

Chapter 17: Endocrine System

Building a Medical Terminology Foundation 2e – Student Companion by Kimberlee Carter; Marie Rutherford; and Connie Stevens

This book is intended as a companion to *Building a Medical Terminology Foundation 2e* (<https://ecampusontario.pressbooks.pub/medicalterminology2/>).

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Endocrine System

If you would like to review the textbook chapter content, please visit [Chapter 17: Endocrine System \[New Tab\]](#).

Learning Objectives

- Identify the anatomy of the endocrine system and describe the main functions of the endocrine system
- Analyze, translate, and define medical terms and common abbreviations of the endocrine system
- Practice the spelling and pronunciation of endocrine system terminology
- Identify the medical specialties associated with the endocrine system and explore common diseases, disorders, diagnostic tests and procedures

Key Word Components

Identify meanings of key word components of the endocrine system:

Prefixes

- eu- (good, normal)
- hypo- (below, under, deficient)
- hyper- (above, excessive)
- oxy- (rapid, sharp, acid)
- para- (around, beside, beyond, abnormal)
- pan- (all, total)
- poly- (many or much)
- syn- (joined, together)
- tetr- (four)

- tri- (three)

Combining Forms

- acr/o (extremities, height)
- aden/o (gland)
- adren/o (adrenal glands)
- adrenal/o (adrenal glands)
- calc/i (calcium)
- cortic/o (cortex, outer layer of a body organ)
- dips/o (thirst)
- glyc/o (sugar)
- endocrin/o (endocrine)
- home/o (sameness)
- kal/i (potassium)
- myx/o (mucus)
- natr/o (sodium)
- parathyroid/o (parathyroid gland)
- phys/o (growing)
- pituitar/o (pituitary gland)
- somat/o (body)
- thyr/o (thyroid gland)
- thyroid/o (thyroid gland)

Suffixes

- -drome (run, running together)
- -ectomy (excision, cut out)
- -emia (in the blood)
- -ia (condition of, abnormal state, diseased state)
- -ism (state of)
- -itis (inflammation)
- -logist (specialist or physician who studies and treats)
- -logy (study of)
- -megaly (enlarged, enlargement)
- -oid (resembling)
- -oma (tumor)
- -pathy (disease)
- -plasia (condition of, formation, development, growth)
- -tomy (incision, cut into)

Endocrine System Words

Endocrine System Medical Terms (Text Version)

Practice the following endocrine system words by breaking into word parts and pronouncing.

1. **endocrinopathy**

- endocrin/o/pathy
- disease of the endocrine system

2. **adrenalectomy**

- adrenal/ectomy
- excision of the adrenal glands

3. **parathyroidectomy**

- parathyroid/ectomy
- excision of the parathyroid glands

4. **adenitis**

- aden/itis
- inflammation of the gland

5. **parathyroidoma**

- parathyroid/oma
- tumour of the parathyroid glands

6. **thyroiditis**

- thyroid/itis
- inflammation of the thyroid gland

7. **thyroidotomy**

- thyroid/o/tomy
- incision into the thyroid gland

8. **hyperthyroidism**

- hyper/thyroid/ism
- state of excessive thyroid gland activity

9. **acromegaly**

- acr/o/megaly

- enlargement of the extremities

10. **adrenomegaly**

- adren/o/megaly
- enlargement of one or both adrenal glands

11. **glycemia**

- glyc/emia
- sugar in the blood

12. **hypokalemia**

- hypo/kal/emia
- deficient potassium in the blood

13. **hypopituitarism**

- hypo/pituitar/ism
- state of deficient pituitary gland activity

14. **adenomegaly**

- aden/o/megaly
- enlarged gland

15. **hypocalcemia**

- hypo/calc/emia
- deficient calcium in the blood

16. **polydipsia**

- poly/dips/ia
- condition of excessive thirst

17. **hypoglycemia**

- hypo/glyc/emia
- deficient sugar in the blood

18. **hyperkalemia**

- hyper/kal/emia
- excessive potassium in the blood

19. **endocrinopathy**

- endocrin/o/pathy
- disease of the endocrine system

20. **hypercalcemia**

- hyper/calc/emia
- excessive calcium in the blood

21. **panhypopituitarism**

- pan/hypo/pituitar/ism *rebel does not follow the rules
- state of total deficient pituitary gland activity

22. **cortical**

- cortic/al
- pertaining to the cortex

23. **thyroidectomy**

- thyroid/ectomy
- excision of the thyroid gland

24. **syndrome**

- syn/drome
- run together (signs and symptoms occur together characterizing of a specific disorder)

25. **thyroparathyroidectomy**

- thyr/o/parathyroid/ectomy
- excision of the thyroid gland and parathyroid glands

26. **adrenalitis**

- adrenal/itis
- inflammation of adrenal glands

27. **thyroidectomy**

- thyroid/ectomy
- excision of the thyroid gland

28. **endocrinologist**

- endocrin/o/logist
- specialist who studies and treats diseases of the endocrine system

29. **adrenopathy**

- adren/o/pathy
- disease of the adrenal gland(s)

30. **corticoid**

- cortic/oid
- resembling the cortex

31. **euthyroid**

- eu/thyr/oid
- resembling a normal thyroid gland

32. **endocrinology**

- endocrin/o/logy
- study of the endocrine system

33. **hyponatremia**

- hypo/natr/emia
- deficient sodium in the blood

34. **adenectomy**

- aden/ectomy
- excision of a gland

35. **euglycemia**

- eu/glyc/emia
- normal (level) of blood sugar in the blood

36. **adenosis**

- aden/osis
- abnormal condition of a gland

37. **adrenocorticohyperplasia**

- adren/o/cortic/o/hyper/plasia
- excessive development of the adrenal cortex

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Pronouncing and Defining Commonly Abbreviated Endocrine System Terms

Practice pronouncing and defining these commonly abbreviated endocrine system terms:

- ACTH (adrenocorticotrophic hormone)
- ADH (antidiuretic hormone)
- DI (diabetes insipidus)

- DKA (diabetic ketoacidosis)
- DM (diabetes mellitus)
- FBS (fasting blood sugar)
- FNA (fine needle aspiration)
- FSH (follicle-stimulating hormone)
- GH (growth hormone)
- HbA1C (glycosylated hemoglobin)
- LH (luteinizing hormone)
- PRL (prolactin)
- RAIU (radioactive iodine uptake)
- Thyroid Profile (T4, T3, and TSH)
- T4 (thyroxine level)
- T3, (triiodothyronine level)
- TSH (thyroid stimulating hormone)

Sorting Terms

Sort the terms from the word lists above into the following categories:

- **Disease and Disorder** (terms describing any deviation from normal structure and function)
- **Diagnostic** (terms related to process of identifying a disease, condition, or injury from its signs and symptoms)
- **Therapeutic** (terms related to treatment or curing of diseases)
- **Anatomic** (terms related to body structure)

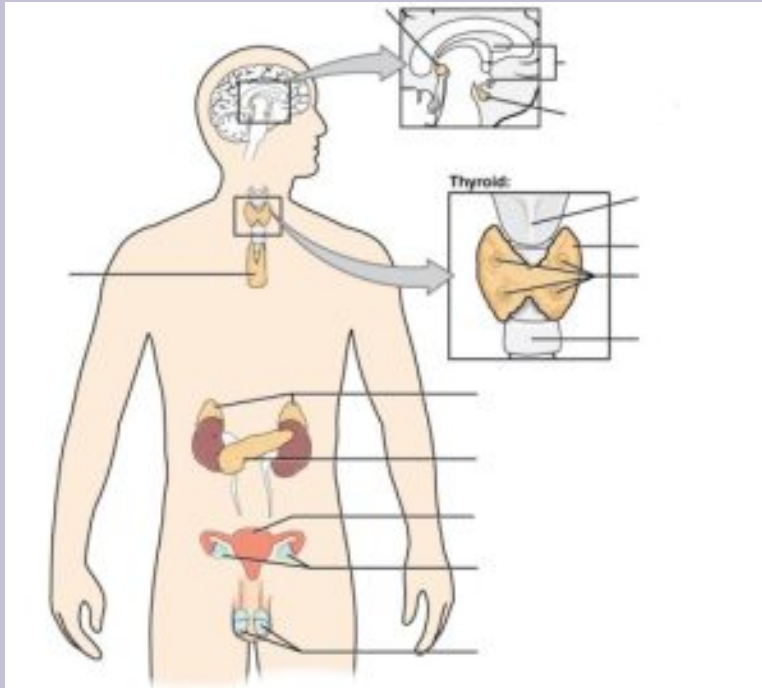
Endocrine System Structures

Label the following endocrine system anatomy:

Endocrine System Anatomy labeling activity (Text Version)

Label the diagram with words listed below:

- | | | |
|------------------------------------|----------------------|---|
| 1. Trachea | 6. Thyroid gland | 11. Parathyroid glands (on posterior side of thyroid) |
| 2. Testes (male) | 7. Thalamus | 12. Thymus |
| 3. Pancreas | 8. Adrenal glands | 13. Pituitary gland |
| 4. Thyroid cartilage of the larynx | 9. Uterus | |
| 5. Pineal gland | 10. Ovaries (female) | |



Endocrine System Diagram (Text Version)

This diagram shows the endocrine glands and cells that are located throughout the body. The endocrine system organs shown from top to bottom include the pea size structure known as the _____[Blank 1] as well as the primary glandular structure of the endocrine system found enclosed within the _____[Blank 2] known as the _____[Blank 3]. The pituitary is located on the anterior side of the thalamus while the pineal gland is located on the posterior side of the thalamus. The _____[Blank 4] is a shield shaped cartilage that forms part of the laryngeal skeleton. This is a butterfly-shaped gland that wraps around the _____[Blank 5] within the neck. Four small, disc-shaped _____[Blank 6] are embedded into the posterior side of the thyroid. The _____[Blank 7] are located on top of the kidneys. The _____[Blank 8] is located at the center of the abdomen. In females, the _____[Blank 9] connects the two _____[Blank 10] a by two long, curved, tubes in the pelvic region. In males, the two _____[Blank 11] are in the scrotum below the penis. One the left side of the diagram and located in the center of the chest is the _____[Blank 12], a glandular structure responsible for the secretion of a hormone called thymosin.

Check your answers ¹

Activity source: Endocrine System Anatomy by Gisele Tuzon, from *Building a Medical Terminology Foundation* by Kimberlee Carter and Marie Rutherford, licensed under CC BY- 4.0. /Text version added.

Medical Terms in Context

Place the following medical terms in context to complete the scenario below:

Endocrine System – Consultation Report (Text version)

Use the words below to fill in the consultation report:

- menstrual
- palpitations
- conjunctival
- antibodies
- side effects
- medications
- discontinue
- elevated

PATIENT NAME: Jane SMITH

AGE: 26

SEX: Female

DATE OF CONSULTATION: January 15, 2020

CONSULTING PHYSICIAN: Mary Johnstone, MD, Internal Medicine

REASON FOR CONSULTATION: Hyperthyroidism; Graves disease.

PATIENT NAME: Jane SMITH

AGE: 26

SEX: Female

DATE OF CONSULTATION: January 15, 2020

CONSULTING PHYSICIAN: Mary Johnstone, MD, Internal Medicine

REASON FOR CONSULTATION: Hyperthyroidism; Graves disease.

HISTORY: Around 2 months ago she started noticing _____[Blank 1] and peripheral tremor. She was feeling more anxious and edgy. She had a 10-pound weight loss despite eating well. She was having some heat intolerance and diarrhea, and her _____[Blank 2] cycles were irregular. She also noticed her eyes were different. She went to see her family doctor who did lab work and was found to have a TSH suppressed with a free T4 around 40 and free T3 around 10. She then had a 24-hour thyroid uptake and scan that was abnormal with a 24-hour of 70 and a diffuse pan with a homogeneous pattern percentage in keeping with Graves disease. Her TSI was _____[Blank 3] at around 30.

PHYSICAL EXAMINATION: On physical exam her blood pressure was 140/60, heart rate was 120 with regular rhythm. She had mild proptosis with no infection of the _____[Blank 4] area. Normal eye movement. No pretibial myxedema. She had a diffuse goiter of around 60 g with no murmur and no nodularity. No abnormal lymphadenopathies. There was a positional tremor. Her weight was 90 pounds.

SOCIAL HISTORY: Jane has no significant past medical history. She is finishing her fourth year in biological studies. She is also working on a part-time basis. She is not aware of a family history of thyroid disease. She is currently on no medications. She is a smoker, around 15 cigarettes a day. She rarely drinks alcohol. She denies marijuana use.

SUMMARY: Jane presents with Graves disease. She has hyperthyroidism positive _____[Blank 5] and an increased thyroid uptake and a thyroid scan in keeping with her condition.

We talked about different repair options. We discussed Tapazole versus radioactive iodine. We discussed the pros and cons of each treatment option. She preferred to start on Tapazole. We talked about the potential

_____ [Blank 6] of these medications including the risk of rash, increasing liver enzymes, and the rare risk of agranulocytosis. I explained to her that if she has a mild or high fever, she should have her CBC checked through the ER, and if there is evidence of a granulocytosis, she cannot resume Tapazole. Usually Tapazole is well tolerated.

PLAN: I have started her on Tapazole 30 mg, and she will repeat lab work in a month and see me at that point. I explained to her that usually 8-18 months of treatment are necessary. Response varies from patient to patient. Frequent levels are necessary to adjust the _____ [Blank 7] according to response.

If she has side effects to Tapazole or there is no response, or she is experiencing regular flares, then she should _____ [Blank 8] the use of the Tapazole. Other options such as radioactive iodine can be considered. I would not favour radioactive iodine in her case as she is a smoker and that she has had a mild ophthalmopathy. Radioactive iodine can worsen ophthalmopathy, therefore it should be avoided in smokers. We talked about the importance of discontinuing smoking as it can worsen the disease.

Mary Johnstone, MD, Internal Medicine

Note: Report samples (H5P and Pressbooks) are to encourage learners to identify correct medical terminology and do not represent the Association for Health Documentation Integrity (AHDl) formatting standards.

Check your answers: ²

Activity source: Endocrine System – Consultation Report by Heather Scudder, from *Building a Medical Terminology Foundation* by Kimberlee Carter and Marie Rutherford, licensed under CC BY- 4.0. /Text version added.

Medical Terms in Context

Place the following medical terms in context to complete the scenario below:

“Endocrine System – Consultation Report” (Text version)

Use the words below to fill in the consultation report:

- diabetes
- metabolic
- palpitations
- neuropathy
- congestive
- rhythm
- pulses
- diuretics
- sugars
- vascular disease
- edema

PATIENT NAME: Margaret JONES

SEX: Female

AGE: 56

DATE OF CONSULTATION: January 15, 2020

CONSULTING PHYSICIAN: Mary Johnstone, MD, Internal Medicine

REASON FOR CONSULTATION: Type 2 diabetes.

HISTORY: I saw Margaret as a follow up today in regards to poorly controlled type 2 _____[Blank 1]. She is reluctant to make any changes in her current medications. She is very afraid of side effects of all her medications. She has not been testing her blood sugar but is planning to start doing it again.

Unfortunately, Mary did not do lab work prior to seeing me. I do not have an updated lab work for at least 2 years. It is very difficult to assess her _____[Blank 2] control without any information.

She continues to be sedentary, but she tells me she has no chest pain or shortness of breath when doing the chores around the house or going up or down the stairs. She denies of orthopnea, ankle swelling, _____[Blank 3], presyncope or syncope.

PAST MEDICAL HISTORY

1. Type 2 diabetes diagnosed 2009. Advanced microvascular complications including non-proliferative retinopathy. Nephropathy with significant microalbuminuria. No _____[Blank 4]. Positive coronary artery disease and peripheral vascular disease. Poor control for several years.
2. Coronary artery disease. CABG 4 in 2019. LIMA to LAD SVG to OM and RCA. Grade 2 left ventricular function. Previous episodes of _____[Blank 5] heart failure preserved ejection fraction with regular admissions due to volume overload.
3. Hypertension.
4. Hypercholesterolemia.
5. Smoker.
6. Alcohol, 5-8 beers a week.
7. Obesity.
8. Peripheral vascular disease, femoral popliteal bypass in 2017.

MEDICATIONS

Aspirin 81 g q.d..

Bisoprolol 5 mg q.d.

Ramipril 20 mg q.d.

Rosuvastatin 20 mg q.d.

Invokana 300 mg q.d.

Tresiba 20 units q.d.

Metformin 1 b.i.d.

Ozempic 1 mg q.wk.

PHYSICAL EXAMINATION: On physical exam her weight was 100 kg. Blood pressure 160/70, heart rate 88/min. Sa and S2 were heard in 4 areas with regular _____[Blank 6]. There is a 2/6 systolic murmur best heard in aortic area with no radiation. Strong carotid pulses and radial _____[Blank 7]. JVP was 3 cm above sternal angle. Lungs were clear. There was bilateral leg _____[Blank 8] with venous changes in keeping with venous stasis dermatitis. Abdomen was soft, no evidence of ascites. No focal findings.

SUMMARY: Margaret has a history of poorly controlled type 2 diabetes and today is very difficult to assess her metabolic control as I do not have any information as she is not checking her blood _____[Blank 9] and has not had lab work for several years. She tells me she is compliant with her plan.

She also has a history of coronary artery disease and currently has no exertional symptoms. There is no evidence of significant volume overload, but she has a history of recurrent admissions due to congestive heart

failure preserved ejection fraction. She is currently not on _____[Blank 10] and I do not think that needs to be restarted. She should continue on the combination of ACE inhibitors, beta-blockers, antiplatelets, and high intensity setting therapy.

PLAN: I asked her to do lab work and come back to see me to reassess if her treatment plan is adequate. We talked about the importance of quitting smoking. Smoking is associated with increased risk of further coronary events and progression of her peripheral _____[Blank 11].

Mary Johnstone, MD, Internal Medicine

Note: Report samples (H5P and Pressbooks) are to encourage learners to identify correct medical terminology and do not represent the Association for Health Documentation Integrity (AHDI) formatting standards.

Check your answers: ³

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Test Your Knowledge

Test your knowledge by answering the questions below:

Endocrine System Reinforcement Activity (Text version)

1. Endocrine glands _____[Blank 1].
 - a. secrete chemical messengers that travel in the bloodstream
 - b. secrete hormones that travel through a duct to the target organs
 - c. release neurotransmitters into the junction between two neurons (synaptic cleft)
 - d. include sebaceous glands and sweat glands
2. Chemical signaling that affects neighboring cells is called _____[Blank 2].
 - a. autocrine
 - b. paracrine
 - c. endocrine
 - d. neuron
3. Graves disease is _____[Blank 3].

- a. a condition marked by a disorder of the pancreas, resulting in high levels of glucose in the blood.
 - b. a condition marked by low levels of thyroid hormones that results in weight gain, cold sensitivity, and reduced mental activity.
 - c. a condition marked by a disorder of the thyroid gland, resulting in hyperthyroidism.
 - d. a condition marked by high levels of thyroid hormones that results in weight loss, profuse sweating, and increased heart rate.
4. In the endocrine system _____[Blank 4].
- a. the distance travelled by hormones is always short
 - b. hormones are secreted into the extracellular fluid
 - c. the response time is always fast
 - d. the glands release their secretions through ducts

Check your answers: ⁴

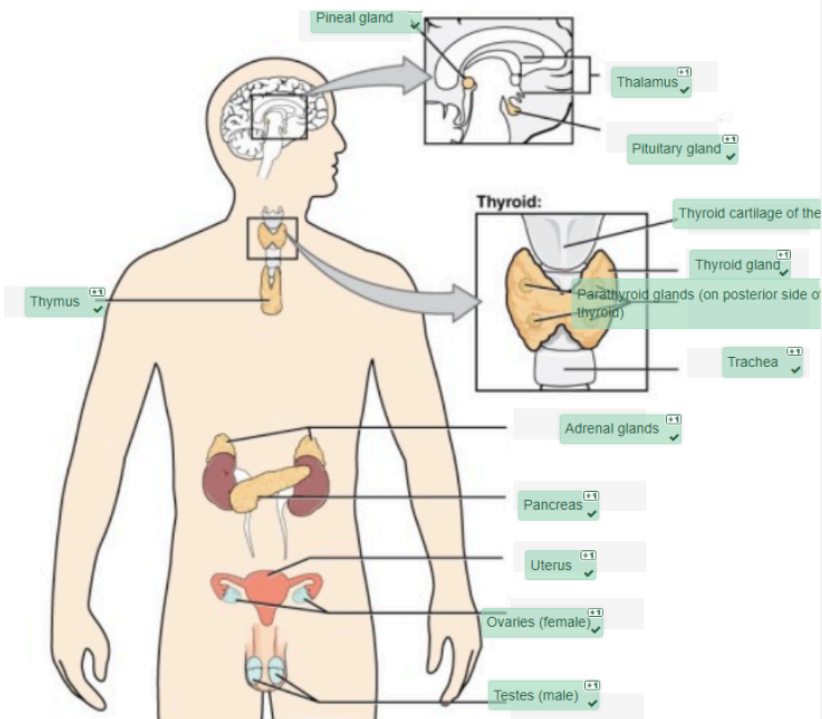
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Notes

Endocrine System Anatomy



1.

Check your answers: Endocrine System Diagram (Text Version) This diagram shows the endocrine glands and cells that are located throughout the body. The endocrine system organs shown from top to bottom include the pea size structure known as the **pineal gland** as well as the primary glandular structure of the endocrine system found enclosed within the **thalamus** known as the **pituitary gland**. The pituitary is located on the anterior side of the thalamus while the pineal gland is located on the posterior side of the thalamus. The **thyroid cartilage of the larynx** is a shield shaped cartilage that forms part of the laryngeal skeleton. The **thyroid gland** is a butterfly-shaped gland that wraps around the **trachea** within the neck. Four small, disc-shaped **parathyroid glands** are embedded into the posterior side of the thyroid. The **adrenal glands** are located on top of the kidneys. The **pancreas** is located at the center of the abdomen. In females, the **uterus** connects the two **ovaries** a by two long, curved, tubes in the pelvic region. In males, the two **testes** are in the scrotum below the penis. One the left side of the diagram and located in the center of the chest is the **thymus**, a glandular structure responsible for the secretion of a hormone called thymosin.

2. 1.palpitations, 2.menstrual, 3.elevated, 4.conjunctival, 5.antibodies, 6.side effects, 7.medications, 8.discontinue
3. 1.diabetes, 2.metabolic, 3.palpitations, 4.neuropathy, 5.congestive, 6.rhythm, 7.pulses, 8.edema, 9.sugars, 10.diuretics, 11.vascular disease
4. 1. a) secrete chemical messengers that travel in the bloodstream, 2. b) paracrine, 3. c) a condition marked by a disorder of the thyroid gland, resulting in hyperthyroidism, 4. b) hormones are secreted into the extracellular fluid,

Instructions

Locate the combining forms (root) from this chapter and include them below. Find medical terms in the chapter which use the combining form as part of the term and list and define them in the space provided below.

Locate chapter words without combining form. List them below.

Locate words from the chapter not built from word parts that you should memorize. List them below.



Scenario - Endocrine

Instructions

Read aloud the following paragraph, paying close attention to the correct pronunciation of each medical term. Use the phonetic spelling provided with the term to guide you. At the conclusion of reading the paragraph and using this document, compose a list of the bolded medical terms and translate their correct meaning. Be sure to number each term in your list.

Scenario:

Elodie is studying for an anatomy and physiology exam on the Endocrine System. She is having problems remembering all the hormones and the eight major glands that produce them. To help her study, Elodie looks up the history of **endocrinology** (ĕn-dō-krĭn-ŌL-ō-jē) and learns that it dates back more than 2,000 years ago. Elodie knows that becoming an **Endocrinologist** (ĕn-dō-krĭ-NŌL-ŏ-jĭst) is not a career path she wants to pursue. Imagine having to go to school 13 years after graduating from high school.

Elodie decided to look at some of the common disorders of the endocrine system to help her study. Elodie knows that diabetes affects how the body uses energy from what a person eats. She also knows that diabetes develops when the pancreas doesn't make enough of a hormone called insulin. According to Elodie's learning objectives, she should study the terms **euglycemia** (ū-glĭ-SĒ-mē-ă), **glycemia** (glĭ-SĒ-mē-ă), **polydipsia** (pol-ē-DIP-sē-ă), **glycosuria** (glĭ-kō-SHOOR-ē-ă), **hyperglycemia** (hĭ-pĕr-glĭ-SĒ-mē-ă), and **hypoglycemia** (hĭ-pō-glĭ-SĒ-mē-ă).

Moving onto the thyroid gland, Elodie just learned the term euglycemia or having a normal level of sugar in the blood. Knowing that the prefix eu- means good, normal, proper, or well, she is able to break the medical term **euthyroid** (ū-THĪ-royd) apart and know that it means a normal functioning thyroid gland. By looking at the term's **hypothyroidism** (hĭ-pō-THĪ-royd-ĭzm) and **hyperthyroidism** (hĭ-pĕr-THĪ-royd-ĭzm), Elodie knows they are conditions in which the thyroid isn't creating and releasing enough thyroid hormone, or the thyroid is creating and releasing too much thyroid hormone.

Four tiny glands make up the parathyroid. Hard to believe something as small as a grain of rice controls the level of calcium in one's body. Elodie knows a little about the parathyroid. Her maternal grandmother was diagnosed with **parathyroidoma** (păr-ă-thĭ-royd-ŏ-MĀ), a rare cancer, that required her grandmother to have a **parathyroidectomy** (păr-ă-thĭ-royd-ĔK-tō-mē).

Elodie decides to study the adrenal gland next. The first condition she sees is **Adrenal hyperplasia** (**ă-drē-NĀL hī-pĕr-PLĀ-zh(ē-)ă**). She learns that this condition is genetic. At this point, Elodie decides it is time for a break and decides to have a hot fudge sundae.

Hormones Matching Activity



(Endocrine)

Hormones Matching Activity - Endocrine

Instructions

Match the function with the correct hormone name.

Function:

1. ___ Hormone produced by the pituitary gland responsible for protein synthesis and tissue building
2. ___ Hormone produced by the pituitary gland that promotes milk production
3. ___ Hormone that stimulates the adrenal cortex
4. ___ Hormone that stimulates the thyroid gland
5. ___ Hormone that aids in metabolism
6. ___ Hormone that helps to increase and maintain the level of calcium in the blood
7. ___ Hormone that reduces the blood calcium level
8. ___ Hormone that stimulates the kidney to reabsorb water and constrict blood vessels to help maintain blood pressure
9. ___ Hormone stimulates the testes in the male and the ovaries in the female
10. ___ Hormone that stimulates the maturation of eggs in the ovaries and sperm in the testes.
11. ___ Hormone that triggers ovulation in women, as well as the production of estrogens and progesterone by the ovaries. Also stimulates production of testosterone by the male testes.
12. ___ Hormone that stimulates development of male secondary sex characteristics and sperm production
13. ___ Hormone that stimulate development of female secondary sex characteristics and prepares the body for childbirth
14. ___ Hormone responsible for uterine contraction during labor, and milk “let down” for breastfeeding
15. ___ Hormone that regulates the electrolyte balance of the body
16. ___ Stress hormones released from the adrenal glands during a dangerous or a frightening situation (fight-or-flight response)

17. ____ Hormone that aids the body during stress by increasing glucose levels to provide energy
18. ____ Hormone secreted by the pancreas for controlling blood sugar and energy absorption; reduces blood glucose levels
19. ____ Hormone that increases blood glucose levels
20. ____ Hormone released from the pineal gland that regulates sleep cycles

Hormones:

- A. Adrenocorticotrophic Hormone (ACTH)
- B. Aldosterone
- C. Antidiuretic Hormone (ADH, also called vasopressin)
- D. Calcitonin
- E. Cortisol
- F. Epinephrine and Norepinephrine
- G. Estrogen and Progesterone
- H. Follicle-Stimulating Hormone (FSH) (a gonadotropic hormone)
- I. Glucagon
- J. Gonadotropic Hormone
- K. Growth hormone (GH)
- L. Insulin
- M. Luteinizing hormone (LH)
- N. Melatonin
- O. Oxytocin
- P. Parathyroid hormone (PTH)
- Q. Prolactin
- R. Testosterone
- S. Thyroid Stimulating Hormone (TSH)
- T. Thyroxine