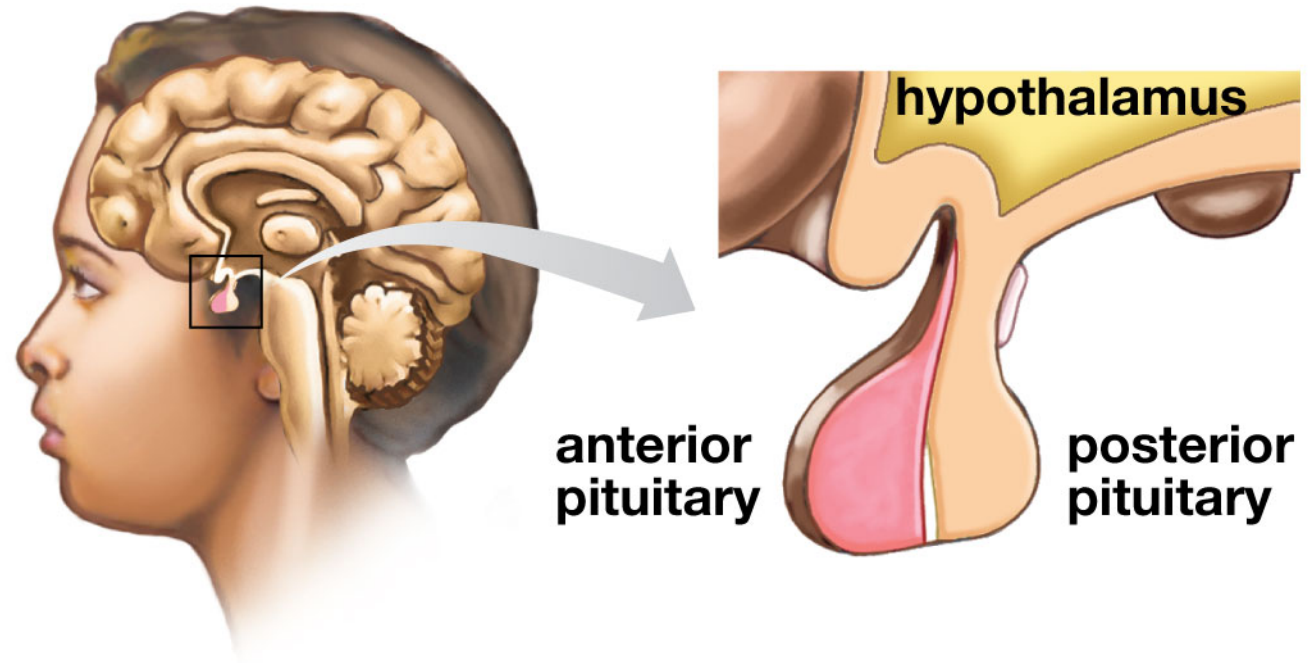
(b) Steroid hormone: Estrogen



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Figure 28.3

(a) Hypothalamus



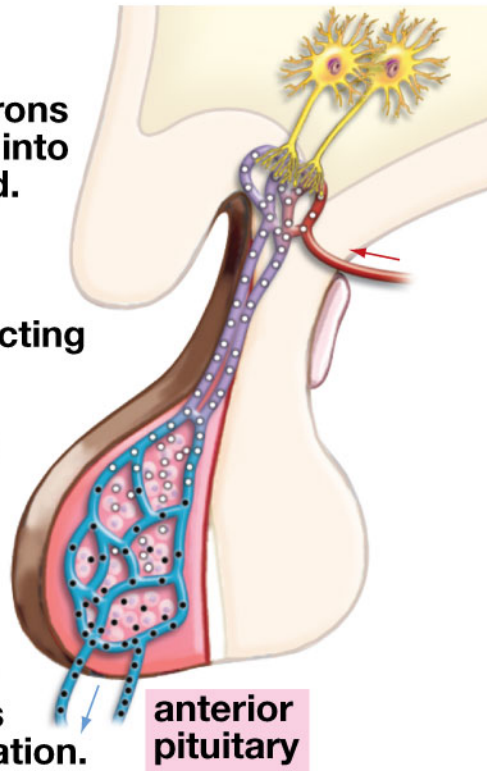
(b) Two means of endocrine control by the hypothalamus

1. Hypothalamic neurons secrete hormones into upper capillary bed.

2. These hormones travel down connecting blood vessels . . .

3. . . . and diffuse out of lower capillary bed into anterior cells . . .

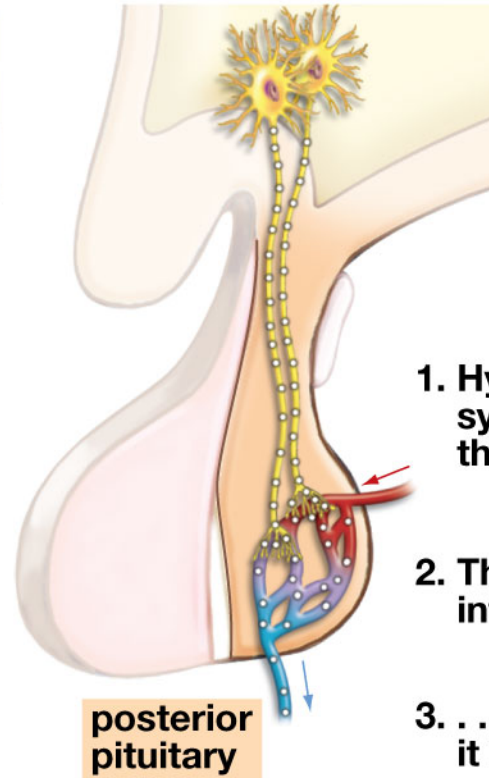
4. . . . controlling the release of anterior pituitary hormones into general circulation.

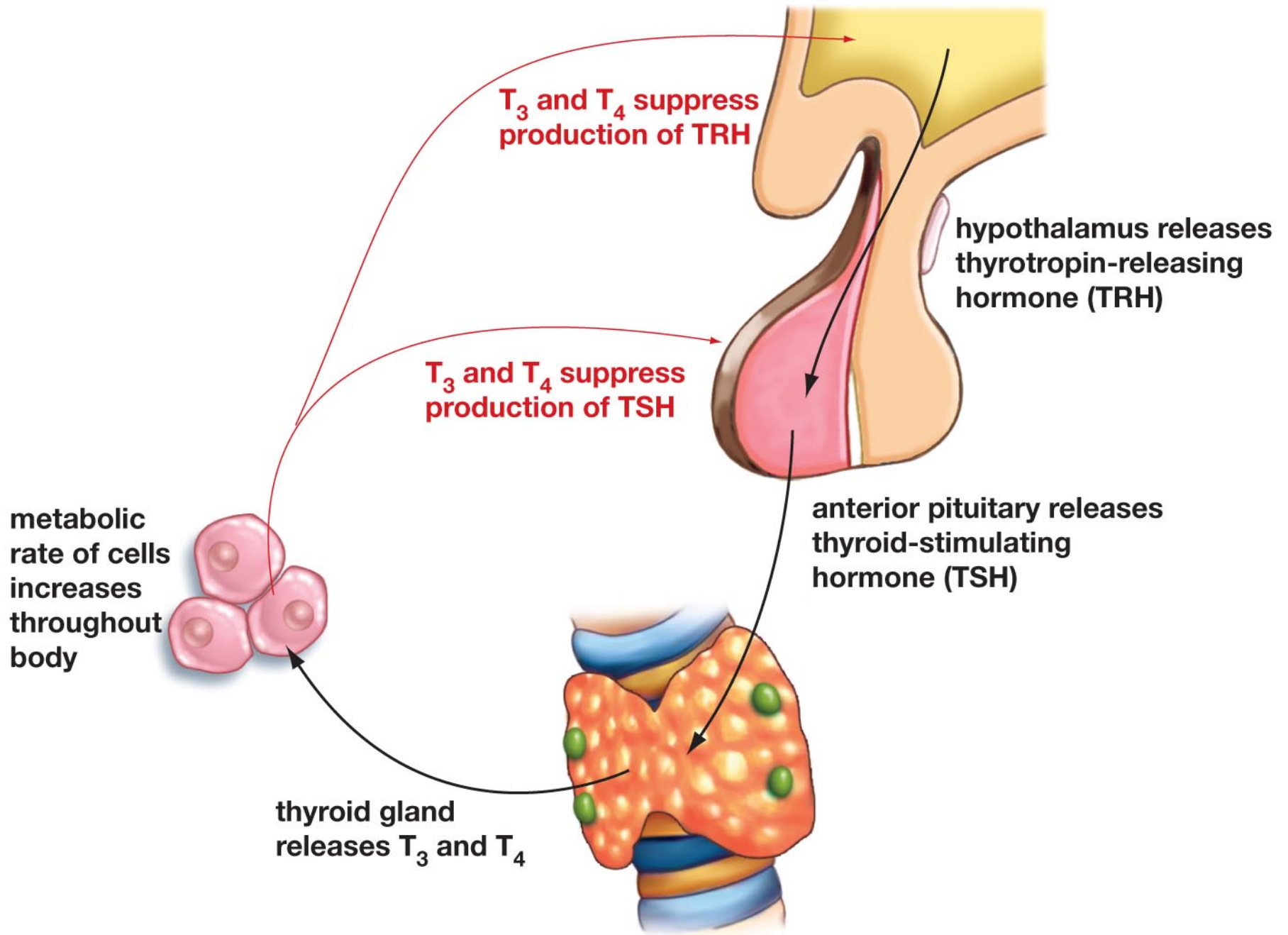


1. Hypothalamic neurons synthesize hormones that travel down axons.

2. These are released into capillary bed . . .

3. . . . and then move from it into general circulation.





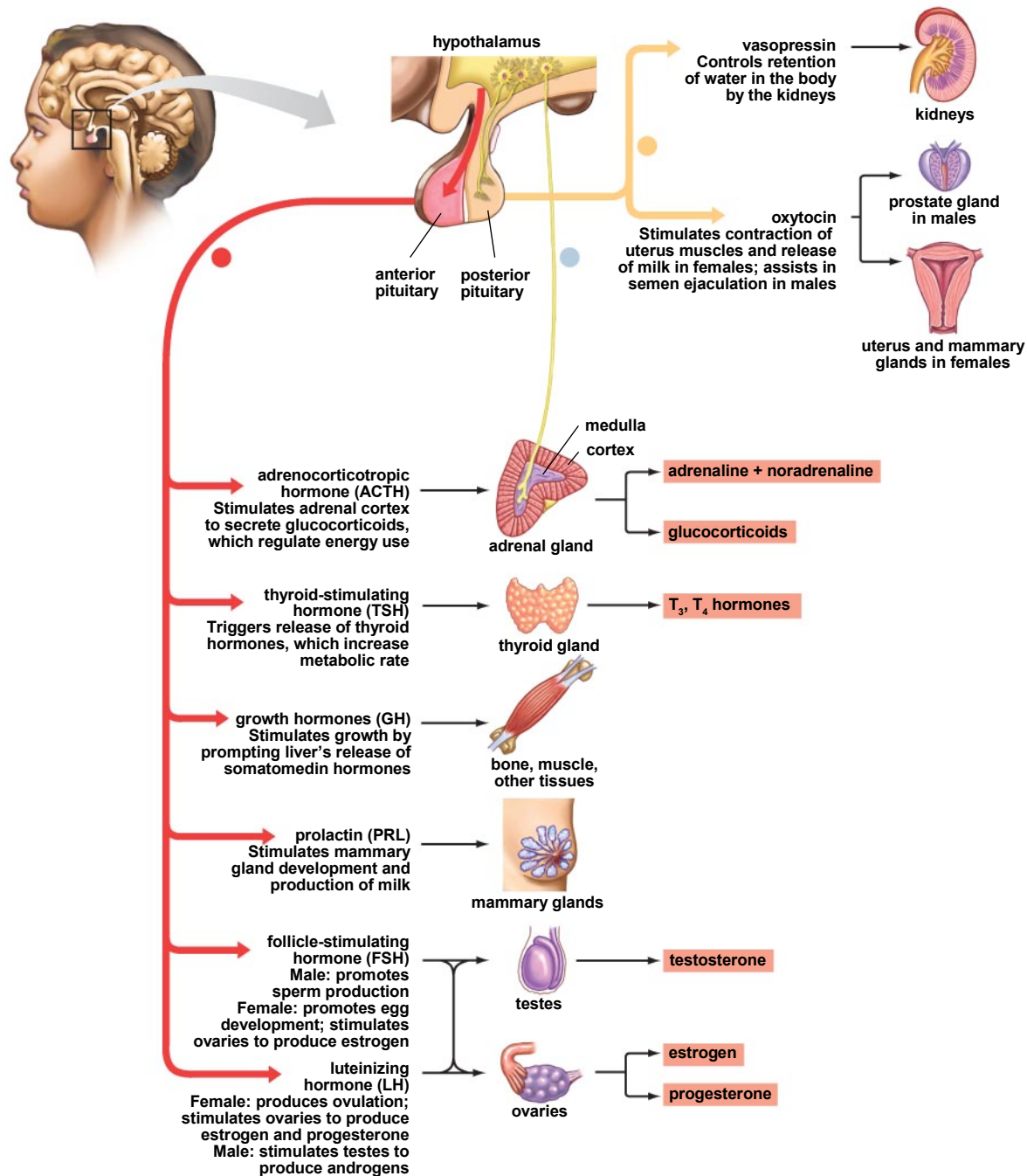
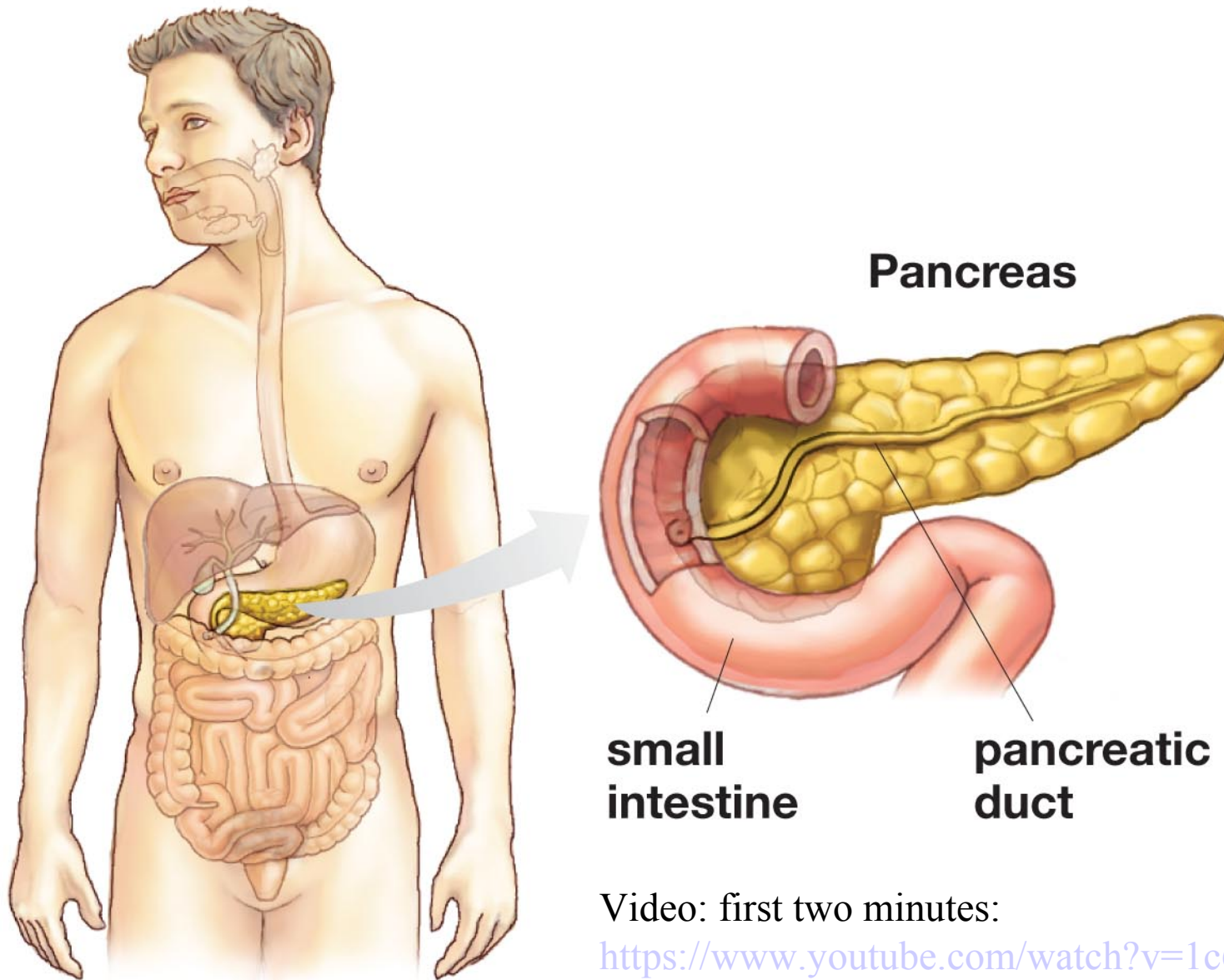


Figure 28.6

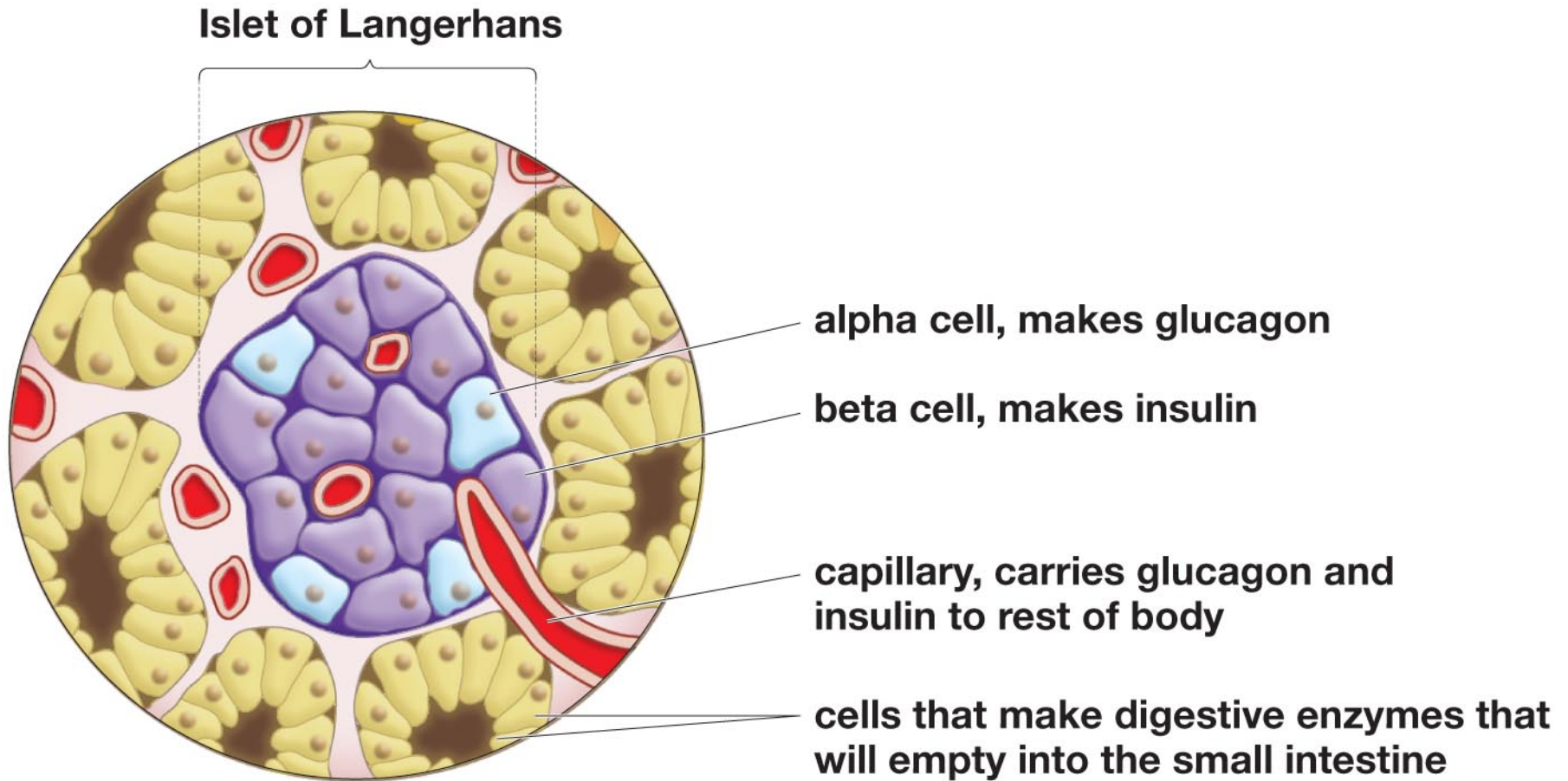
(a) Insulin and glucagon are produced in the pancreas . . .



Video: first two minutes:

<https://www.youtube.com/watch?v=1c6a0BNsyek>

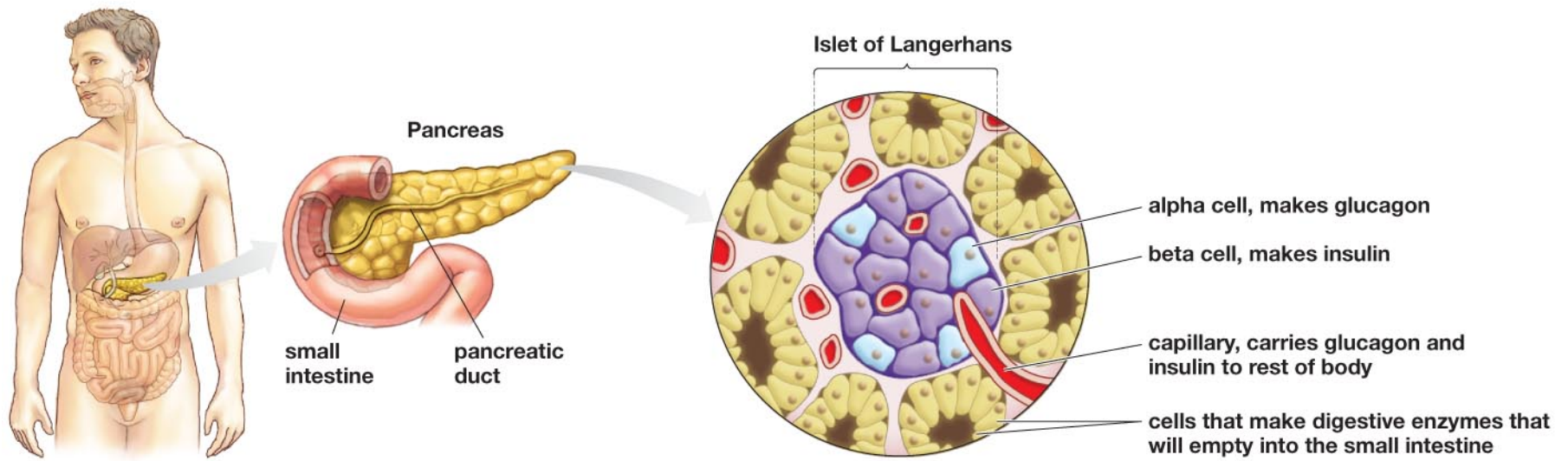
(b) . . . in clusters of cells called Islets of Langerhans



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Figure 28.7

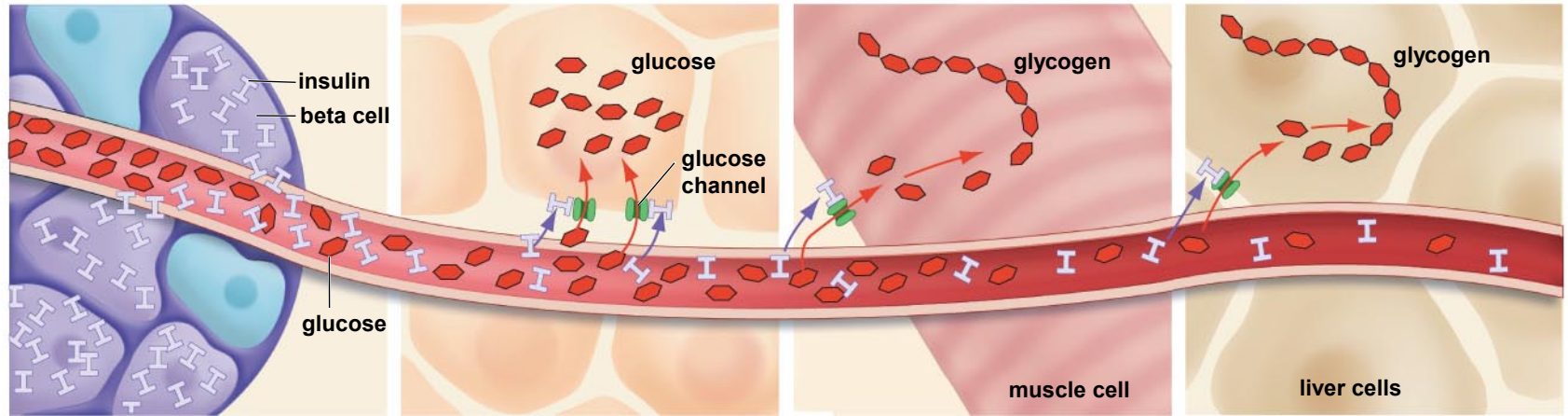
(a) Insulin and glucagon are produced in the pancreas . . . (b) . . . in clusters of cells called Islets of Langerhans



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Figure 28.7

(a) After a meal, the role of insulin

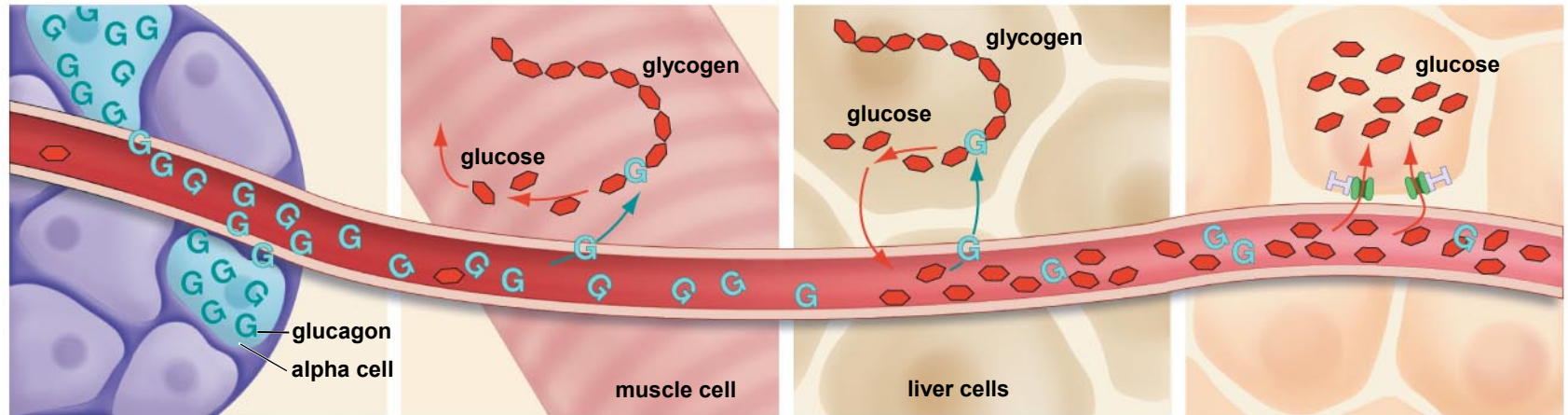


1. **Pancreas:** Stimulated by high levels of glucose in the bloodstream, beta cells in the Islets of Langerhans produce insulin.

2. **Other cells throughout the body:** Insulin enables glucose to move from the bloodstream into cells by triggering the formation of channels in the cell membranes.

3. **Skeletal muscle cells and liver cells:** With insulin's help, glucose can move into these cells and either be used right away or stored in the form of glycogen molecules.

(b) In between meals, the role of glucagon



1. **Pancreas:** Stimulated by low levels of glucose in the bloodstream, alpha cells in the Islets of Langerhans produce glucagon.

2. **Skeletal muscle cells and liver cells:** With glucagon's help, glycogen is broken down into glucose. Muscle cells retain all the glucose they derive from this process, using it to power their own activities. Liver cells, meanwhile, move much of the glucose they liberate into general circulation.

3. **Other cells throughout the body:** Glucose released by the liver moves from the bloodstream into cells, supplying them with energy.

Table 28.1

Hormones of the Endocrine System: Their Sources and Effects

Gland/Hormone	Effects
Hypothalamus	
Releasing hormones	Stimulate hormone production in anterior pituitary
Inhibiting hormones	Reduce hormone production in anterior pituitary
Anterior pituitary	
Thyroid-stimulating hormone (TSH)	Tiggers release of thyroid hormones
Adrencorticotropic hormone (ACTH)	Stimulates adrenal cortex cells to secrete glucocorticoids
Follicle-stimulating hormone	Female: promotes egg development; stimulates ovaries to produce estrogen Male: promotes sperm production
Luteinizing hormone (LH)	Female: produces ovulation (egg release): stimulates ovaries to produce estrogen and progesterone Male: stimulates testes to produce androgens (e.g., testosterone)
Prolactin (PRL)	Stimulates mammary gland development and production of milk
Growth hormone (GH)	Stimulates growth by prompting liver's release of somatomedin hormones
Posterior pituitary	
Vasopressin	Also known as antidiuretic hormone; controls retention of water in the body by the kidneys
Oxytocin	Stimulates contraction of the uterus muscles and release of milk in females; assists in semen ejaculation in males
Thyroid	
T ₃ , T ₄	Increase body's metabolic rate
Calcitonin	Reduces calcium ion levels in blood
Parathyroid	
Parathyroid hormone (PTH)	Increases calcium ion levels in blood

Table 28.1**Hormones of the Endocrine System: Their Sources and Effects**

Gland/Hormone	Effects
Thymus Thymosins	Stimulate development of white blood cells (lymphocytes) in early life
Adrenal cortex Glucocorticoids Mineralocorticoids	Includes cortisol, which stimulates glucose production and breakdown of fats; a stress-response hormone Cause the kidneys to retain sodium ions and water and excrete potassium ions
Adrenal medulla Adrenaline Noradrenaline	Also known as epinephrine; stimulates release of energy stores; increases heart rate and blood pressure Also known as norepinephrine; effects similar to adrenaline
Pancreas Insulin Glucagon	Decreases glucose level in blood Increases glucose level in blood
Testes Testosterone	Promotes production of sperm and development of male sex characteristics
Ovaries Estrogens Progesterones	Support egg development, growth of uterine lining, and development of female sex characteristics Prepare uterus for arrival of developing embryo and support of further embryonic development
Pineal gland Melatonin	Establishes day/night cycle

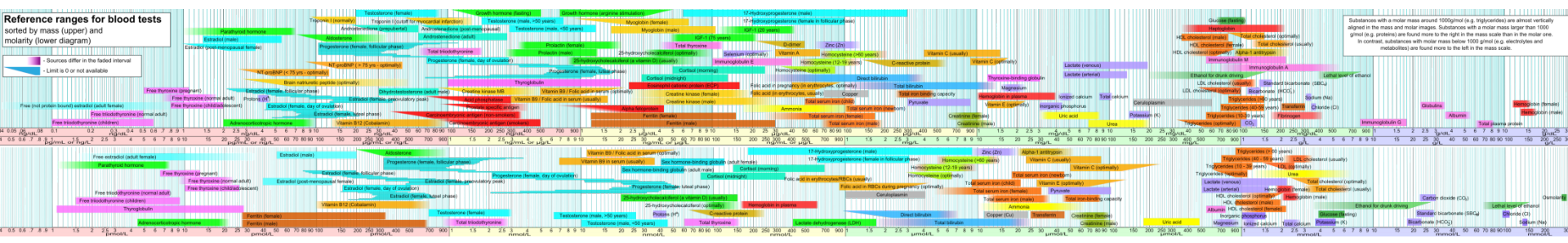
<http://www.hypergh14x.com/>

Paper 1

Paper 2

Paper 3

“Blood values sorted by mass and molar concentration,” from wikipedia



Review: CrashCourse video:

<https://www.youtube.com/watch?v=WVrlHH14q3o>