

## **MODULE 1: ENDOCRINE STRUCTURE AND FUNCTION**

### **Lab 1: Endocrine System**

#### **Exercise 23 – Endocrine System**

Anatomy of the Major Endocrine Organs

Hypothalamus and Pituitary Gland; Adenohypophysis; Neurohypophysis Thyroid Gland

Parathyroid Glands

Pancreas

Adrenal Glands

Gonads

#### **Learning Objectives**

- To identify the classical endocrine glands on a model or diagram
  - Anterior and posterior pituitary glands
  - Thyroid and parathyroid glands
  - Adrenal gland
  - Pancreas
  - Testes
  - Ovaries
- To list the hormones produced by each endocrine gland identified, and discuss the actions of each hormone identified
- To differentiate among the histology of the above glands when viewed on a microscope slide (ie, be able to identify the gland if you saw the tissue on a slide)
  - Distinguish between the anterior and posterior lobes
  - Distinguish among the thyroid follicles, parafollicular cells
  - Identify the zona glomerulosa, zona fasciculata, zona reticularis, and adrenal medulla
  - Identify pancreatic islets
- Describe the relationship between the hypothalamus and the pituitary gland; the pituitary gland and the target gland; the target gland and the hypothalamus / pituitary (ie, describe the nature of the feedback loops that regulate the activity of the hypothalamus, pituitary and endocrine glands)

## Structures of Importance

<b>Pituitary Gland</b>	<b>Adrenal Gland</b>
Anterior and posterior lobes (adenohypophysis and neurohypophysis)	Adrenal cortex: Zona glomerulosa; zona fasciculata; zona reticularis
Basophils and acidophils (if visible)	Adrenal medulla
Infundibulum	
<b>Thyroid Gland</b>	
Follicular and parafollicular cells	
Thyroid follicle	<b>Pancreas</b>
Colloid / thyroglobulin	Islet cells
	Exocrine acini (acinar cells)
<b>Parathyroid Gland</b>	
Oxyphil and chief cells (if visible)	
<b>Ovary</b>	<b>Testis</b>
Vesicular or Graafian follicle	Seminiferous tubule
Antrum	Interstitial cell (Leydig cell)
Ovum	
Primary and primordial follicles	
Medulla and cortex	
*distinguish between oocytes and follicles	

TABLE 1: ENDOCRINE SYSTEM ORGANS		
Structure	Location	Description/Function
Hormones		
Exocrine Glands		
Target Cells		
Pineal Gland		
Pituitary Gland (Hypophysis)		
Anterior Lobe (adenohypophysis)		
Posterior Lobe (neurohypophysis)		
Infundibulum		

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Thyroid Gland		
Lateral lobes		
Medial isthmus		
Follicle Cells		
Colloid		
Parafollicular Cells		
Parathyroid Glands		
Chief cells		
Thymus		

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Pancreas		
Alpha cells		
Pancreatic islets		
Beta Cells		
Delta Cells		
Adrenal Glands		
Outer Cortex		
Inner Medulla		
Zona Glomerulosa		

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Zona Fasciculata		
Zona Reticularis		
Testes		
Seminiferous Tubules		
Interstitial Cells		
Ovaries		

TABLE 2: HORMONES AND THIER EFFECTS		
Organ	Hormones Produced	Effect of Hormones
Pineal Gland	Melatonin	
Pituitary Gland (Adenohypophysis)	Follicle-stimulating hormone (FSH)	

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	Luteinizing hormone (LH)	
	thyroid-stimulating hormone (thyrotropin) (TSH)	
	Adrenocorticotrophic hormone (ACTH)	
	Prolactin (PRL)	
	Growth Hormone (GH)	
<b>Pituitary Gland (Neuropophysis)</b>	Antidiuretic Hormone (ADH)	
	Oxytocin	
<b>Thyroid Gland (Colloid)</b>	Triiodothyronine (T3)	
	Thyroxine (T4)	

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	Calcitonin	
<b>Parathyroid Gland</b>	Parathyroid Hormone (PTH)	
<b>Thymus</b>	Thymosin	
<b>Pancreas</b>	Insulin	
	Glucagon	
	Somatostatin	
<b>Adrenal Gland (cortex)</b>	Corticosteroid Hormones	
<b>Adrenal Gland (zona glomerulosa)</b>	Mineralocorticoids (aldosterone)	
<b>Adrenal Gland (zona fasciculata)</b>	Glucocorticoids (cortisol/hydrocortisone)	



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<b>Adrenal Gland (zona reticularis)</b>	Glucocorticoids (cortisol/hydrocortisone)	
	Dehydroepiandrosterone (DHEA)	
<b>Adrenal Gland (Medulla)</b>	Epinephrine	
	Norepinephrine	
<b>Testes</b>	Testosterone	
	Inhibin	
<b>Ovaries</b>	Estrogen	
	Progesterone	
	Inhibin	

You should also be able to answer the following questions:

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1. What is the general name for the types of organs that produce hormones?
2. What name is given to cells or tissues receptive to hormones?
3. Melatonin is secreted by what gland?
4. Where is ADH stored?
5. What is the effect of TSH, and where is it produced?
6. What connects the two lobes of the thyroid gland?
7. Does parathormone increase or decrease calcium levels in the blood?
8. What does glucagon do as a hormone, and where is it produced?
9. Which hormones in the adrenal gland control water and electrolyte balance?
10. What is the primary gland that secretes epinephrine?
11. Where is growth hormone produced?
12. What is another name for T3?
13. Label the endocrine glands indicated in the following illustration. (See Lab Manual p. 379)
14. Identify the parts of the pituitary as seen in the following illustration and label two hormones located in each. (See Lab Manual p. 380)

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15. Identify the three layers of the adrenal cortex as illustrated and list the hormones produced by each layer. (See Lab Manual p. 380)
16. Interstitial cells produce which hormone?
17. What structures are responsible for the production of estrogen?

Hormone Flow Chart



