

Lesson 1

- Nervous & Endocrine Comparison
- Endocrine Glands diagram
- Feedback Mechanisms



**KEEP
CALM
AND
SURVIVE
PUBERTY**

Nervous System

Endocrine System

1. Uses neurons to transmit electrochemical messages (neurotransmitters)

2. brain, spinal cord, and nerves

3. Fast acting, but short-lived responses

Regulation

Homeostasis

Receptors

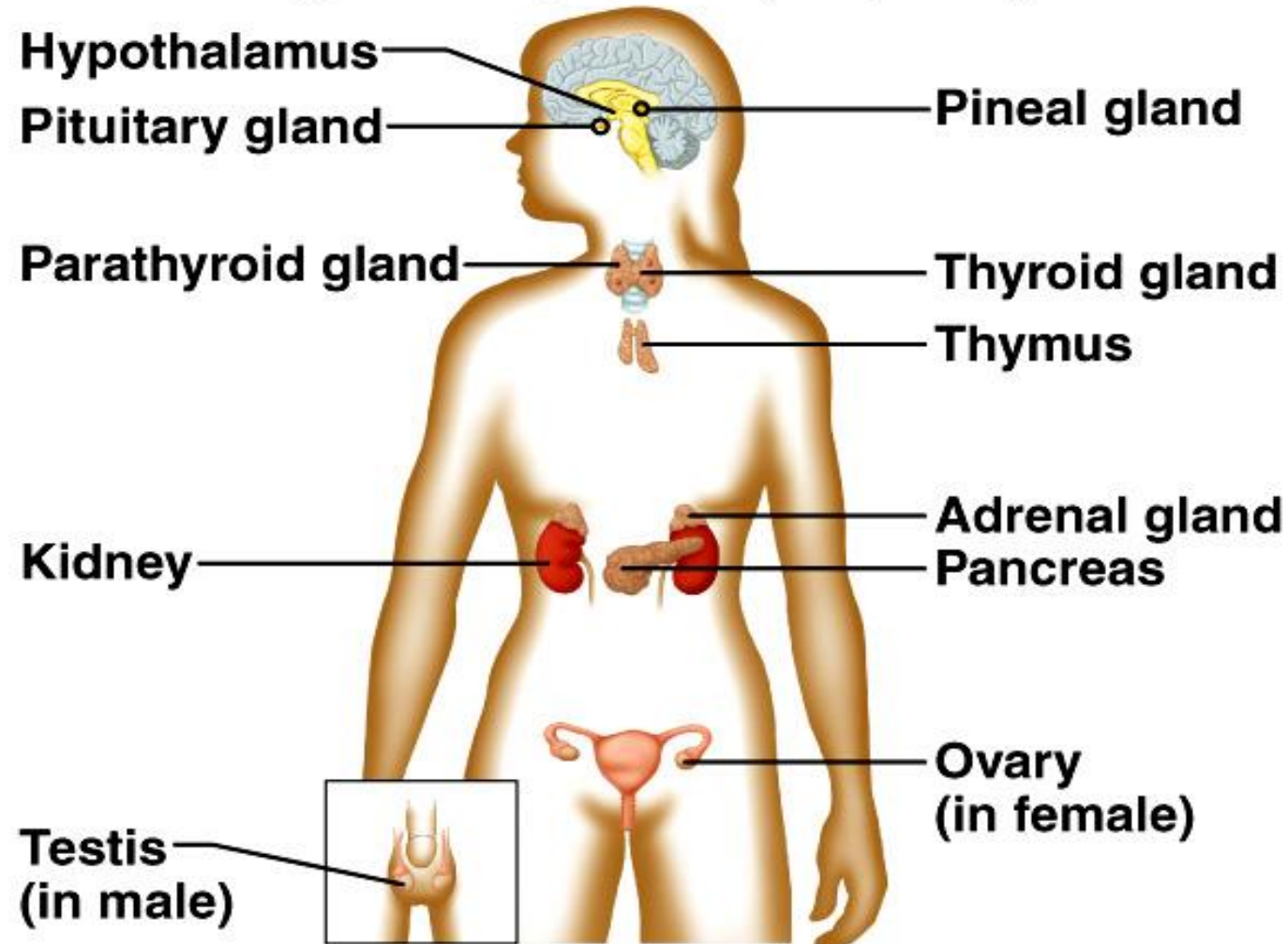
1. Uses the bloodstream to transmit chemical messages (hormones)

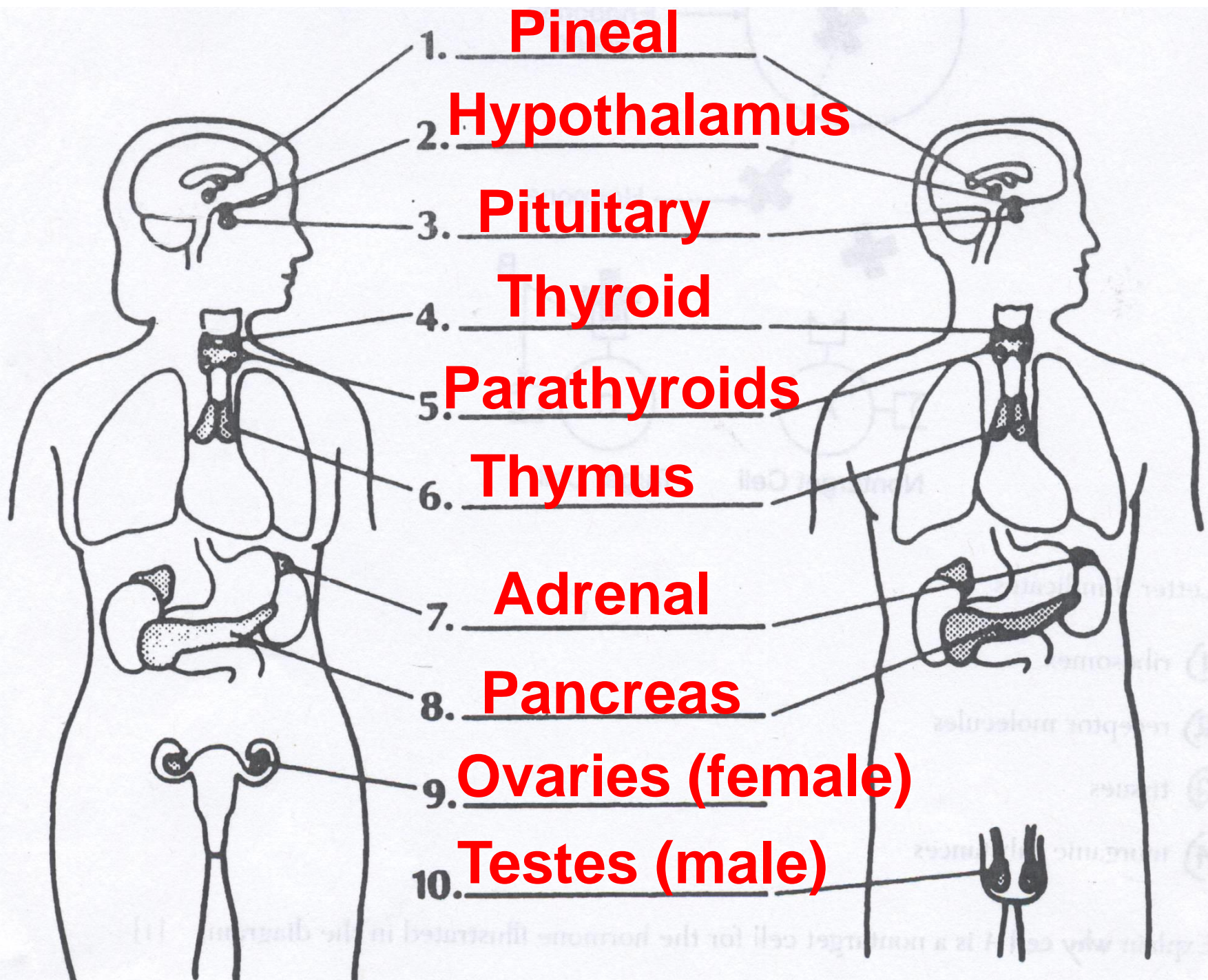
2. glands and the bloodstream

3. Slow acting, but long-lasting responses

The Endocrine System

- Glands that release hormones into the bloodstream to perform chemical cellular communication





The Endocrine System (cont.)

- **Hormones**

- Specific shaped chemical messengers (most are proteins)
- produced by glands to affect other cells of the body
- Travel in blood
- Bind to specific receptors on cells

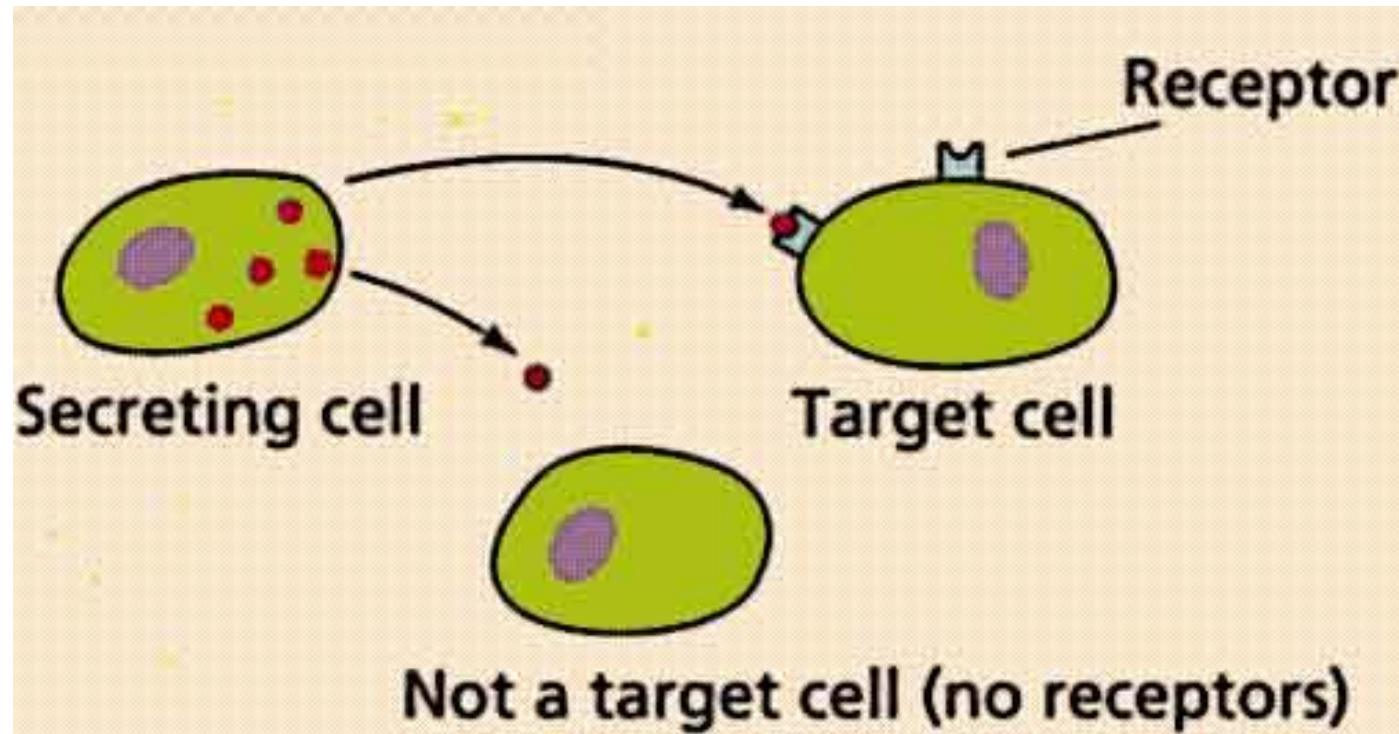
- **Receptor Molecules**

- found on the cell membrane, specifically shaped to receive certain hormones

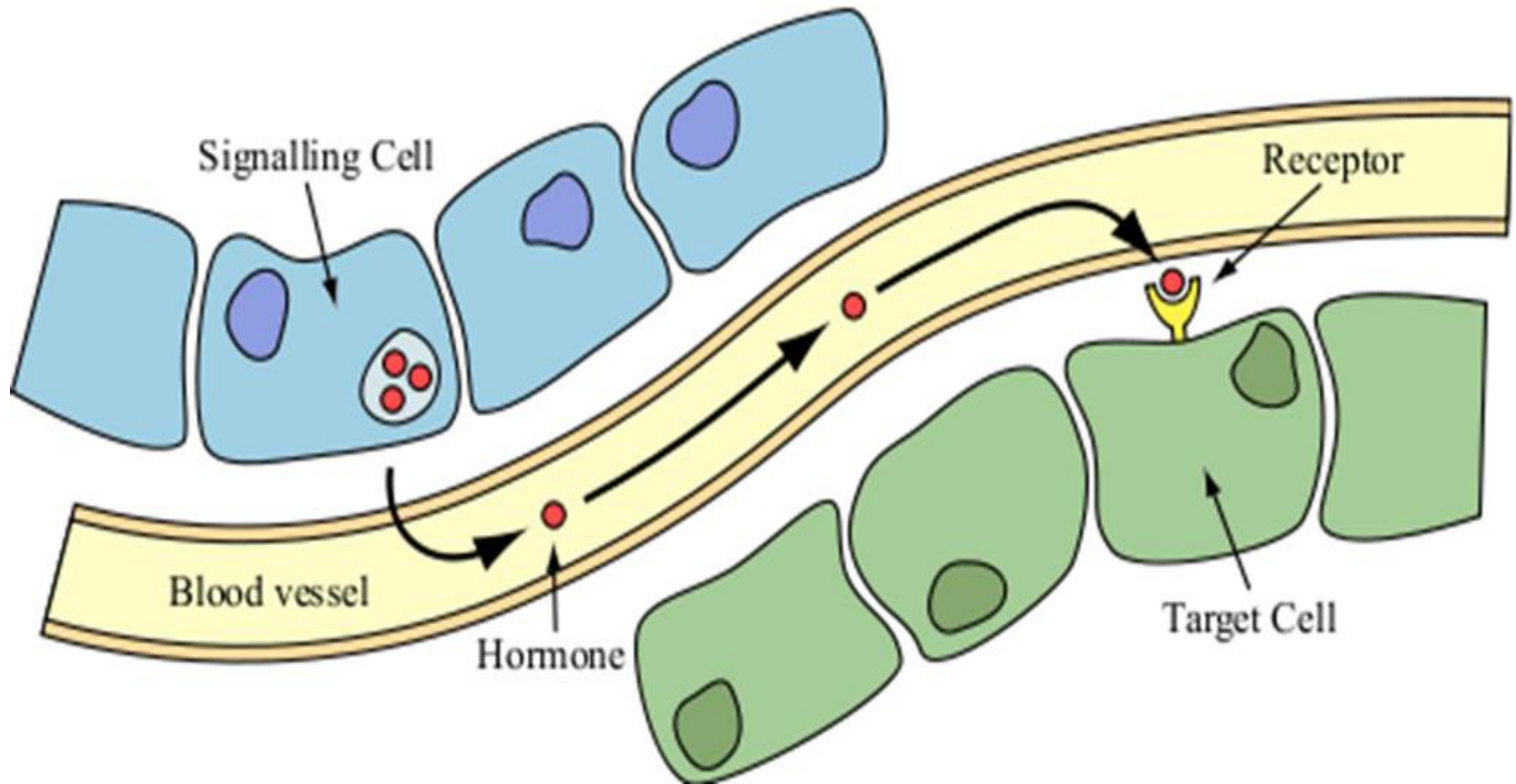
The Endocrine System (cont.)

Target Cells

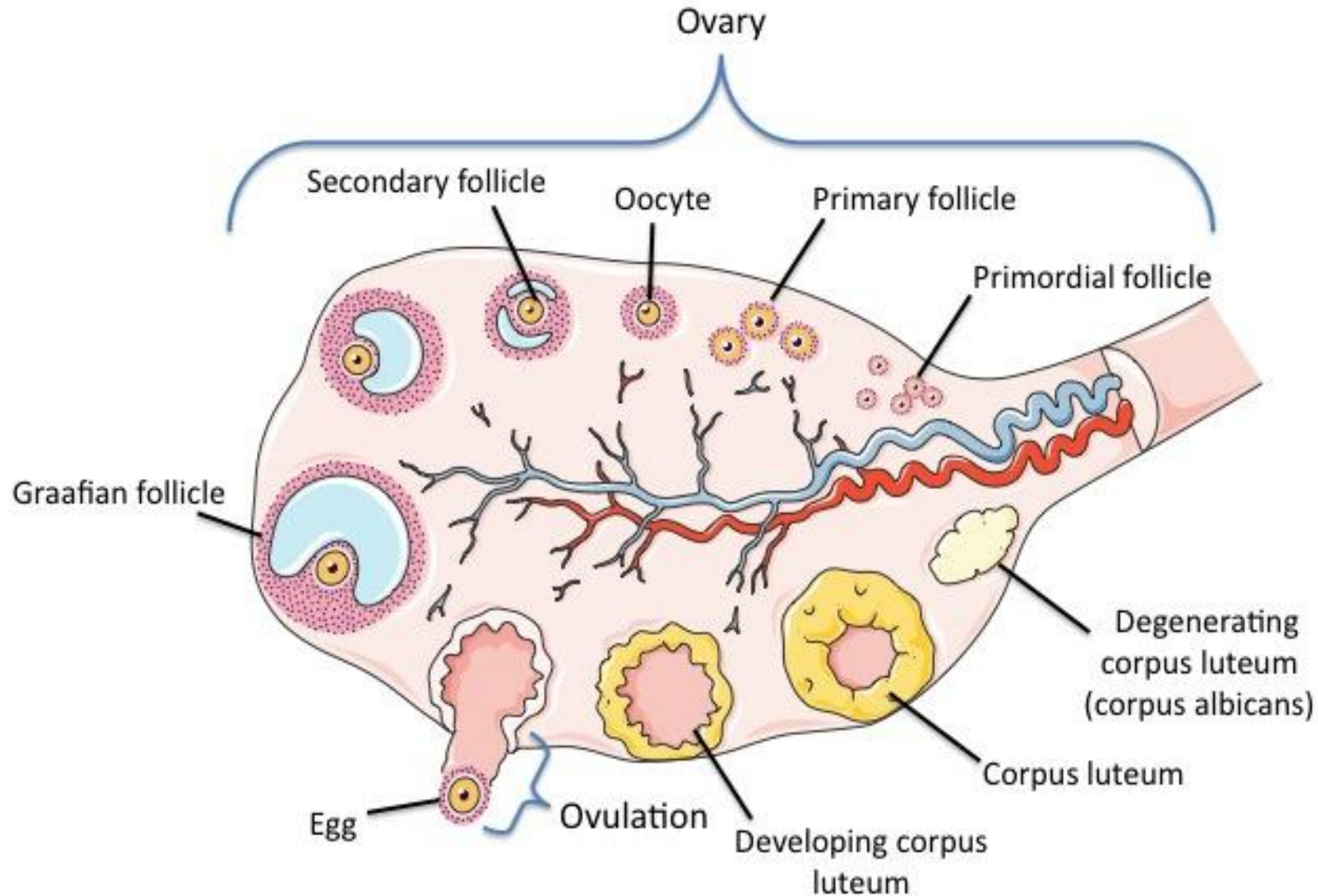
- Cells with specifically shaped receptors for receiving certain hormones



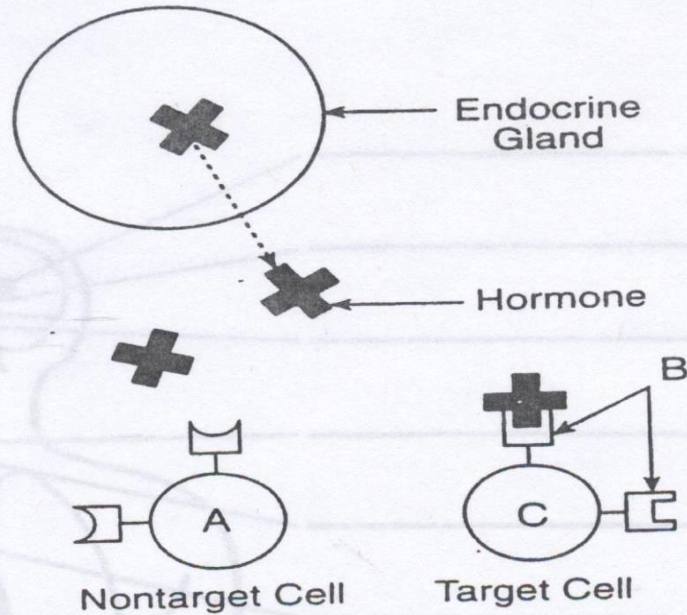
Target Cells



- Ex. Gonads contain receptors for FSH (follicle stimulating hormone) that is released by the pituitary gland. FSH causes these glands to mature during puberty



Base your answers to questions 58 and 59 on the diagram below which illustrates a role of hormones.



58-Letter B indicates

- 1) ribosomes
- 2) receptor molecules
- 3) tissues
- 4) inorganic substances

59 Explain why cell A is a nontarget cell for the hormone illustrated in the diagram. [1]

Cell A receptors are not shaped to fit the hormone

Feedback

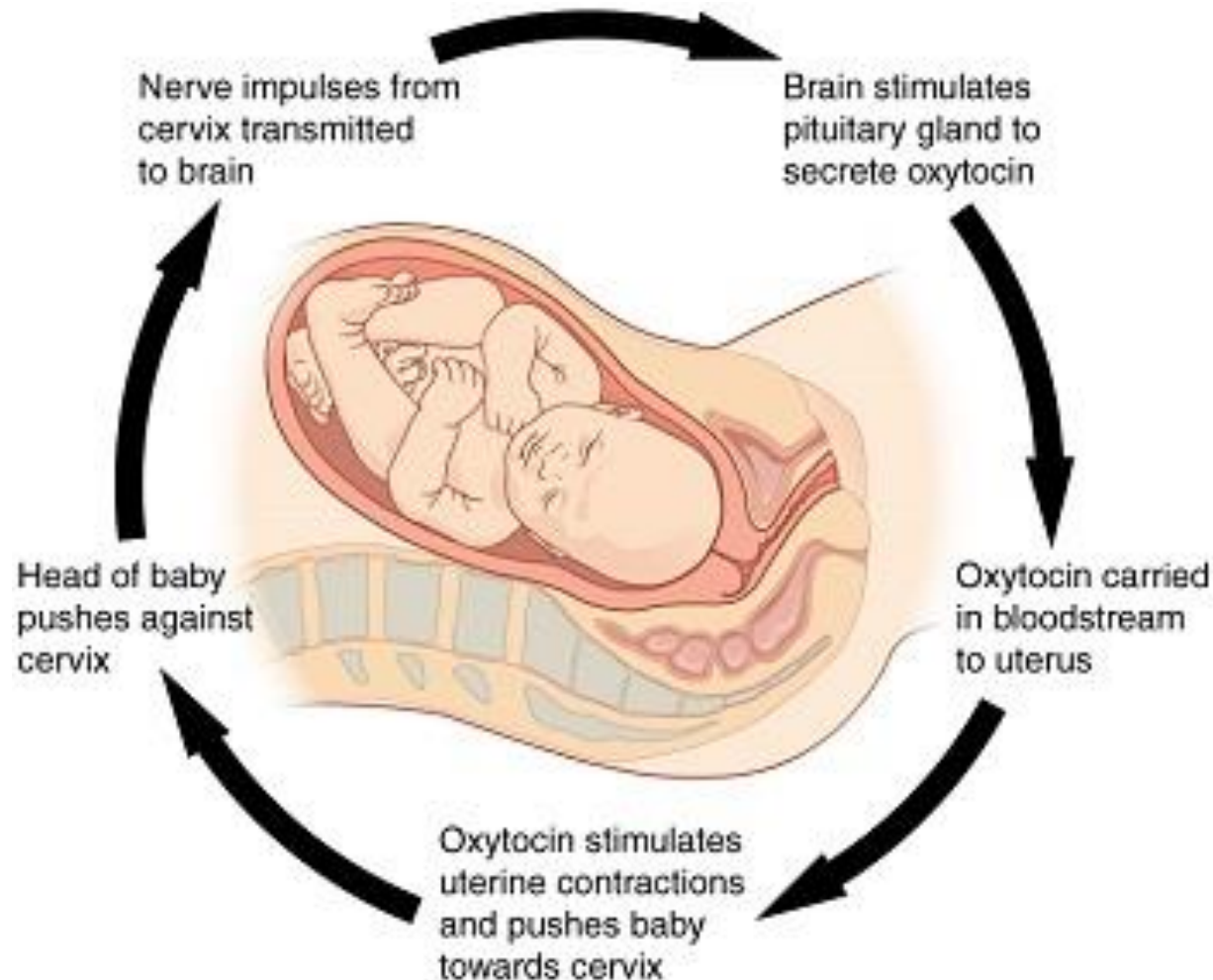


When have you given or received feedback? Why?



Positive Feedback

- can only stimulate a response, not inhibit
 - Ex. blood clotting & labor contractions



Negative Feedback

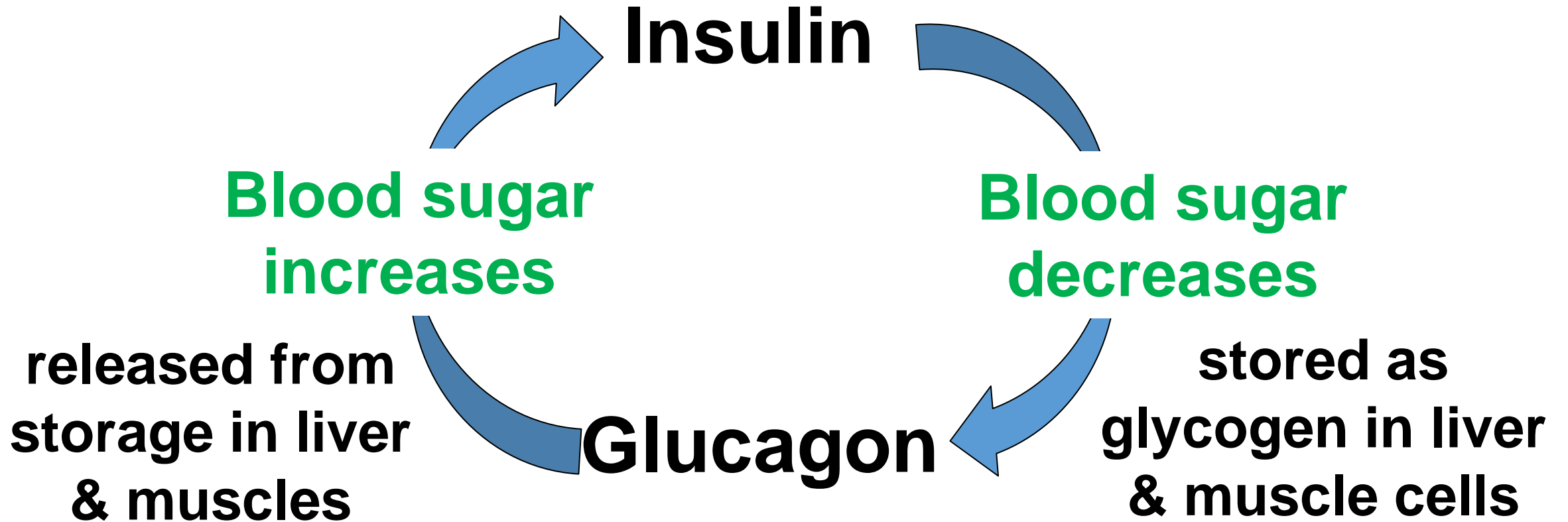
[negative feedback video](#)

- When a hormone level in the blood can **BOTH** inhibit (slow/stop) or stimulate (increase) the production of another hormone
- Most hormones function this way to maintain homeostasis
- Ex. A thermostat

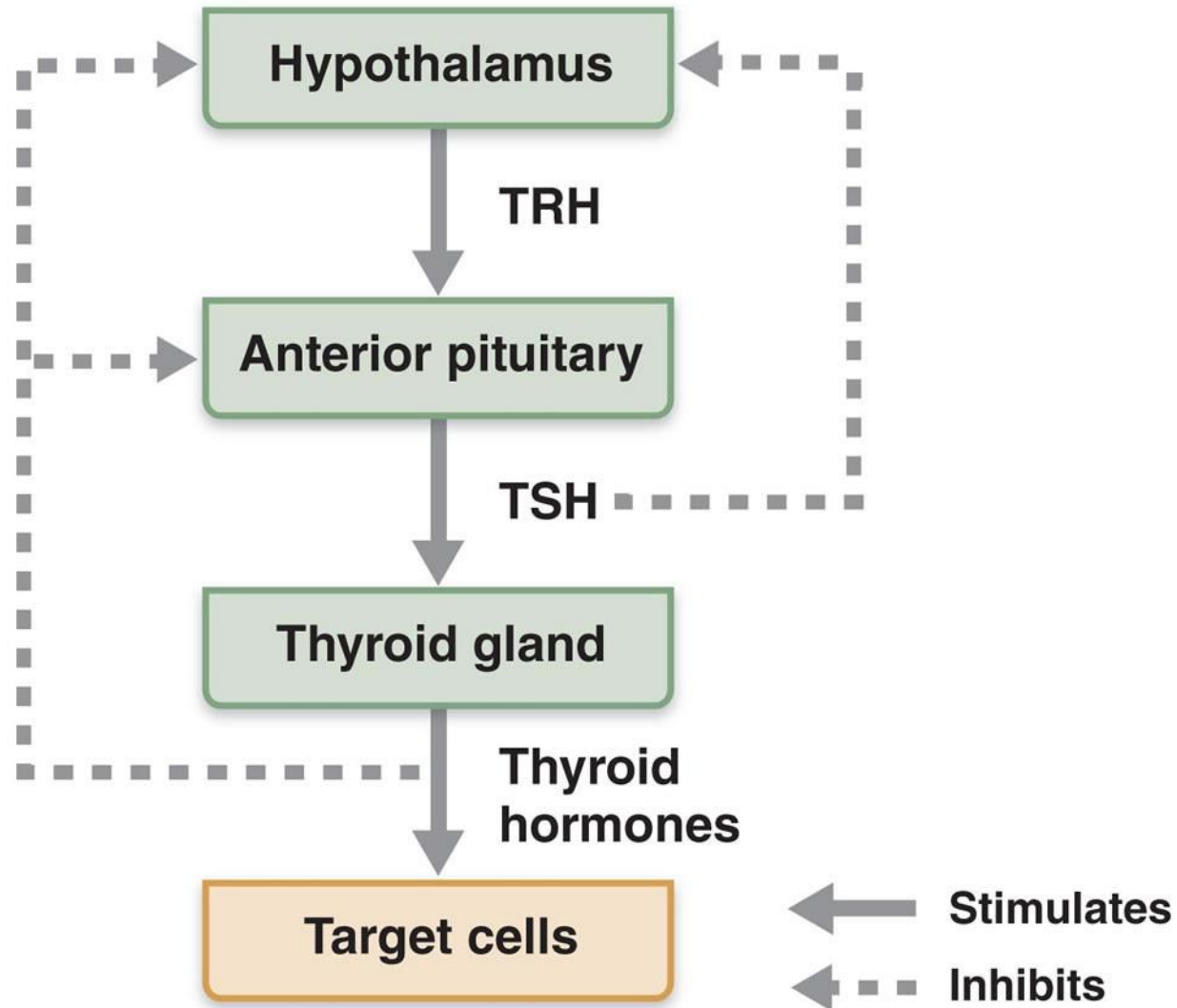


Negative Feedback Loop

Ex. Insulin & Glucagon



Ex. TSH & Thyroxin



Lesson 2

- Endocrine worksheet 8-1
- Glands & Hormones Chart

◆ Understanding Main Ideas

Answer the following questions in the spaces provided.

1. What is the function of the endocrine system?

2. What are the endocrine system's messages made of and how are they carried through the body?

3. What are the two ways the hypothalamus sends messages to the pituitary gland?

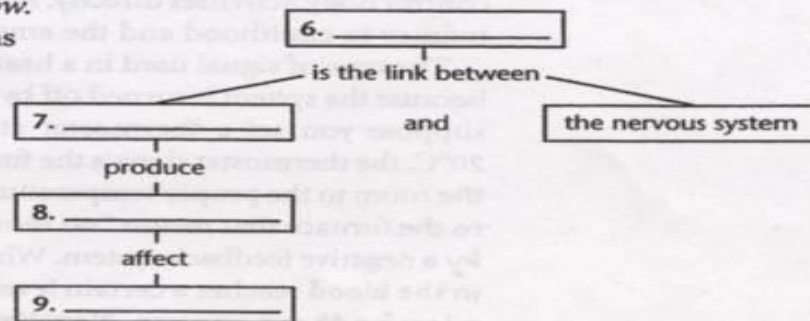
4. What is the general function of the pituitary gland?

5. How does a negative feedback system work? Explain how negative feedback regulates the amount of thyroxine in the blood.

◆ Building Vocabulary

Fill in the flowchart with the words below.

hormones hypothalamus
endocrine glands target cells



Hyposecretion – not enough of a hormone

Ex. Dwarfism (low GH)



Hypersecretion – too much of a hormone

Ex. Gigantism (excess GH)



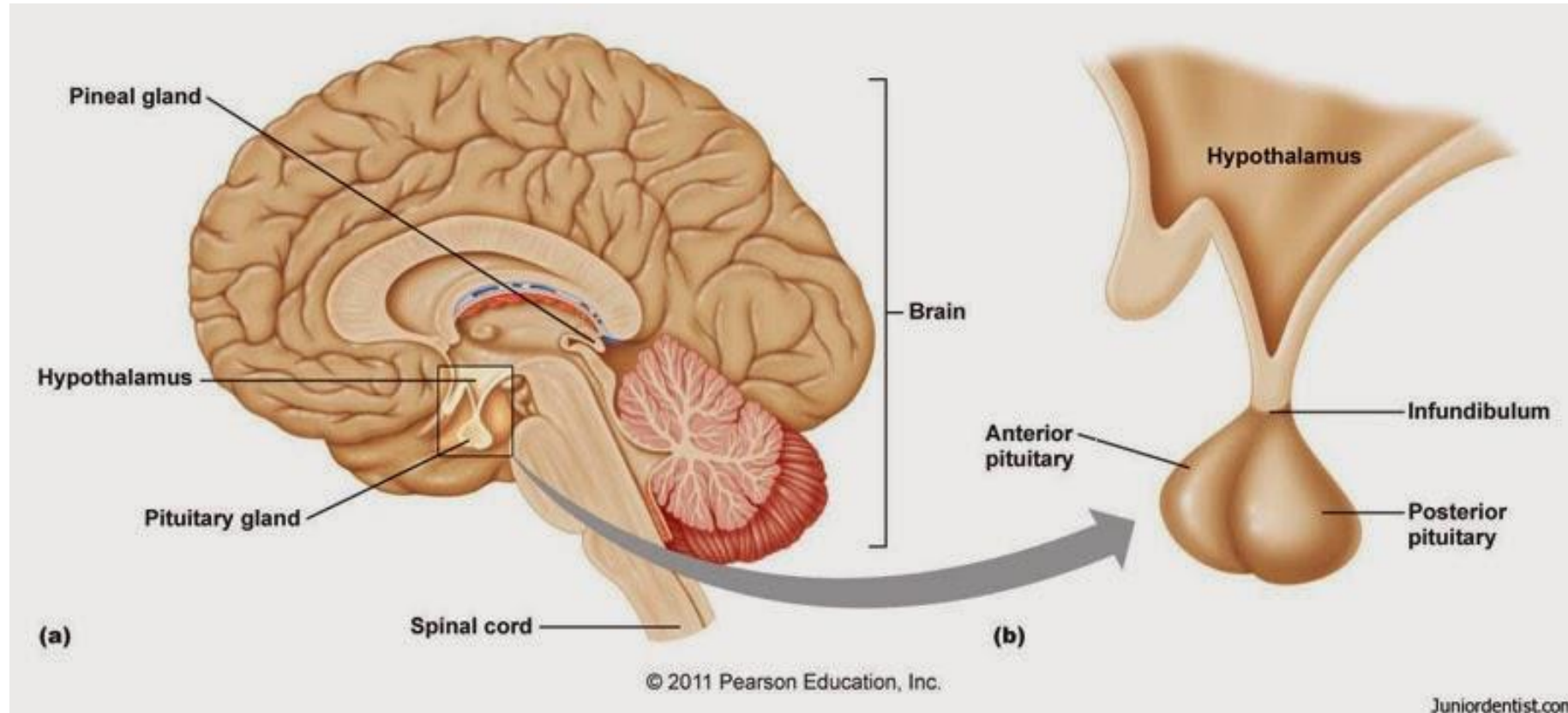
Gland	Location	Hormone(s)	Function	Disorders
-------	----------	------------	----------	-----------

HYPOTHALAMUS

Small gland found in brain

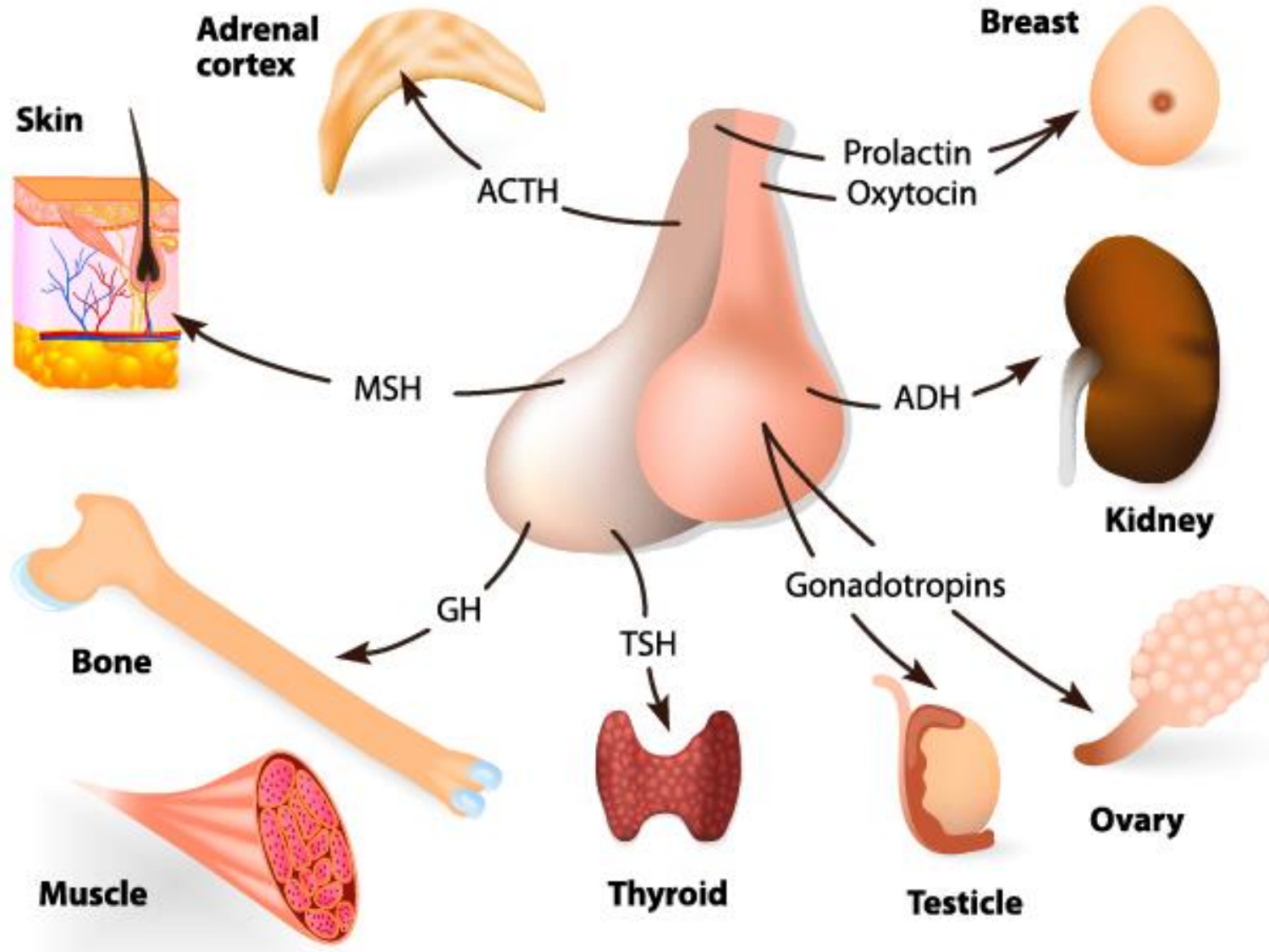
GnRh & CRF
Oxytocin

- produce secretions that effect operation of the pituitary gland
- induce labor contractions, mother-infant bonding



The
“Master”
gland

PITUITARY GLAND



PITUITARY

A.K.A.
"THE
MASTER
GLAND"

pea size
gland at
base of
brain

[What is the
Pituitary
Gland?](#)

Growth
Stimulating
Hormone (GH)

Regulates the growth
of long bones

Thyroid
Stimulating
Hormone (TSH)

Stimulates the thyroid
to produce thyroxin

Follicle
Stimulating
Hormone (FSH)

Stimulates follicles in
gonads to grow and
mature

Luteinizing
Hormone (LH)

Triggers ovulation (egg
release) in females

Prolactin

- stimulates milk production
in female mammary glands

THYROID

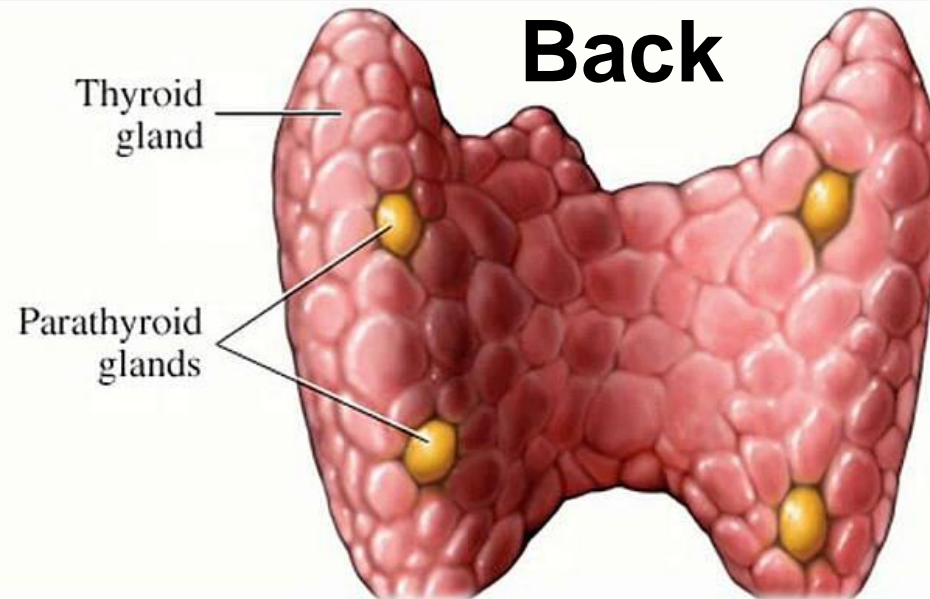
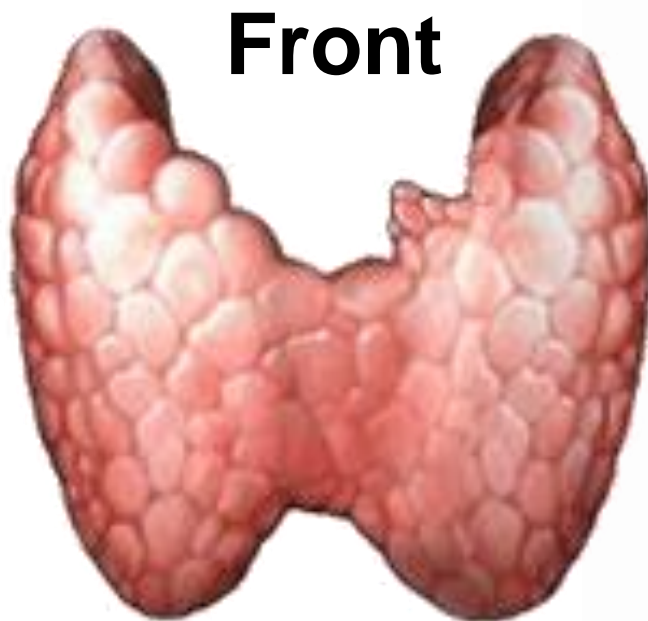
butterfly-shaped gland in neck

Thyroxin

Regulates cell metabolism

Goiter:

Enlarged thyroid due to iodine deficiency in diet



Lesson 3

- Finish glands and hormones chart
- Disorders picture packet

ADRENAL
GLAND

on top
of each
kidney

Adrenaline

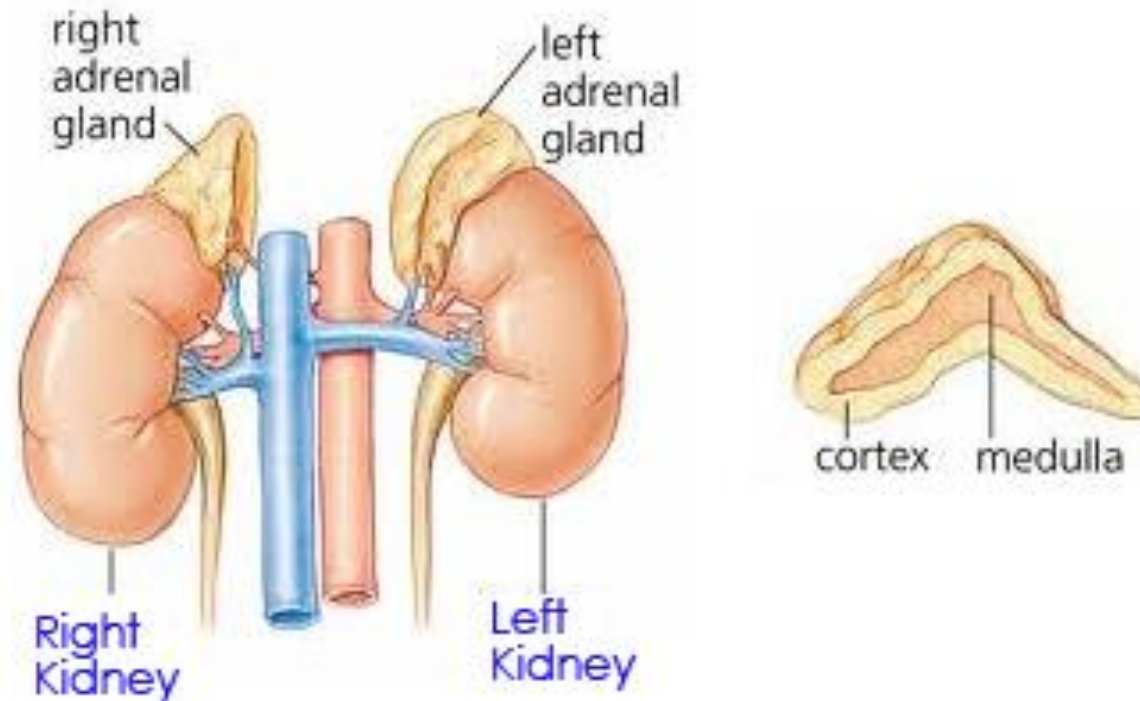
Increases heart rate, dilates pupils, increases diameter of blood vessels (fight or flight)

Cortisol

- regulation of carbohydrate, protein, and fat metabolism

Aldosterone

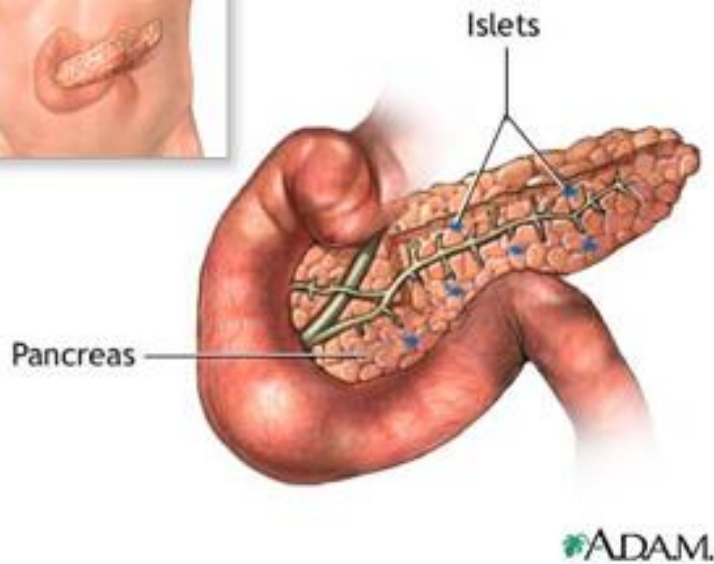
- regulates water balance and blood pressure



Pancreas

(Islets of Langerhans)

through-
out the
pancreas



Insulin

Decreases blood-glucose levels, signaling for it to be stored as glycogen (liver & muscles)

Diabetes:

Insulin deficiency or damaged insulin receptors → high blood sugar levels

Glucagon

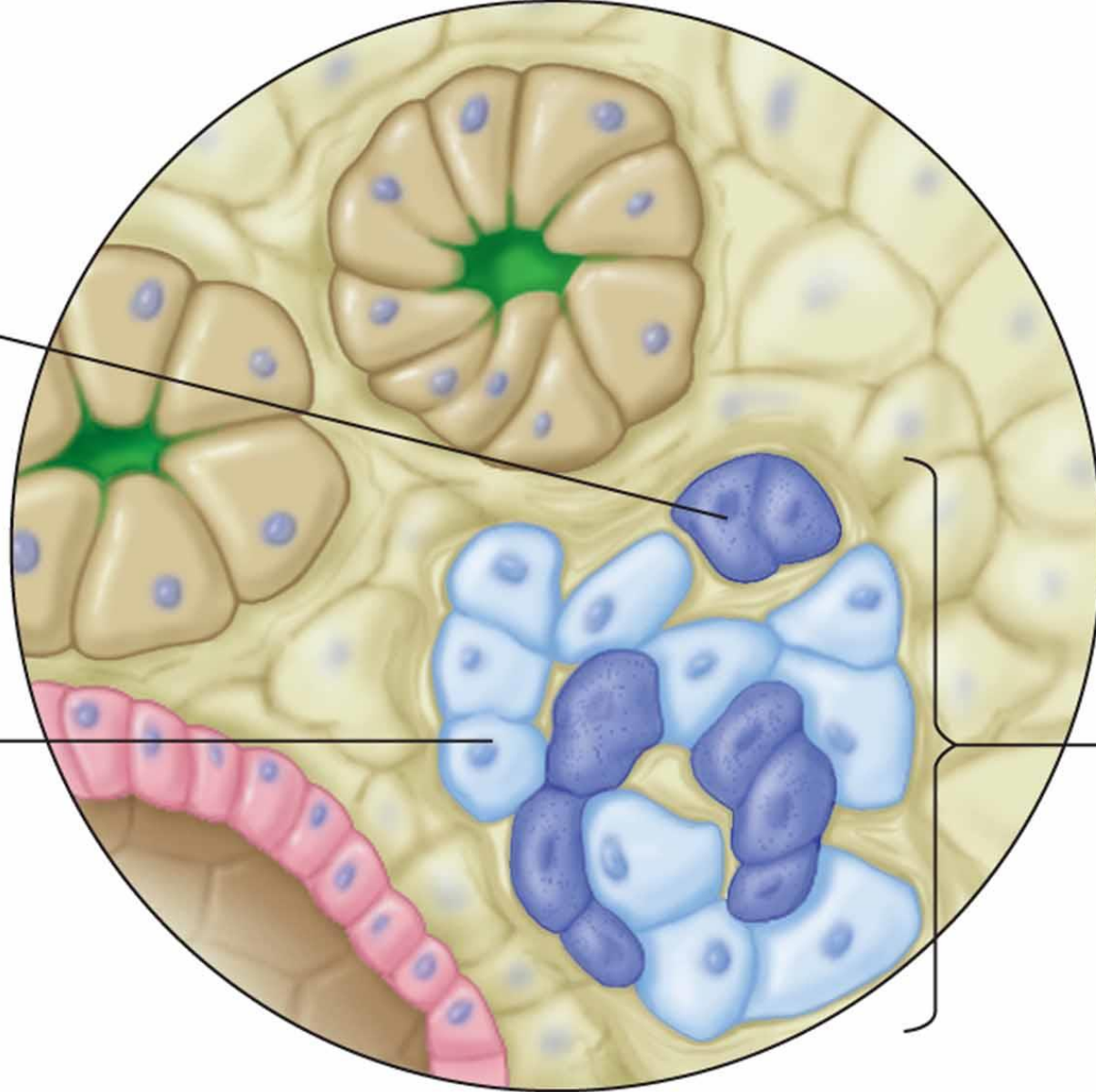
Increases blood glucose levels by converting stored glycogen in liver and muscles into glucose

ALPHA CELL

Glucagon-secreting cell

BETA CELL

Insulin-secreting cell



Islets of Langerhans in pancreas

Glucagon—raises blood glucose level
Insulin—lowers blood glucose level

Male
Gonad

Testes

Testosterone

Secondary sex characteristics (body hair, muscle growth, deeper voice)

Female
Gonad

Ovaries

Estrogen

Secondary sex characteristics (body hair, breast growth, hips widening)

Regulates menstrual cycle

Progesterone

Thickening of the uterine lining

1) Gigantism

- results from excessive production of GH (Growth Hormone) from the pituitary gland (hypersecretion)

[VIDEO](#)

Big Boy Day

SEE HIM *in person!* →

ROBERT WADLOW

THE BIGGEST MAN IN THE WORLD

8 ft. 8 $\frac{1}{4}$ in. Tall
IN HIS STOCKING FEET

WEARS SIZE 37 PETERS SHOE

21 YEARS OLD

This is an honest-to-goodness photo of Robert and his dad (his dad is six feet tall). When Robert was born February 22, 1918, he weighed 8 $\frac{1}{2}$ pounds, at 6 months he weighed 30 pounds, and today he weighs 491 pounds . . . and towers above every other living man.

COME SEE HIM! - - - MEET HIM! - - - TALK TO HIM!

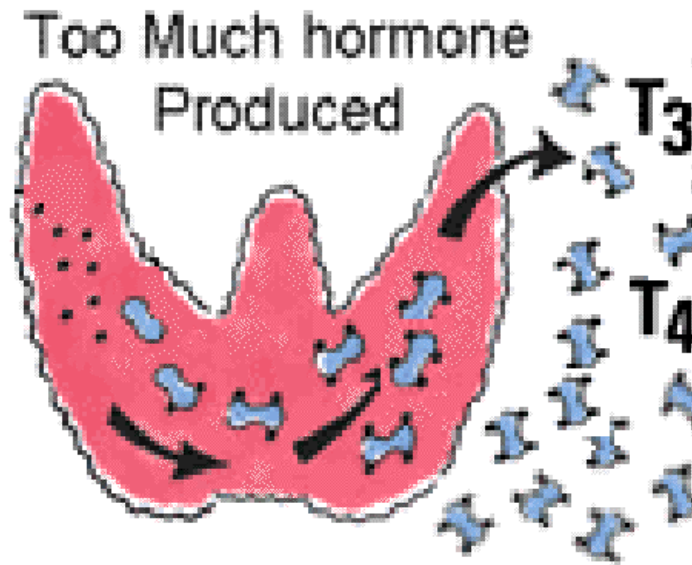
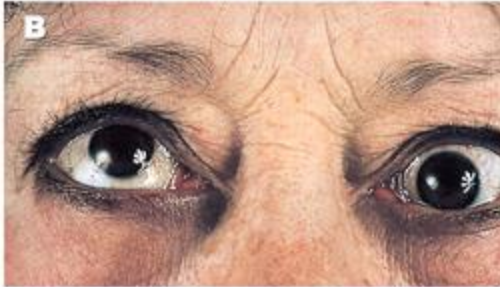
REMEMBER THE DATE . . . THURSDAY, MAY 4th
HE WILL BE IN OUR STORE FROM 2:30 P.M. TO 4:00 P.M.

THOMAS SMITH
DUANE, KENTUCKY



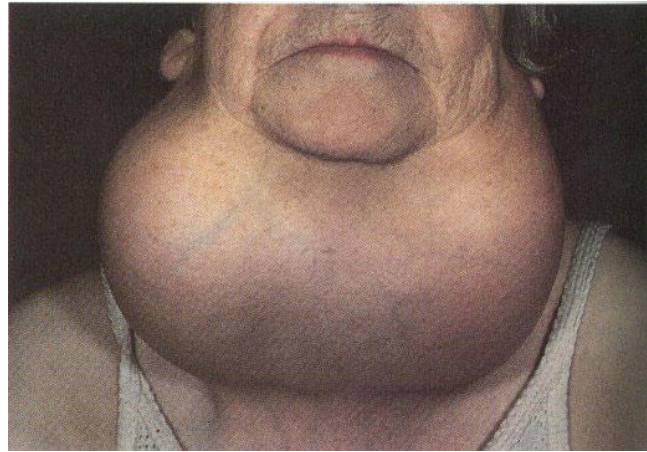
2) Hyperthyroidism

- thyroid produces excessive amounts of thyroxin; causing weight loss, heart palpitations, anxiety, bulging eyes



3) Goiter

- enlargement of the thyroid due to lack of iodine in the diet



Iodine Rich Foods



YOGURT



MOZZARELLA



MILK



EGGS



SEAWEED



CRANBERRIES



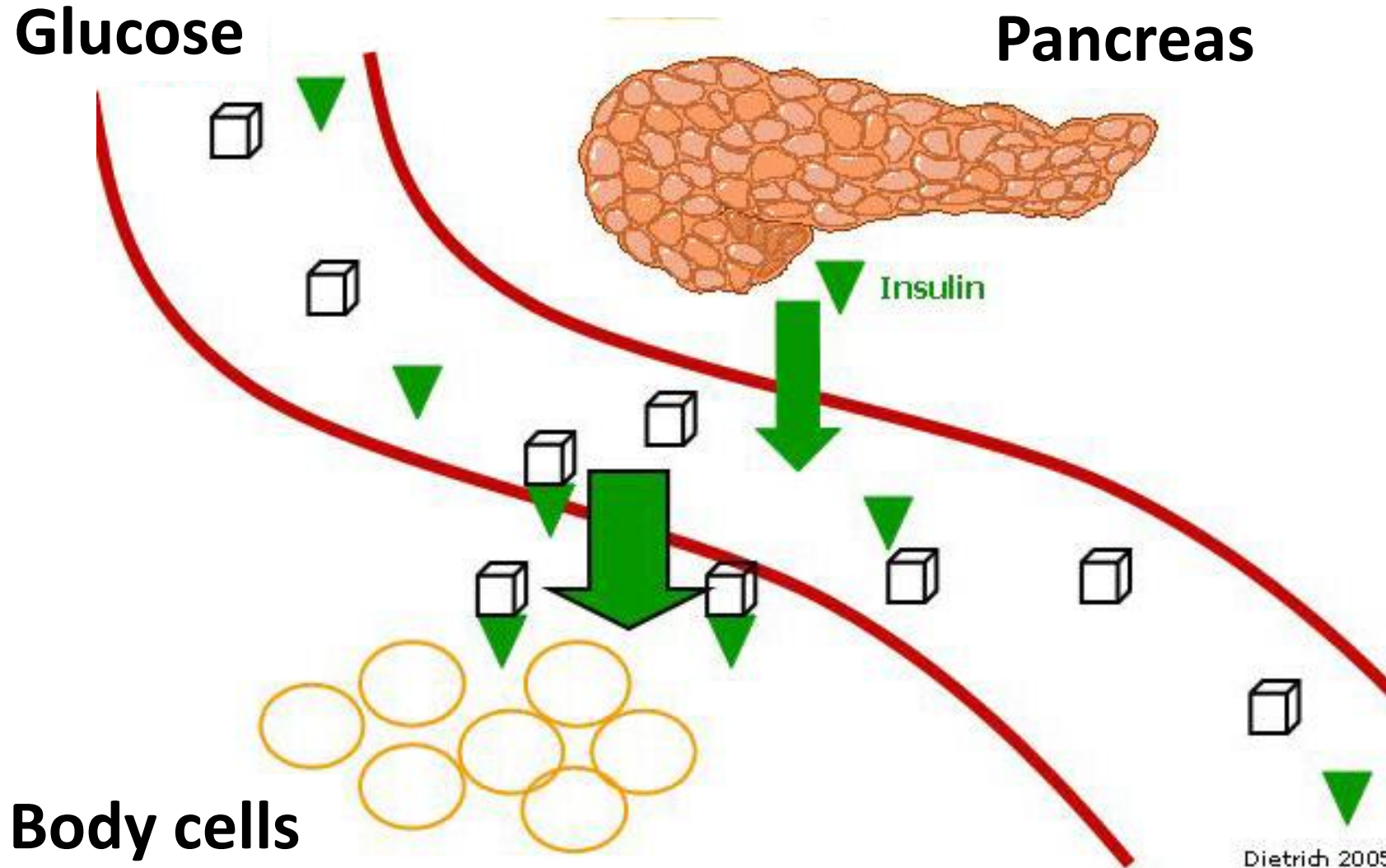
NAVY BEANS



STRAWBERRIES

4) Diabetes

- not enough insulin, leads to high blood sugar levels



[Type 1 Diabetes](#)

[Complications](#)

[Diabetes Animation - YouTube](#)

Endocrine Practice Questions

2

* 1. Which of the following is *not* an endocrine gland? (1) thyroid (2) salivary gland (3) pancreas (4) testis

3

* 2. The part of the brain that is most directly related to the endocrine system is the (1) cerebrum (2) medulla (3) hypothalamus (4) cerebellum

3

* 3. Which structure secretes the substance that it produces directly into the bloodstream? (1) gallbladder (2) salivary gland (3) adrenal gland (4) skin

3

* 4. The hormones insulin and glucagon are produced by the (1) thyroid (2) pituitary (3) pancreas (4) liver

2

* 5. Which hormone lowers blood sugar levels by increasing the rate of entry of glucose into the cells? (1) follicle-stimulating hormone (2) insulin (3) parathormone (4) adrenalin

1

* 6. A person was admitted to the hospital with abnormally high blood sugar and an abnormally high sugar content in his urine. Which gland most likely caused this condition by secreting lower than normal amounts of its hormone? (1) pancreas (2) parathyroid (3) salivary (4) thyroid

4

* 7. Which hormone stimulates activity in the ovaries? (1) testosterone (2) ACTH (3) insulin (4) FSH

2

* 8. The rate of metabolism is regulated by a hormone secreted by the (1) parathyroids (2) thyroid (3) pancreas (4) adrenals

4

* 9. Estrogen, which influences the development of secondary sex characteristics, is produced by the (1) pituitary (2) adrenals (3) parathyroids (4) ovaries

4

* 10. In humans, the level of calcium in the blood is regulated by the (1) pancreas (2) thyroid (3) adrenals (4) parathyroids

3

* 11. The mechanism that regulates the secretion of hormones by endocrine glands is called (1) peristalsis (2) active transport (3) negative feedback (4) filtration

4

* 12. Insufficient iodine in the diet may cause goiter, a disorder of the (1) adrenal glands (2) pancreas (3) pituitary (4) thyroid

4

* 13. The increased rate of heartbeat and breathing that occurs in times of stress is caused by a hormone produced by the (1) pituitary (2) thyroid (3) pancreas (4) adrenal glands