

PHARMACOLOGY NOTES

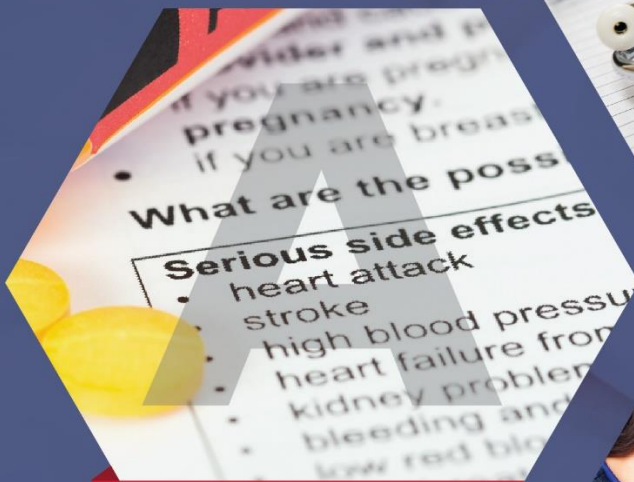
NURSING IMPLICATIONS FOR
CLINICAL PRACTICE



Administration



Therapeutic Effects



Adverse Effects



Teaching

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PHARMACOLOGY NOTES

NURSING IMPLICATIONS FOR CLINICAL PRACTICE

Overview

There are currently nine (9) units comprising this *Pharmacology Notes* resource. Units are broken down by body system and published individually for ease of retrieval:

Unit A: Autonomic Nervous System (ANS) Pharmacology

Unit B: Cardiovascular (CV) System Pharmacology

Unit C: Hematological System Pharmacology

Unit D: Central Nervous System (CNS) Pharmacology

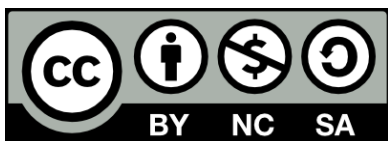
Unit E: Skeletal System: Bone and Joint Pharmacology

Unit F: Immune System Pharmacology

Unit G: Digestive System Pharmacology

Unit H: Endocrine System Pharmacology

Unit I: Respiratory System Pharmacology



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UNIT H

ENDOCRINE SYSTEM PHARMACOLOGY

Table of Contents

Endocrine Pharmacology

Anatomy and Physiology/Pathophysiology Review

Major Endocrine Organs

Functions of Select Hormones

Relationship of Endocrine Disorders to Glands and Hormones

Pharmacology

Pharmacologic Connections for Endocrine Drugs

Drug Classes: A-T-A-T

(MC) Major Class or Therapeutic Class (SC) Subclass or Pharmacologic Class (SSC) Selective Subclass – more specific action within Subclass

(MC) Hypothalamic Agents

(MC) Anterior Pituitary Agents

(MC) Posterior Pituitary Agents

(MC) Thyroid Hormones

(MC) Antithyroid Agents

(MC) Parathyroid Agents

(MC) Corticosteroids

(MC) Hyperglycemics

(MC) Hypoglycemics or Antidiabetic Agents

(MC) Female Sex Hormones

(MC) Oxytocics

(MC) Tocolytics

(MC) Male Sex Hormones

(MC) Erectile Dysfunction Agents

(MC) Antiprostatic Agents

Endocrine System Pharmacology

I. ANATOMY AND PHYSIOLOGY/PATHOPHYSIOLOGY REVIEW

A. Major Endocrine Organs

1. Hypothalamus
2. Pituitary Gland: Anterior and Posterior
3. Thyroid Gland
4. Parathyroid Gland
5. Adrenal Gland: Cortex and Medulla
6. Pancreas
7. Ovaries
8. Testes

B. Functions of Select Hormones

1. Growth Hormone:
 - a. Growth of cells, bones, and soft tissues
 - b. Affects CHO, protein, and fat metabolism
 - c. Increases blood glucose
 - d. Increases protein synthesis
 - e. Increases lipolysis
 - f. Increases fluid/electrolyte retentions
2. Antidiuretic Hormone (ADH):
 - a. Major regulator of osmolality and body water volume
 - b. Increases water reabsorption
 - c. Stimulates water intake by stimulating perception of thirst
3. Thyroxine (T₄) and Triiodothyronine (T₃):
 - a. Regulates metabolic rate
 - b. Regulates protein, fat, CHO catabolism
 - c. Regulates body heat production
 - d. Insulin antagonist → increases blood glucose
 - e. Maintains cardiac rate, force, output
 - f. Affects respiratory rate and oxygen utilization
 - g. Regulates SNS activity
 - h. Maintains calcium mobilization
 - i. Affects RBC production
4. Parathormone:
 - a. Regulates serum calcium levels

5. Cortisol:
 - a. Maintains blood glucose – gluconeogenesis
 - b. Increases protein catabolism
 - c. Promotes lipolysis
 - d. Antiinflammatory/immunosuppression
 - e. Degrades collagen/decreases scar tissue formation
 - f. Increases RBC formation and platelet formation
 - g. Increases gastric acid and pepsin production
 - h. Promotes sodium and water retention
 - i. Maintains emotional stability
6. Glucagon:
 - a. Promotes gluconeogenesis
 - b. Promotes glycogenolysis
7. Insulin:
 - a. Glucose transport – brings glucose into the cells from the blood for use
 - b. Promotes glucose storage as glycogen
8. Amylin:
 - a. ↓ glucagon secretion
 - b. ↓ gastric emptying
 - c. ↑ satiety leading to ↓ caloric intake
9. Incretin:
 - a. ↑ insulin secretion
 - b. ↓ glucagon secretion
 - c. Slows gastric emptying
10. Follicle-Stimulating Hormone (FSH):
 - a. Stimulates follicles in ovaries to mature (oocytes) phase
 - b. Secrete estrogen
11. Luteinizing Hormone (LH):
 - a. Promotes follicle to rupture → transformed into corpus luteum
 - b. Secrete progesterone
12. Estrogen:
 - a. Promotes growth in tissues related to reproduction (enlarges fallopian tubes, uterus, vagina, breasts, and external genitalia) → appearance of secondary sex characteristics
 - b. Proliferation of endometrial lining of uterus – nourishes ovum during pregnancy
 - c. Promotes bone formation; ↓ bone loss
 - d. ↑ HDL
 - e. ↓ LDL
 - f. Enhances blood coagulation

13. Progesterone:

- a. Maintains endometrial lining of uterus
- b. Promotes development of milk-producing cells
- c. Reduces uterine contractility
- d. Supports pregnancy
- e. ↑ LDL
- f. ↓ HDL
- g. ↑ insulin levels

14. Oxytocin:

- a. Promotes uterine contraction
- b. Causes milk to be ejected ('let down') from mammary glands

15. Testosterone:

- a. Androgenic effects: development of male sexual characteristics → reproduction
- b. Anabolic effects: protein synthesis – (+) nitrogen balance → stimulates tissue building; reverses tissue depletion

C. Relationship of Endocrine Disorders to Gland and Hormone

↑ = hormone excess

↓ = hormone deficiency

Gland	Hormone	Endocrine Disorders
pancreas	insulin	↑ hypoglycemia ↓ hyperglycemia = diabetes mellitus (DM)
anterior pituitary	growth hormone	↑ acromegaly/gigantism ↓ dwarfism
posterior pituitary	antidiuretic hormone (ADH)	↑ syndrome of inappropriate ADH (SIADH) ↓ diabetes insipidus (DI)
thyroid	triiodothyronine (T ₃) and thyroxine (T ₄)	↑ hyperthyroidism (Grave's) ↓ hypothyroidism (myxedema)
parathyroid	parathormone	↑ hyperparathyroidism/hypercalcemia ↓ hypoparathyroidism/hypocalcemia
Adrenal cortex	cortisol	↑ Cushing's disease/syndrome ↓ Adrenal insufficiency/Addison's Disease
Adrenal medulla	catecholamines	↑ pheochromocytoma ↓ Ø

II. PHARMACOLOGY

A. Pharmacologic Connections for Endocrine Drugs

1. Purposes of Drug Agents:
 - a. **Replace** to restore normal hormonal function with natural or synthetic sources
 - b. **Negate** to restore normal hormonal function by:
 - 1) inhibiting production or synthesis of a hormone
 - 2) inhibiting hormonal action(s)
 - c. **Exaggerate** one or more of a hormone's normal function(s) for another condition
2. Relationship of Endocrine Agents (replacements vs. antagonists) and Management of Endocrine Disorders (hypofunction/deficiency vs. hyperfunction/excess)

Type of Agent	Pharmacotherapeutics (Clinical Uses)	Therapeutic Effects	Adverse Effects "Too much of a good thing"
Hormone Replacement	<u>HYP</u> O – Function of target gland → <u>HYP</u> O – Secretion of hormones	↑ Hormonal functions → restore normal function	<u>HYP</u> ER – Excessive function from ↑ hormonal levels (medications used as replacements provide exogenous source to body)
Hormone Antagonists (Anti-)	<u>HYP</u> ER – Function of target gland → <u>HYP</u> ER – Secretion of hormones	↓ Hormonal functions → ↓ s/sx → return to normal function	<u>HYP</u> O – Reduce function by inhibiting either synthesis or secretion of hormones <u>too</u> much

3. Additional Points for Endocrine Drugs:
 - a. Produces widespread effects → administration of one hormone may alter the effects of other hormones
 - b. Most hormonal agents are contraindicated during pregnancy due to effects on the fetus

Nursing Implications: Endocrine Pharmacology: Hypothalamic and Pituitary Agents

Major Class	MOA	Prototype – generic	Prototype – trade	A – Admin	T – ✓ Therapeutic Effects – General (MC)	A – ✓ Adverse Effects – General (MC)	A – ✓ Adverse Effects – Specific (SC)	T – Teaching – General (MC)	T – Teaching – Specific (SC)
Hypothalamic agents	Gonadotropin-releasing hormone (GnRH) agonist → desensitizes receptors ⇒ initial ↑ then, ↓↓ LH & FSH (sex hormone suppression)	leuprolide	Eligard, Lupro Depot	Route: IM Duration: 1,2,3,4 month Contra-indications: • pregnancy	<ul style="list-style-type: none"> • + response (↓ growth) of advanced prostate cancer • ↓s/sx endometriosis: <ul style="list-style-type: none"> ○ ↓uterine wall thickening ○ ↓bleeding w/ menstrual cycles ○ ↓pelvic pain & cramping ○ ↓pain w/ intercourse • Normal puberty/sexual development 		<ul style="list-style-type: none"> • Injection site: redness/burning/stinging/pain/bruising • CNS: dizziness, HA, pain, rare: seizures • CV: peripheral edema, MI • GI: N/V/A/C • GU: urinary frequency, hematuria • Endo: hot flashes, ↑ sweating 		<ul style="list-style-type: none"> • Safety re: osteoporosis risk • Teach re: proper administration • ✓ labs: F/E, CBC • ✓ weight • Support for body changes • Report: △ mood/depression, CNS △'s, difficulty voiding
Anterior Pituitary agents	Growth hormone (GH) replacement (SC)	somatropin	Genotropin, Nutropin	Route: SQ/IM	<ul style="list-style-type: none"> • ↓s/sx dwarfism or ↑effects of GH 		GH excess or acromegaly: <ul style="list-style-type: none"> • hyperglycemia • hypothyroidism • bone pain • HA • visual △'s 		<ul style="list-style-type: none"> • Proper injection technique • ✓ G&D, growth plateaus, • Report adverse effects • Provide emotional support
	Growth hormone antagonist (SC) – acts directly on post-synaptic dopamine receptors in brain	bromocriptine mesylate octreotide	Parlodel, Cucloset Sandostatin	Route: PO Route: IM/SQ Contraindications: pregnancy, other endocrine disorders	<ul style="list-style-type: none"> • ↓s/sx acromegaly or ↓effects of GH • ↓s/sx Parkinson's dz • Restore menstrual cycles → ↑fertility • ↓incidence of acute GI/variceal bleeding • ↓s/sx carcinoid tumors (i.e. ↓ diarrhea) 		<ul style="list-style-type: none"> • CNS: dizziness, fatigue, drowsiness, HA • GI: N/V/D/C, abd cramping, gallbladder abnormalities • △ BG levels • Endo: hypothyroidism • CV: sinus bradycardia 		<ul style="list-style-type: none"> • Safety – move to standing slowly • Give meds. w/ food • Teach re: injection technique • ✓ blood glucose

Major Class	MOA	Prototype – generic	Prototype – trade	A – Admin	T – ✓ Therapeutic Effects – General (MC)	A – ✓ Adverse Effects – General (MC)	A – ✓ Adverse Effects – Specific (SC)	T – Teaching – General (MC)	T – Teaching – Specific (SC)
Posterior Pituitary agents	ADH replacement	desmopressin vasopressin	DDAVP, Stimate Vasopstrict	Route: IV/IM /IN ✓ vs – BP	<ul style="list-style-type: none"> • ↓s/sx diabetes insipidus or ↓ UO: <ul style="list-style-type: none"> ○ ↑specific gravity ○ improved fluid & electrolyte balance (↓Na⁺) • Maintain BP & FV post-op/shock 	ADH excess or SIADH: <ul style="list-style-type: none"> • water excess • hyponatremia • neuro △'s 	Route – related: <ul style="list-style-type: none"> • tenderness at injection sites • nasal dryness/irritation 	<ul style="list-style-type: none"> • ✓ weight, I/O • ✓ specific gravity • ✓ electrolytes, esp. Na⁺ 	<ul style="list-style-type: none"> • Route injection sites • Route nares

Nursing Implications: Endocrine Pharmacology: Thyroid and Parathyroid Agents

Major Class	MOA	Prototype – generic	Prototype – trade	A – Admin	T – ✓ Therapeutic Effects – General (MC)	A – ✓ Adverse Effects – General (MC)	A – ✓ Adverse Effects – Specific (SC)	T – Teaching – General (MC)	T – Teaching – Specific (SC)
Thyroid agents	T ₃ , T ₄ replacement	levothyroxine desiccated thyroid	Synthroid, Levotheroid	Route: PO ✓ vs - HR	<ul style="list-style-type: none"> ↓ s/sx hypothyroidism (myxedema) or ↑ metabolism 	<ul style="list-style-type: none"> S/sx thyroid excess or hyperthyroidism 		<ul style="list-style-type: none"> ✓ thyroid fn. – T₃, T₄ levels lifelong tx 	<ul style="list-style-type: none"> ✓ HR daily
Antithyroid agents	Blocks thyroid hormone synthesis by blocking combination of iodine + tyrosine	propylthiouracil methimazole	PTU Tapazole	Route: PO, 3x/day; up to 40 yo PO, 1x/day	<ul style="list-style-type: none"> ↓ s/sx hyperthyroidism (Grave's Dz) or ↓ metabolism 	<ul style="list-style-type: none"> S/sx hypothyroidism 	<ul style="list-style-type: none"> Blood dyscrasias Hepatotoxicity Preg. risk cat.=D 	<ul style="list-style-type: none"> ✓ thyroid fn.- T₃, T₄ levels 	<ul style="list-style-type: none"> ✓ CBC esp. WBCs – watch for fever ✓ AST, ALT Contraception
	Radiation destroys thyroid tissue → ↓ hormone production	radioactive iodine	¹³¹ I	Route: PO, one-time dose; >40 yo			<ul style="list-style-type: none"> Radioactive body secretions BMD Preg. risk cat.=X 		<ul style="list-style-type: none"> Radiation precautions ✓ CBC Contraception
	Large doses of iodine inhibit thyroid secretion	strong iodine solution	Logol's solution	Route: PO, 3x/day; short-term use			<ul style="list-style-type: none"> Iodism (mucous membranes) 		<ul style="list-style-type: none"> Diet restriction of iodized salt
Anti-hypocalcemics	↓ parathormone levels <ul style="list-style-type: none"> Vit. D stimulates calcium absorption from intestine 	calcitriol	Rocaltrol	Route: PO	<ul style="list-style-type: none"> ↑ Ca⁺⁺ WNL ↓ s/sx hypocalcemia or tetany Prevention of osteoporosis 	<ul style="list-style-type: none"> S/sx hypercalcemia – ↓ N-M irritability; Hepatotoxicity 		Refer to Bone Pharmacology: <ul style="list-style-type: none"> ✓ diet safety exercise ✓ electrolytes 	<ul style="list-style-type: none"> Take as directed Watch for complication of hypercalcemia (renal calculi) Dietary sources of calcium Report: s/sx liver toxicity
Anti-hypercalcemics	↓ bone resorption	alendronate	Fosamax	Route: PO Timing: take on empty stomach; do <u>not</u> take before HS	<ul style="list-style-type: none"> ↓ Ca⁺⁺ WNL ↓ s/sx hypercalcemia Ø progression of osteoporosis – ↑ bone density 	<ul style="list-style-type: none"> S/sx hypocalcemia 	<ul style="list-style-type: none"> GI: esophageal irritation 		<ul style="list-style-type: none"> Sit upright or ambulate after taking for ~30 minutes Drink w/ full glass of water

Major Class	MOA	Prototype – generic	Prototype – trade	A – Admin	T – ✓ Therapeutic Effects – General (MC)	A – ✓ Adverse Effects – General (MC)	A – ✓ Adverse Effects – Specific (SC)	T – Teaching – General (MC)	T – Teaching – Specific (SC)
Corticosteroids	Mimics cortisol <ul style="list-style-type: none"> • replacement • exaggerate anti-inflammatory & immune suppressive effects 	prednisone methyl-prednisolone	Deltasone Solu-Medrol	Route: PO/IV, bolus Frequency: daily → every 6-12 hrs Timing: AM	<ul style="list-style-type: none"> • ↓ s/sx adrenal insufficiency • ↓ s/sx inflammation/immunosuppression <ul style="list-style-type: none"> ○ e.g. COPD, Arthritis, Crohn's dz ○ organ transplants, autoimmune dz 	<ul style="list-style-type: none"> • Cushing's Dose – & duration-dependent • CV: fluid retention, edema, HTN • Electrolytes: ↑Na, ↓K+, ↑Ca, ↑BG • CNS: mood swings • GI: N/V, GI bleed • MS: ↑bone resorption • Skin: paper thin, bruises, infections, delayed healing • Adrenal-insufficiency 		<ul style="list-style-type: none"> • ✓ diet • ✓ safety-skin • ✓ injury & infection prevention • ✓ electrolytes • Tapering • Weigh self • Use other meds for adverse effects 	
Hyperglycemics	Mimics glucagon	glucagon	GlucaGen	Route: SQ/IM/IV, ✓ BG	<ul style="list-style-type: none"> • ↑ BG • ↓ s/sx of hypoglycemia 	<ul style="list-style-type: none"> • Hyperglycemia 	<ul style="list-style-type: none"> • N/V → aspiration 	<ul style="list-style-type: none"> • ✓ BG • Injection technique 	<ul style="list-style-type: none"> • Aspiration precautions • DM management
Hypoglycemics or Antidiabetic agents	exogenous insulin	insulins	**Know types (rapid-, short-, intermittent-, and long-acting)	Route: SQ/IM/IV, ✓ BG	<ul style="list-style-type: none"> • ↓ BG • Hbg_{A1C} < 6–6.5 • ↓ s/sx of hyperglycemia: <ul style="list-style-type: none"> Ø polyuria, Ø polydipsia, Ø polyphagia 	<ul style="list-style-type: none"> • Hypoglycemia 	<ul style="list-style-type: none"> • Lipohypertrophy • Somogyi effect 	<ul style="list-style-type: none"> • ✓ BG ac/HS • Timing • Diet • Exercise 	<ul style="list-style-type: none"> • Injection technique • Sliding scale coverage • Storage

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Hypoglycemics: Oral Hypoglycemics				Route: PO ✓ timing ✓ BG	<ul style="list-style-type: none"> • ↓ BG • HbgA1C < 6–6.5 • ↓ s/sx of hyperglycemia: Ø polyuria, Ø polydipsia, Ø polyphagia 	(See previous page)		(See previous page)	<ul style="list-style-type: none"> • Avoid ETOH • F/U lab: liver function tests, electrolytes • Sun protection • Drug-drug interactions
<ul style="list-style-type: none"> • 1st generation sulfonylureas • 2nd generation sulfonylureas 	<ul style="list-style-type: none"> • ↑insulin sensitivity • ↑insulin secretion • ↑# of insulin receptors 	chlorpropamide glipizide glyburide	Diabinese Glucotrol DiaBeta, Micronase				<ul style="list-style-type: none"> • Weight gain 		
• Biguanides	<ul style="list-style-type: none"> • ↓glucose production & ↑glucose uptake; • ↓hepatic glucose production 	metformin	Glucophage				<ul style="list-style-type: none"> • GI: N/V/D/A, Vit. B deficiency • Acid-base: lactic acidosis 		
• Meglitinides	<ul style="list-style-type: none"> • ↑ insulin release 	repaglinide	Prandin				<ul style="list-style-type: none"> • Weight gain 		
• Thiazolidinediones (TZD)	<ul style="list-style-type: none"> • ↓insulin resistance; • ↑glucose uptake; • ↓glucose production 	pioglitazone	Actos				<ul style="list-style-type: none"> • CV risk-fluid retention, ↑LDL • Hepatotoxicity 		
• alpha-glucosidase inhibitors	<ul style="list-style-type: none"> • Inhibits enzyme that breaks down glucose → delays glucose/CHO absorption 	acarbose	Precose				<ul style="list-style-type: none"> • GI: abd. distention, cramping, diarrhea, gas • Anemia • Hepatotoxicity 		
• dipeptidyl peptidase -4 inhibitors	<ul style="list-style-type: none"> • Slows breakdown of GLP-1 → ↑ effects of incretin 	sitagliptin	Januvia				<ul style="list-style-type: none"> • Well tolerated 		

Major Class	MOA	Prototype – generic	Prototype – trade	A – Admin	T – ✓ Therapeutic Effects – General (MC)	A – ✓ Adverse Effects – General (MC)	A – ✓ Adverse Effects – Specific (SC)	T – Teaching – General (MC)	T – Teaching – Specific (SC)
Other hypo-glycemic (new) • amylin mimetic	Mimics amylin • ↓glucagon secretion • ↓gastric emptying • ↑satiety • ↑insulin secretion	pramlintide	Symlin	Route: SQ • ✓BG` Timing: immediately āc Contraindications: alcoholism, osteoporosis	(See previous page)	(See previous page)	• Local reaction at injection site	(See previous page)	<ul style="list-style-type: none"> • Do <u>not</u> give w/ insulin • Prefilled injector pens
• incretin mimetic	Mimics incretin-glucagon-like poly-peptide (GLP-1) • ↑insulin release • ↓glucagon release • ↓GI emptying	exenatide	Byetta	Contraindications: bowel dz			• Pancreatitis		
• sodium-glucose cotransporter 2 (SGLT-2) inhibitors	Inhibits SGLT-2 in proximal tubule → ↓glucose reabsorption & ↑glucose excretion	canagliflozin	Invokana	Route: PO Contraindications: renal impairment			<ul style="list-style-type: none"> • FE: dehydration, hyperkalemia • Acid-base: ketoacidosis • GU: genital infections 		<ul style="list-style-type: none"> • ✓ CBC, electrolyte, BUN, Cr, EGFR • Timing: take in AM • Encourage fluids • Report: s/sx UTI, or genital infections

Nursing Implications: Endocrine Pharmacology: Reproductive Agents: Female

Major Class	MOA	Prototype – generic	Prototype – trade	A – Admin	T – ✓ Therapeutic Effects – General (MC)	A – ✓ Adverse Effects – General (MC)	T – Teaching – General (MC)
Female Sex Hormones = estrogen & progesterone	Mimics effects of estrogen	conjugated estrogens	Cenestin, Enjuvia, Premarin	Route: PO – daily ; long-term prep: injections, implants, transdermal patches, rings, IUD Freq: varies w/ other routes Contraindications: CV risk factors, thromboembolic dz	<ul style="list-style-type: none"> • Ø pregnancy • + female sex characteristics, + menses • Relief of s/sx of menopause • Restore regular menses • Reduced growth of reproductive cancers 	<ul style="list-style-type: none"> • GYN: menstrual disorders, breast tenderness • GI s/sx; ↑BG • Skin: acne • CNS s/sx • CV: ↑FV, HTN, +DVT/PE, dyslipidemia • Reproductive CA • Gallbladder dz • Vision △'s 	<ul style="list-style-type: none"> • Take as directed – esp. w/ missed oral dose(s) • Ø smoking • Drug-drug interactions w/ BCs (alternative contraception) • S/sx DVT/PE • Diet △'s – ↓Na⁺ • Report unusual bleeding or abnormal pain BLACK BOX WARNING
	Mimics effects of progesterone	estradiol medroxyprogesterone norethindrone acetate	Estrace Provera, Depo-Provera Aygestin				
Oxytocics = uterine motility drugs	Mimics oxytocin- ↑frequency & force of uterine contractions	oxytocin	Pitocin Syntocinon	Route: IM/IV/IN	<ul style="list-style-type: none"> • Childbirth • Firm uterine fundus • ↓vaginal bleeding • +milk let-down for breastfeeding 	<ul style="list-style-type: none"> • Uterine rupture • CV: HTN, HA, dysrhythmias • CNS: seizures • GI: N/V/abd pain 	<ul style="list-style-type: none"> • If contrx > every 90 sec & > 60 sec duration → stop med
Tocolytics = uterine relaxants	Selective β ₂ agonist	terbutaline sulfate	Brethine	Route: SQ/IV/PO (maintenance); give up to 48 hrs	<ul style="list-style-type: none"> • Labor stopped • Birth postponed long enough to ↓prematurity problems 	<ul style="list-style-type: none"> • CV: palpitations, dysrhythmias, ↑HR, CP • CNS excitation, ↑BG 	<ul style="list-style-type: none"> • Non-pharmacologic tx for preterm labor: <ul style="list-style-type: none"> ○ bedrest ○ hydration ○ sedation
	CNS depressant	magnesium sulfate				<ul style="list-style-type: none"> • CNS depression-lethargy, weakness • Resp depression • GI: N/V/D 	

Nursing Implications: Endocrine Pharmacology: Reproductive Agents: Male

Major Class	MOA	Prototype – generic	Prototype – trade	A – Admin	T – ✓ Therapeutic Effects – General (MC)	A – ✓ Adverse Effects – General (MC)	T – Teaching – General (MC)
Male sex hormones	Mimics testosterone – androgenic & anabolic effects	testosterone oxandrolone	Androderm, Androgel, Testopel Oxandrin	Route: Multiple Contraindications: liver dz, BPH	<ul style="list-style-type: none"> • ↑masculinizing effects: <ul style="list-style-type: none"> ○ achieve erection ○ improved sperm count • ↑appetite, weight gain, euphoria in debilitated patients • ↓progression of breast cancer 	<ul style="list-style-type: none"> • GI: hepatotoxicity • CV: edema, electrolyte imbalances; dyslipidemia • GU: difficulty voiding • ↑virilism effects in females 	<ul style="list-style-type: none"> • Proper administration • F/U labs: electrolytes, lipid panel, liver function tests • ✓ weight – report FV excess • <u>Not</u> for enhancing athletic performance
Erectile dysfunction agents	Inhibits phosphodiesterase type 5 receptors to cause relaxation of smooth muscle in corpus cavernosum → ↑ blood flow to penis	sildenafil	Viagra	Take 30-60 min before sex Contraindications: taking nitrates	<ul style="list-style-type: none"> • Erection achieved & maintained 	<ul style="list-style-type: none"> • Most common: nasal congestion, HA, facial flushing, dizziness • GU: priapism, UTI • Skin: rash • GI: diarrhea, dyspepsia, indigestion • CV: ↓BP, CP if taking nitrates 	<ul style="list-style-type: none"> • Freq: 1x/day & timing • F/U w/ MD/ report chest pain, prolonged, painful erection • Do <u>not</u> take w/ nitrates
Antiprostatic agents	Blocks testosterone production by inhibiting enzyme for testosterone metabolism	finasteride	Proscar, Propecia	Route: PO Freq: daily dose; response time- takes several months Preg. risk cat.=X	↓s/sx of BPH: <ul style="list-style-type: none"> • ↓urinary elimination sx • improved bladder emptying 	<ul style="list-style-type: none"> • Gynecomastia • Sexual dysfunction 	<ul style="list-style-type: none"> • Daily dosing, takes up to 6 mos. • Instruct partner to avoid contact w/ semen
	Relaxes smooth muscle walls of bladder neck & prostate (α-adrenergic blocker) – ↓ SNS effects on bladder & UT	tamsulosin doxazosin	Flomax Cardura	Route: PO Freq: daily dose; ✓BP	Ø complications of BPH: <ul style="list-style-type: none"> • Ø UTI • ↓renal function 	<ul style="list-style-type: none"> • CV: ↓BP, ↑HR, dizziness, drowsiness • GI: upset • Sexual dysfunction 	<ul style="list-style-type: none"> • General: F/U labs: PSA • Report adverse effects • Non-pharm measure to help bladder emptying