

**Lincoln Memorial University**  
**Caylor School of Nursing**  
**NURS 241**  
**Spring 2010**

**TITLE:**        **Nursing Strategies: Alterations of Endocrine Function**

**DATES:**       **See Syllabus**

**TIMES:**       **See Syllabus**

**OBJECTIVES:**     Upon completion of this unit, the student will be able to demonstrate, in the clinical/campus laboratory setting, in individual and group conferences and on written material the ability to:

1.     Using the four adaptive modes of Roy's Adaptation Model (RAM), recognize human adaptive responses to behavior or stimuli that affect endocrine function.
2.     Describe the parameters appropriate for determining the status of endocrine functioning including the characteristics and functions of hormone and the basic regulatory mechanisms of hormones.
3.     Describe the pathophysiology, clinical manifestations, management and associated use of the RAM nursing process to provide care for adults with alterations of the pituitary, thyroid, parathyroid, and adrenal glands.
4.     Identify the physical and psychosocial discharge planning needs of adults with compromised endocrine functioning.
5.     Explain how the following diagnostic tests are performed, pre- and post-test nursing responsibilities, and recognize the implications of abnormal results:
  - a.     Resin T3 Uptake
  - b.     T3, T4, TSH
  - c.     radioactive iodine uptake
  - d.     total serum calcium
  - e.     ACTH test
  - f.     thyroid scan
  - g.     water deprivation test
6.     Describe the surgical procedures, postoperative nursing care, postoperative complications, and discharge planning needs of adults undergoing surgery of the pituitary, thyroid, parathyroid, and adrenal glands.
7.     Identify the stimuli of emotional stress and its relationship to the adult with endocrine disorders.
8.     Identify the stimuli and behaviors which are common to endocrine disorders: hypopituitarism, hyperpituitarism, hypothyroidism, hyperthyroidism, hypoparathyroidism, hyperparathyroidism, Addison's disease, and Cushing's disease.
9.     Identify the medications on the drug list by generic name, classification, mechanism of action, clinically significant side effects, normal dosage, and nursing implications and be able to correctly calculate IV, IM and oral dosages.

## TOPICAL OUTLINE

### Review Diabetes from NURS 125 – content will be included on this unit exam!!

- I. Anatomic and physiologic review - general brief overview of hormone function and regulation
- II. Health history and physical assessment
- III. Diagnostic evaluation
- IV. Nursing care of adults with disorders of the pituitary gland
  - A. Anatomy and physiology overview of the pituitary gland
    1. Posterior pituitary hormones
      - a. Vasopressin (ADH)
    2. Anterior pituitary hormones
      - a. Adrenocorticotropic hormone (ACTH)
      - b. Thyroid-stimulating hormone (TSH)
  - B. Disorders of the pituitary gland
    1. Hypopituitarism – diabetes insipidus
    2. Hyperpituitarism – SIADH
    3. Pituitary tumors – Transsphenoidal Hypophysectomy
- V. Nursing care of adults with disorders of the thyroid gland
  - A. Anatomy and physiology overview of the thyroid gland
    1. Thyroid hormones--thyroxine (T<sub>4</sub>) and triiodothyronine (T<sub>3</sub>)
    2. Calcitonin
  - B. Disorders of the thyroid gland
    1. Hypothyroidism
    2. Hyperthyroidism – Grave’s Disease (Thyroid storm, thyroiditis)
    3. Thyroid cancer - (Thyroidectomy)
- VI. Nursing care of adults with disorders of the parathyroid gland
  - A. Anatomy and physiology overview of the parathyroid gland
    1. Parathyroid hormone or parathormone
  - B. Disorders of the parathyroid gland
    1. Hypoparathyroidism
    2. Hyperparathyroidism
- VII. Nursing care of adults with disorders of the adrenal gland
  - A. Anatomy and physiology overview of the adrenal gland
    1. Adrenal medulla hormones- catecholamines
      - a. Epinephrine
      - b. Norepinephrine
    2. Adrenal cortex hormones
      - a. Glucocorticoids
      - b. Mineralcorticoids

- B. Disorders of the adrenal gland
  - 1. Adrenal Medulla - Pheochromocytoma
  - 2. Adrenal Cortex
    - a. Adrenocortical insufficiency - Addison's disease
    - b. Adrenocortical excess - Cushing's syndrome (Adrenalectomy)
- C. Corticosteroid therapy

**REQUIRED READINGS:**

Kee, J. L., Hayes, E.R., & McCuiston, L.E. (2009). *Pharmacology: A nursing process approach (Ed 6)*. St. Louis: Mosby. Ch 50 pp. 769-788, 51 pp. 789-804.

Smeltzer, S.C., Bare, B.G., Hinkle, J.L. and Cheever, K. H. (2008). *Brunner & Suddarth's Medical surgical nursing. (Ed 11)*. Philadelphia: Lippincott, Williams & Wilkins. Ch 42, 61 p. 2189-2190.

Wissmann, J. (Ed.). *Adult Medical –Surgical Nursing: Content mastery series review module (Ed 7.1)*. Kansas City, MO: Assessment Technologies Institute, LLC. Ch 51-58; review 59-60.

**CLINICAL SKILLS:**

1. Identify potential endocrine/metabolic abnormalities utilizing appropriate assessment skills.
2. Manage care for selected clients experiencing commonly occurring alterations in endocrine function.

**VOCABULARY LIST:**

See p. 1440: Glossary of Terms

**DRUG LIST:**

Desmopressin (DDAVP)	Mithramycin
Vasopressin tannate in oil	Calcitonin
Clofibrate	Etidronate (Didronel)
Chlopropamide (Diabinese)	Pamidronate (Aredia)
Thiazide diuretics	Calcium gluconate
Levothyroxine (Synthroid, Levothroid)	Phentolamine (Regitine)
Radioisotope iodine 131 (I 131)	Sodium nitroprusside (Nipride)
Propylthiouracil (PTU)	Nifedipine (Procardia)
Methimazole (Tapazole)	Hydrocortisone (Solu-Cortef)
Liothyroxine (Cytomel)	Cortisone
Sodium iodine	Prednisone
Potassium iodine	Prednisolone
Saturated solution of potassium iodine (SSKI)	Methylprednisolone (solu-Medrol)
Dexamethasone (Decadron)	Beclomethasone (Vancenase)
Propranolol (Inderal)	

# OVERVIEW OF ENDOCRINE HORMONES

## **1. POSTERIOR PITUITARY (neurohypophysis)**

- smaller
- stores and secretes 2 hormones (**only covering one**)

### **ADH - Antidiuretic Hormone {Diabetes insipidus, SIADH}**

causes renal and collecting tubules to be more permeable to water altering urine concentration

## **2. ANTERIOR PITUITARY secretes 6 hormones TSH, FSH, LH, Prolactin GH, ACTH – We are only covering the following:**

### **ACTH - Adrenocorticotrophic Hormone (corticotropin)**

- adrenal cortex to produce glucocorticoids (cortisol)
- **3 Factors regulate ACTH secretion**
  1. circulating cortisol levels (negative feedback)
  2. stress
  3. diurnal variation (circadian rhythm)
    - > cortisol levels peak at 8AM
    - > lowest point 9PM - 12MN

**TSH - Thyroid Stimulating Hormone (thyrotropin)** –stimulates thyroid gland to release T3 / T4 (thyroid hormone)

## **3. THYROID GLAND {Hyper/hypothyroidism}**

below larynx, in front of trachea - butterfly shape  
- 2 lobes joined by isthmus - highly vascular

**T3 (triiodothyronine)  T4 (thyroxine)** (together called thyroid hormone)

metabolic function of all body tissue

- rate of nutrient use
- CV function / GI function
- mental processes
- accelerate growth in children
- activity of other endocrine glands

**calcitonin** (thyrocalcitonin) - also produced by parathyroid gland

- inhibits calcium loss from bone
- renal excretion of calcium
- serum calcium levels

#### **4. PARATHYROID GLANDS {Hyper/hypoparathyroidism}**

- usually 4 glands below larynx, in front of trachea
- imbedded in 4 corners of thyroid

**PTH (parathyroid hormone /parathormone)** (opposite of calcitonin)

- promotes loss of calcium from bone
- kidney excretion of calcium
- serum calcium levels

#### **5. ADRENAL GLANDS**

**ADRENAL MEDULLA {Pheochromocytoma}**

- smaller inner portion of the adrenal gland which produces catecholamines, also produced as neurotransmitters in the nervous system

**epinephrine (adrenalin) & norepinephrine (noradrenalin)**

ANS stimulation-fight or flight response

**ADRENAL CORTEX**

- larger outside portion

**glucocorticoids (cortisol) {Cushings, Addison's disease}**

- help maintain F/E balance thru sodium & water retention and K<sup>+</sup> excretion
- promote protein and fat breakdown to glucose alter glucose metabolism to increase it during stress
- suppress inflammatory & immune responses
- are critical for body's response to stress

**mineralocorticoids (aldosterone) {Primary Aldosteronism}**

- stimulates renin-angiotensin system in kidneys
- aldosterone acts on renal tubules which leads to reabsorption and retention of Na<sup>+</sup> and excretion of K<sup>+</sup>
- Factors controlling aldosterone release - Main control thru  angiotensin II

# ENDOCRINE CONCEPT MAP

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