

# Component I: Core

## Module B: Terminology, Anatomy and Physiology

### Topic 8: Endocrine System

#### Statement of Purpose

To learner with basic knowledge of the endocrine system.

#### Student Learning Outcomes

Upon completion of this topic, the learner will be able to:

1. Spell and define key terms.
2. Differentiate between endocrine and exocrine glands.
3. Discuss the function of hormones.
4. List examples of body functions affected by hormones.
5. Identify the glands of the endocrine system by labeling an anatomical illustration.
6. Explain the function of the pituitary, adrenal, pancreas, and thymus glands.
7. List a hormone associated with each major gland.

#### Terminology

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|--|---------------------------------------|
| 1. Adrenocorticotrophic hormone (ACTH) | 24. Islets of Langerhans              |
| 2. Antidiuretic hormone (ADH)          | 25. Kidneys                           |
| 3. Adrenal                             | 26. Melatonin                         |
| 4. Adrenaline                          | 27. Ovaries                           |
| 5. Amino acids                         | 28. Oxytocin                          |
| 6. Anterior lobe                       | 29. Pancreas                          |
| 7. Antidiuretic hormone                | 30. Parathormone                      |
| 8. Cortisol                            | 31. Parathyroid hormone (PTH)         |
| 9. Ducts                               | 32. Parathyroid                       |
| 10. Endocrine                          | 33. Pineal body                       |
| 11. Epinephrine                        | 34. Pituitary                         |
| 12. Erythropoietin                     | 35. Posterior lobe                    |
| 13. Estrogen                           | 36. Prostaglandin                     |
| 14. Exocrine                           | 37. Progesterone                      |
| 15. Feedback                           | 38. Prolactin                         |
| 16. "Fight or flight" mechanism        | 39. Secrete                           |
| 17. Follicle-stimulating hormone (FSH) | 40. Sperm                             |
| 18. Gonad                              | 41. Testes                            |
| 19. Glycogen                           | 42. Testosterone                      |
| 20. Glucocorticoids                    | 43. Thymus                            |
| 21. Growth hormone                     | 44. Thyroxin                          |
| 22. Hormone                            | 45. Thyroid                           |
| 23. Insulin                            | 46. T-lymphocytes                     |
|  | 47. Thyroid stimulating hormone (TSH) |

#### References

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2. Dennerll, J.T., & Davis, P.E. (2010). *Medical Terminology: A Programmed Systems Approach (10<sup>th</sup> Ed.)*. Clifton Park, NY: Delmar, Cengage Learning.
3. Kronenberger, J., Southard D. L., & Woodson, D. (2012). *Comprehensive Medical Assisting (4<sup>th</sup> Ed.)*. Philadelphia, PA: Lippincott, Williams & Wilkins.
4. Blesi, M., Wise, B.A., & Kelley-Arney, C, (2012) *Medical Assisting Administrative and Clinical Competencies (7<sup>th</sup> Ed.)* Clifton Park, NY: Delmar, Cengage Learning
5. Lindh, W., Pooler, M., Tamparo, C. & Dahl, B., (2013). *Comprehensive Medical Assisting Administrative and Clinical Competencies (5<sup>th</sup> Ed.)*. Clifton Park, NY: Delmar, Cengage Learning.
6. French, L.L., & Fordney, M.T. (2013). *Administrative Medical Assistant (7<sup>th</sup> Ed.)* Clifton Park, NY: Delmar, Cengage Learning.
7. Booth, K.A., Whicker, L.G., Wyman, T.D., & Moaney-Wright, S. (2011). *Medical Assisting: Administrative & Clinical Competencies with Anatomy and Physiology. (4<sup>th</sup> Ed.)*. New York, NY: McGraw-Hill Company, Inc.
8. Proctor, D. B., & Young-Adams, A. P. (2011). *Kinn's The Medical Assistant: An Applied Learning Approach (11<sup>th</sup> Ed.)*. Philadelphia, PA: Saunders Elsevier
9. Larsen, W. (2011). *Computerized Medical Office Procedures: A Worktext Using Medisoft v16 (3<sup>rd</sup> Ed.)*. Philadelphia, PA: Saunders Elsevier.

#### Websites

1. [www.innerbody.com](http://www.innerbody.com)
2. [www.cdc.gov](http://www.cdc.gov)
3. [www.vivo.colostate.edu/hbooks/pathphys/digestion/](http://www.vivo.colostate.edu/hbooks/pathphys/digestion/)
4. [www.merckmanuals.com/professional/pulmonary\\_disorders.html](http://www.merckmanuals.com/professional/pulmonary_disorders.html)
5. [www.lung.org/associations/states/california/](http://www.lung.org/associations/states/california/)
6. [www.stedmansonline.com/index.aspx](http://www.stedmansonline.com/index.aspx)
7. [http://kidshealth.org/parent/general/body\\_basics/kidneys\\_urinary.html](http://kidshealth.org/parent/general/body_basics/kidneys_urinary.html)

Content Outline/Theory Objectives	Suggested Learning Activities
<p><b>Objective 1</b>  <b>Spell and define key terms.</b></p> <ul style="list-style-type: none"> <li>A. Review the terms listed in the terminology section.</li> <li>B. Spell the listed terms accurately.</li> <li>C. Pronounce the terms correctly.</li> <li>D. Use the terms in their proper contexts.</li> </ul>	<ul style="list-style-type: none"> <li>A. Games: word searches, crossword puzzles, Family Feud, Jeopardy, bingo, spelling bee, hangman and concentration.</li> <li>B. Administer vocabulary pre-test and post-test.</li> <li>C. Discuss learning gaps and plan for applying vocabulary.</li> </ul>
<p><b>Objective 2</b>  <b>Differentiate between endocrine and exocrine glands, and then give examples.</b></p> <ul style="list-style-type: none"> <li>A. Endocrine glands have ductless secretions which go directly into capillaries or tissue, e.g., pituitary gland.</li> <li>B. Exocrine glands have ducts which secrete hormones to specific targets, e.g., pancreas.</li> </ul>	<ul style="list-style-type: none"> <li>A. Lecture/Discussion</li> <li>B. Assigned Readings</li> <li>C. Use anatomical diagrams/posters/videos/computer assisted learning/workbook activities.</li> </ul>
<p><b>Objective 3</b>  <b>Discuss the function of hormones.</b></p> <ul style="list-style-type: none"> <li>A. Hormones are chemicals secreted into the blood, carried to cells and affect the functions of cells.</li> <li>B. Steroids, part of the makeup of hormones <ul style="list-style-type: none"> <li>1. Estrogen.</li> <li>2. Progesterone.</li> <li>3. Testosterone.</li> <li>4. Cortisol.</li> </ul> </li> <li>C. Non-steroidal hormones <ul style="list-style-type: none"> <li>1. Made up of amino acids or proteins.</li> <li>2. Attaches to the outside of the cell.</li> </ul> </li> <li>D. Prostaglandins <ul style="list-style-type: none"> <li>1. Local hormones.</li> <li>2. Derived from lipid molecules within organs.</li> <li>3. Find target cells close by like the kidneys, stomach, heart, and brain.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>A. Lecture/Discussion</li> <li>B. Assigned Readings</li> <li>C. Use anatomical diagrams/posters/videos/computer assisted learning/ workbook activities.</li> </ul>
<p><b>Objective 4</b>  <b>List examples of body functions affected by hormones.</b></p> <ul style="list-style-type: none"> <li>A. Growth.</li> <li>B. Skin pigmentation.</li> <li>C. Maturity of the reproductive system.</li> <li>D. Metabolism.</li> <li>E. Electrolyte balance.</li> <li>F. Glucose levels.</li> <li>G. Immunity.</li> </ul>	<ul style="list-style-type: none"> <li>A. Lecture/Discussion</li> <li>B. Assigned Readings</li> <li>C. Use anatomical diagrams/posters/videos/computer assisted learning/workbook activities.</li> </ul>
<p><b>Objective 5</b>  <b>Identify the glands of the endocrine system by labeling an anatomical illustration.</b></p> <ul style="list-style-type: none"> <li>A. Pituitary <ul style="list-style-type: none"> <li>1. Anterior lobe.</li> <li>2. Posterior lobe.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>A. Lecture/Discussion</li> <li>B. Assigned Readings</li> <li>C. Use anatomical diagrams/posters/videos/computer assisted learning/workbook activities.</li> </ul>

<ul style="list-style-type: none"> <li>B. Thyroid.</li> <li>C. Parathyroid.</li> <li>D. Adrenal <ul style="list-style-type: none"> <li>1. Medulla.</li> <li>2. Cortex.</li> </ul> </li> <li>E. Pancreas.</li> <li>F. Thymus.</li> <li>G. Pineal gland.</li> <li>H. Ovaries.</li> <li>I. Testes.</li> </ul>	
<p><b>Objective 6</b>  <b>Explain the function of the pituitary, adrenal, pancreas, and thymus glands.</b></p> <ul style="list-style-type: none"> <li>A. Pituitary gland <ul style="list-style-type: none"> <li>1. Located at the base of the brain and controlled by the hypothalamus.</li> <li>2. Protected by a bony structure.</li> <li>3. Secretes hormones and regulated by feedback mechanism.</li> <li>4. Divided into two lobes, anterior and posterior. <ul style="list-style-type: none"> <li>a. Anterior lobe secretes: <ul style="list-style-type: none"> <li>1) Growth hormone (GH).</li> <li>2) Prolactin (PRL) which stimulates milk production by mammary glands.</li> <li>3) Adrenocorticotrophic hormone (ACTH) which stimulates the adrenal cortex to release its hormones.</li> <li>4) Thyroid stimulating hormone (TSH) which stimulates the thyroid hormone to release its hormones.</li> <li>5) Follicle-stimulating hormone (FSH) which in females stimulates the production of estrogen by the ovaries, maturity of eggs before ovulation. In males it stimulates sperm production.</li> <li>6) Luteinizing hormone (LH), in females, stimulates ovulation (release of egg from the ovaries) and the production of estrogen. In males, it stimulates the productions of testosterone.</li> </ul> </li> <li>b. Posterior lobe secretes: <ul style="list-style-type: none"> <li>1) Antidiuretic hormone (ADH) which stimulates the kidneys to conserve water and helps to maintain blood pressure.</li> <li>2) Oxytocin (OT) causes contractions</li> </ul> </li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>A. Lecture/Discussion</li> <li>B. Assigned Readings</li> <li>C. Use anatomical diagrams/posters/videos/computer assisted learning/workbook activities.</li> <li>D. Use models to illustrate location of glands.</li> <li>E. Describe and discuss the general functions of each endocrine gland.</li> <li>F. Have students find a web site that discusses endocrine conditions.</li> <li>G. Research and discuss how weight management and endocrinology are related.</li> <li>H. Have students create a patient education poster for an aspect of diabetes. Some of the patient education poster subjects could include: <ul style="list-style-type: none"> <li>1. ADA Diets.</li> <li>2. Foot care.</li> <li>3. Blood glucose control.</li> </ul> </li> </ul>

<p style="text-align: center;">of the uterus during childbirth and ejection of milk from mammary glands during breast feeding.</p> <ol style="list-style-type: none"> <li>5. Hormones regulate growth in general.</li> <li>6. Hormones regulate the thyroid and parathyroid glands, the pancreas, gonads and kidneys.</li> <li>7. Hormones regulate metabolism of some basic proteins and fatty acids.</li> </ol> <p>B. Adrenal glands-Cortex</p> <ol style="list-style-type: none"> <li>1. Secretes epinephrine and norepinephrine.</li> <li>2. Provide for “fight or flight” mechanism (sympathomimetic).</li> </ol> <p>C. Adrenal glands-Medulla</p> <ol style="list-style-type: none"> <li>1. Secrete cortisol, aldosterone, androgen and estrogen.</li> <li>2. Increase glucose.</li> <li>3. Control kidney function.</li> <li>4. Regulate water and salt metabolism.</li> <li>5. Cause secondary sexual characteristics.</li> </ol> <p>D. Pancreas</p> <ol style="list-style-type: none"> <li>1. Both endocrine and exocrine gland.</li> <li>2. Considered an exocrine gland because it secretes digestive enzymes into a duct that leads to the small intestine.</li> <li>3. Enzymes include trypsin, lipase, and amylase.</li> <li>4. Considered an endocrine gland because it contains a structure known as the islets of Langerhans that secretes hormones into the blood stream.</li> <li>5. The islets of Langerhans secrete insulin that lowers the blood sugar.</li> <li>6. Promotes the transport of amino acids into cells and increases protein synthesis.</li> <li>7. Produces glucagon, which stimulates the liver to release glycogen, which increases blood sugar levels.</li> </ol> <p>E. Thymus gland</p> <ol style="list-style-type: none"> <li>1. Reacts upon lymphoid tissue to produce “T” lymphocyte cells.</li> <li>2. Develops immune response to certain diseases.</li> </ol>	
<p><b>Objective 7</b>  <b>List a hormone associate with each major gland.</b></p> <p>A. Pituitary</p> <ol style="list-style-type: none"> <li>1. Anterior lobe provides growth hormone.</li> <li>2. Posterior lobe produces antidiuretic hormone (ADH).</li> </ol> <p>B. Thyroid produces thyroxin (T4).</p> <p>C. Parathyroid produces parathormone.</p> <p>D. Pancreas (Islets of Langerhans) produces insulin and glucagon.</p>	<p>A. Lecture/Discussion</p> <p>B. Assigned Readings</p> <p>C. Use anatomical diagrams/posters/videos/computer assisted learning/workbook activities.</p> <p>D. Ask class to discuss scenarios in which:</p> <ol style="list-style-type: none"> <li>1. Pituitary gland was removed.</li> </ol>

<p>E. Adrenal</p> <ol style="list-style-type: none"><li>1. Medulla produces adrenaline.</li><li>2. Cortex produces glucocorticoids.</li></ol> <p>F. Thymus produces thymosin.</p> <p>G. Pineal gland produces melatonin.</p> <p>H. Ovaries produce estrogen.</p> <p>I. Testes produce testosterone.</p> <p>J. Kidneys produce erythropoietin.</p>	<ol style="list-style-type: none"><li>2. Pancreas was injured.</li><li>3. Both testes were removed on a 7 year old.</li><li>4. A nineteen year old woman's ovaries were removed.</li></ol>
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