Autacoids/Nonsteroidal Antiinflammatory/Asthmatic Drugs

Subcommittee:

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DIPHENHYDRAMINE
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<tr><td>Endogenous Substances</td><td>H_2 Receptor Antagonists</td><td>Histamine Release Modifiers</td></tr>
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omalizumab</td></tr>
<tr><td colspan="3">Learning Objectives</td></tr>
<tr><td colspan="3">Physiology and pathophysiology
Describe the synthesis, storage and release of histamine.
Describe the metabolism and elimination of histamine.
Identify the major classes of histamine receptors - H1, H2 (with mention of H3 and H4) and discuss their tissue distribution and function.</td></tr>
<tr><td colspan="3">Mechanism of action
Explain the molecular mechanism of action of each drug in each drug class.</td></tr>
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Describe the pharmacological effects of the drugs in each class on various organ systems.
Differentiate the histamine receptor subtypes responsible for mediating the effects of histamine in each organ system.</td></tr>
<tr><td colspan="3">Pharmacokinetics
Describe the pharmacokinetics of the second generation antihistamines.</td></tr>
<tr><td colspan="3">Adverse effects, drug interactions and contraindications
Describe the principal adverse effects of the drugs in each class.
Describe the clinically important drug interactions of the drugs in each class.
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<tr><td colspan="3">Therapeutic uses
Differentiate the use of the antihistamines in allergies, sedation, and motion sickness.</td></tr>
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Clinical Pharmacology

Of the first generation antihistamines, chlorpheniramine is the least sedating and is often preferred because of this characteristic

Dimenhydrinate and diphenhydramine have a relatively narrow therapeutic index and are often used recreationally as over-the-counter hallucinogens.

Cimetidine is no longer recommended as an H2 receptor antagonist due to its property of being a suicide substrate for CYP 3A4 and the potential for toxicity of concurrently ingested drugs that are metabolized by this CYP isoform.

Relevance

USMLE topic Respiratory System-Abnormal Processes-Immunological Disorders and Inflammatory Disorders	**Principles of therapeutics** Decongestants, cough suppressants, expectorants, mucolytics & other therapeutic modalities
AAMC Medical School Objectives Project Report X Patient Safety-Table 1	**Topic C** Drug treatment of common conditions and disease

Notes

Objectives for H2-receptor antagonists are covered in Gastrointestinal Drugs.
Objectives for Histamine Release Modifiers are covered in Asthma Drugs.

5-Hydroxytryptamine (5-HT, Serotonin): Agonists & Antagonists

Recommended Curriculum Equivalent: 0.5 hr

Drug Classes and Drugs to consider

Drugs used for Migraine

Abortive Agents		Prophylactic Agents
Triptans	Ergot Alkaloids	
SUMATRIPTAN zolmitriptan	ergotamine	AMITRIPTYLINE PROPRANOLOL TOPIRAMATE

Serotonin Agonists and Antagonists	Antiemetic
SEROTONIN cyproheptadine	ONDANSETRON

Learning Objectives

Physiology and pathophysiology

Describe the synthesis, storage and release of serotonin.

Describe the metabolism and elimination of serotonin.

Identify the major types of serotonin receptors relevant to therapeutic drugs acting in the brain, the vasculature and the g.i. tract.

Describe the roles of serotonin in migraine, carcinoid syndrome, and in the CNS (emesis; mood disorders and other psychiatric conditions, covered with CNS drugs).

Mechanism of action

Explain the molecular mechanism of action of each drug in each drug class.

Actions on organ systems

Describe the pharmacological effects of the drugs in each class on various organ systems.

Pharmacokinetics

Describe the pharmacokinetics of abortive therapy for migraine.

Adverse effects, drug interactions and contraindications

Describe the principal adverse effects of the drugs in each class

Describe the clinically important drug interactions of the drugs in each class.

Describe the principal contraindications of the drugs in each class.

Therapeutic uses

Differentiate the use of these drugs in migraine (prophylaxis vs. abortive therapy) and as antiemetic agents.

Note the use of the 5HT2A and H1 antagonist cyproheptadine in carcinoid syndrome.

Clinical Pharmacology

A combination of aspirin, acetaminophen and caffeine in clinically effective doses should be tried prior to use of triptan drugs for the treatment of migraine headaches. This drug combination is available as an over-the-counter product and has been demonstrated to be effective in the majority of migraine headache attacks.

Relevance

USMLE topic Central and Peripheral Nervous System- Normal processes: cell/tissue structure and function-synthesis, storage, release, reuptake, and degradation of neurotransmitters and neuromodulators	**Principles of therapeutics** Mechanisms of action and use of drugs for treatment of disorders of the nervous system-antimigraine agents
AAMC Medical School Objectives Project Report X Patient Safety-Table 1	**Topic C** Drug treatment of common conditions and disease

Nitric Oxide and Drugs for Erectile Dysfunction			
Recommended Curriculum Equivalent: 0.5 hr			
Drug Classes and Drugs to consider			
Agonist	PDE inhibitor	NO Donors	PGE_1 Analog
NITRIC OXIDE	SILDENAFIL	SODIUM NITROPRUSSIDE nitroglycerin	alprostadil
Learning Objectives			
Physiological roles of NO and cGMP Describe the mechanisms and cellular site of endogenous synthesis of NO and its interactions with guanylate cylcase to regulate cellular levels of cGMP. Explain the roles of NO and cGMP in local control of blood flow, erectile dysfunction and relaxation of the pulmonary vasculature .			
Mechanism of action Explain the molecular mechanism of action of NO, guanyl cyclase and each drug in each class.			
Actions on organ systems Describe the pharmacological effects of the drugs in each class on various organ systems.			
Pharmacokinetics Describe the synthesis (constitutive vs. inducible) and release of nitric oxide.			
Adverse effects, drug interactions and contraindications Describe the principal adverse effects of the drugs in each class. Describe the clinically important drug interactions of the drugs in each class. Describe the principal contraindications of the drugs in each class.			
Therapeutic uses Differentiate the use of these drugs in erectile dysfunction. Describe the use of NO gas to induce pulmonary vasodilation in persistent pulmonary hypertension in newborn and in adult respiratory distress syndrome.			
Clinical Pharmacology			
Relevance			
USMLE topic Cardiovascular System Reproductive System Pharmacodynamic and Pharmacokinetic Processes-general principles		**Principles of therapeutics** Mechanisms of action, use, and adverse effects of drugs for treatment of disorders of the cardiovascular system antihypertensive drugs, coronary and peripheral vasodilators Restoration of potency Signal transduction	
AAMC Medical School Objectives Project Report X Patient Safety-Table 1		**Topic C** Drug treatment of common conditions and disease	

Notes
Objectives for NO donors are covered under Cardiac Drugs.
Objectives for drugs related to prostaglandins in ED are covered under Eicosanoids.

Eicosanoids: Agonists & Antagonists

Recommended Curriculum Equivalent: 0.5 hr

Drug Classes and Drugs to consider

Prostanoids		Leukotrienes	
Endogenous	Analogs	Endogenous	Leukotriene Modifiers
PGE_2 PGF_{2A} PROSTACYCLIN THROMBOXANE A_2	ALPROSTADIL MISOPROSTOL Latanoprost	LTB_4 LTC_4,D_4,E_4	ZAFIRLUKAST Montelukast Zileuton

Learning Objectives

Physiology and Pathophysiology

Describe the synthesis of prostaglandins, thromboxanes, leukotrienes from arachidonic acid.

Explain physiologic and pathophysiologic roles of esicosanoids in regulation of local blood flow, airway resistance, inflammation and nociception.

Mechanism of action

Explain the molecular mechanism of action of each drug in each drug class.

Actions on organ systems

Describe the pharmacological effects of the drugs in each class on various organ systems.

Differentiate drugs inhibiting leukotriene synthesis (zileuton) from leukotriene action at CysLT1 receptors (zafirlukast).

Pharmacokinetics

Describe the metabolism and elimination of eicosanoids

Adverse effects, drug interactions and contraindications

Describe the principal adverse effects of the drugs in each class.

Describe the clinically important drug interactions of the drugs in each class.

Describe the principal contraindications of the drugs in each class.

Describe the shunting of arachidonic acid metabolism to the production of leukotrienes by inhibition of COX enzymes, leading to bronchoconstriction.

Therapeutic uses

Describe the clinical utility of prostaglandin analogs.

Clinical Pharmacology

The leukotriene antagonists remain as secondary choices for the management of patients with asthma.

Prostaglandin analogs are contraindicated in women of child-bearing age who are or are likely to become pregnant.

Misoprostol is most often used together with an NSAID (most often diclofenac) to reduce the risk of a GI bleed in patients requiring chronic drug therapy with an anti-inflammatory analgesic.

Relevance

USMLE topic	**Principles of therapeutics**
Musculoskeletal System	Mechanisms of action and use of drugs for treatment of disorders of the musculoskeletal system

AAMC Medical School Objectives Project Report X Patient Safety-Table 1	**Topic D** Drug treatment of common conditions and diseases, using frequently prescribed classes of drugs for the treatment and prevention of disease
Notes Objectives for the Leukotriene Modifiers are covered under Asthma Drugs.	

Bioactive Peptides		
Recommended Curriculum Equivalent: 0.25 hr		
Drug Classes and Drugs to consider		
Kinins	Neuropeptides	
	Endogenous	Antagonist
BRADYKININ	CGRP substance P VIP	aprepitant
Physiology and Pathophysiology: Describe the synthesis and metabolism of kinins, and the pathological factors that can trigger kinin formation. Describe the roles of substance P, neurokinins and CGRP in pain perception and local inflammation, and the probable role of substance P in emesis. Describe briefly the receptors activated by bradykinin, and substance P and other neurokinins.		
Therapeutic uses: Describe the use of the neurokinin antagonist, aprepitant, as an anti-emetic.		
Drug interactions Describe the effects of ACE inhibitors on the metabolism of bradykinin and the production of cough related to ACE inhibitor therapy.		
Clinical Pharmacology Where cough is induced by treatment with an ACE inhibitor, this side effect may be eliminated by substitution with an angiotensin receptor antagonist. There is no good clinical evidence for the concurrent use of an ACE inhibitor and an angiotenson receptor antagonist.		
Relevance		
USMLE topic Pharmacodynamic and Pharmacokinetic Processes-general principles Gastrointestinal System	**Principles of therapeutics** Signal transduction Mechanisms of action and use of drugs for treatment of disorders of the gastrointestinal system	
AAMC Medical School Objectives Project Report X Patient Safety-Table 1	**Topic C** Drug treatment of common conditions and disease	

Drugs used for treating Asthma and COPD

Recommended Curriculum Equivalent: 1 hr

Drug Classes and Drugs to consider

Antiinflammatory Drugs		Leukotriene Modifiers	
Steroids	Modulators of mast cell degranulation	Leukotriene receptor antagonists	5-LO inhibitor
BECLOMETHASONE FLUTICASONE	CROMOLYN omalizumab	ZAFIRLUKAST montelukast	zileuton

Bronchodilators		
β_2 Agonists	Methylxanthines	Muscarinic receptor antagonists
ALBUTEROL PIRBUTEROL SALMETEROL terbutaline	THEOPHYLLINE aminophylline	IPRATROPIUM tiotropium - now preferred due to once daily dosage

Learning Objectives

Physiology and Pathophysiology

Describe the disease processes of asthma and COPD including airway inflammation, bronchial smooth muscle constriction, and mast cell degranulation.

Describe the role of various mediators (histamine, acetylcholine, proteases, leukotrienes C4, D4; prostaglandins; cytokines) in asthma and COPD.

Mechanisms of action

Explain the molecular mechanism of action of each drug in each drug class.

Actions on organ systems

Differentiate the effects on the lung of the quick relief drugs and the drugs used for long-term control.

Pharmacokinetics

Describe the routes of administration of each drug.

List the main drugs and clinical situations that can alter the pharmacokinetics of theophylline.

Adverse effects, drug interactions and contraindications

Describe the principal adverse effects of the drugs of each class.

Describe the clinically important drug interactions of the drugs of each class.

Describe the principal contraindications of the drugs of each class.

Therapeutic uses

Differentiate the use of these drugs in asthma (short term relief and long term control) and their use in COPD.

Clinical Pharmacology

Long-acting beta-2 receptor agonists are not to be used alone, due to down-regulation of the beta-2 receptor. These drugs are to be used only concurrently with inhaled steroids. Many clinicians prefer beclomethasone as an inhaled steroid therapy because of its high first pass metabolism for that portion of the dose that is swallowed during the inhalational ingestion.

There is no good evidence for superiority of any of the short-acting beta-2 receptor agonist congeners.

Theophylline remains an effective bronchodilator, but the recommended dose has been lowered in recent times.

Tiotropium has supplanted ipratropium as an antimuscarinic bronchodilator strategy due to its more convenient once daily dosage recommendation. Anticholinergic and antileukotriene drug therapy remain secondary drug management strategies.

Relevance	
USMLE topic Respiratory System	**Principles of therapeutics** Mechanisms of action and use of drugs for treatment of disorders of the respiratory system-bronchodilator drugs
AAMC Medical School Objectives Project Report X Patient Safety-Table 1	**Topic C** Drug treatment of common conditions and disease
Notes Objectives for steroids are covered under Adrenal Cortex	

Hypersensitivity and Immunopharmacology

Recommended Curriculum Equivalent: 1 hr

Drug Classes and Drugs to consider

Immunosuppressants

Cytotoxic drugs	Lymphotoxic drugs	Drugs acting on Immunocompetent cells	Drugs acting on cytokines or on cytokine receptors	Other
AZATHIOPRINE	PREDNISONE Antithymocyte immunoglobulin	CYCLOSPORINE TACROLIMUS MYCOPHENOLATE MOFETIL Muromonab Sirolimus	DACLIZUMAB INFLIXIMAB Lenalidomide Etanercept Thalidomide	Rh_o(D) immune globulin

Immunostimulants and colony stimulating factors

EPOETIN ALFA
FILGRASTIM (G-CSF)
INTERFERONS
SARGRAMOSTIM (GM-CSF)
Idesleukin
BCG vaccine

Learning Objectives

Physiology and Pathophysiology
Describe the role of immunoglobulins (IgE, IgG, IgM) and cytokines in the immune response.
Differentiate different types of allergic reactions (Type I-IV) and factors (e.g. cytokines, MHC) involved
Describe the release of allergic mediators and processes leading to hypersensitivity.

Mechanisms of action
Explain the molecular mechanism of action of each drug in each drug class.

Actions on organ systems
Relate the main effects of each drug to its molecular mechanism of action.

Pharmacokinetics
Describe the route of administration and the relevant pharmacokinetic features of each drug in each drug class.

Adverse effects, drug interactions and contraindications
Describe the principal adverse effects of the drugs of each class.
Describe the clinically important drug interactions of the drugs of each class.
Describe the principal contraindications of the drugs of each class.

Therapeutic uses
Outline the main therapeutic uses of the drugs of each class.

Clinical Pharmacology
These drugs are almost always used in combinations. Emphasize the increased risk of activation of latent infection and increased susceptibility to tuberculosis. Some of these drugs suspected to increase the risk of cancer.

Relevance

USMLE topic Immune System	**Principles of therapeutics** Mechanisms of action and use of drugs that specifically affect immune function-immunomodulating drugs
AAMC Medical School Objectives Project Report X Patient Safety-Table 1	**Topic C** Drug treatment of common conditions and disease
Notes Objectives for Corticosteroids are covered under Adrenal Cortex.	

Analgesic, Antipyretic, Antiinflammatory		
Recommended Curriculum Equivalent: 1 hr		
Drug Classes and Drugs to consider		
Nonsteroidal Antiinflammatory Drugs (NSAIDS)		
Salicylic acid derivatives	Nonselective COX inhibitors	Selective COX-2 inhibitors
ACETYLSALICYLIC ACID mesalamine sodium salicylate	IBUPROFEN INDOMETHACIN - NO LONGER A FIRST CHOICE NSAID DUE TO ITS GI TOXICITY NAPROXEN diclofenac ketorolac piroxicam sulindac	CELECOXIB

Analgesic, Antipyretic Drugs	Antidote for acetaminophen
ACETAMINOPHEN	acetylcysteine

Physiology and Pathophysiology of pain, inflammation & hyperthermia

Outline the physiological basis of temperature control and peripheral sensory pain fibers.
Describe the role of eicosanoids and bradykinin in causing local pain, edema and fever.
Outline the pathophysiology of acute and chronic inflammation.

Mechanisms of action

Explain the molecular mechanism of action of each drug in each drug class.
Differentiate the mechanisms of action of acetylsalicylic acid, acetaminophen, and NSAIDS.

Actions on organ systems

Differentiate the effects on pain, fever, and inflammation of the drugs in each class.

Pharmacokinetics

Describe the metabolism of and mechanism of toxicity of acetaminophen. - Why? This Is not an NSAID and is not included in the list above. No acceptable evidence for clinically Important anti-inflammatory activity - can be used together with an NSAID to treat acute pain before turning to opioids - See above for migraine headache therapy strategies.
Describe the factors that affect the renal elimination of acetylsalicylic acid. Emphasize the dose-dependent disposition within the therapeutic dose range and the ability to dose less than QID if administered as a 900 mg dose.

Adverse effects, drug interactions and contraindications

Describe the principal adverse effects of the drugs of each class.
Describe consequences of protein binding, zero order metabolism, and irreversible inhibition related to acetylsalicylic acid.
Describe the clinically important drug interactions of the drugs of each class.
Describe the principal contraindications of the drugs of each class.

Therapeutic uses

Differentiate the use of these drugs in treatment of pain, fever, and inflammation.
Describe the principles of treatment for acetaminophen toxicity.
Describe the principles of treatment for salicylate toxicity.

Clinical Pharmacology

Never use two NSAIDs concurrently. Naproxen is indicated in patients resistant to other propionic acid congeners because it is the only congener that is present in the pure active isomer. Resistance may include a component of inability to convert the inactive isomer to its active form, since this metabolic pathway is highly variable among patients.

Sulindac should be included, since it is the only member of this class where inactivation of the active sulfide metabolite occurs in the kidney of the majority of patients, and may allow use of an NSAID in a patient with impaired renal function.

Selective COX-2 inhibitor drugs have a slower onset of analgesia and should not be used for management of acute pain. Remember that COX-2 is the primary isoenzyme in the kidney and the brain. One should emphasize the danger when two highly-bound drugs are used together – e.g. most NSAIDs and sulfonylureas. Important also is the risk of bleeds with warfarin + an NSAID due to different mechanisms of anticoagulant effect.

Relevance

USMLE topic	**Principles of therapeutics**
Musculoskeletal System	Mechanisms of action and use of drugs for treatment of disorders of the musculoskeletal system-non-steroidal anti-inflammatory drugs and analgesics
AAMC Medical School Objectives Project Report X Patient Safety-Table I	**Topic D** Drug treatment of common conditions and diseases, using frequently prescribed classes of drugs for the treatment and prevention of disease

Notes:

Objectives for glucocorticoids are covered under Adrenal Cortex.

Objectives for opiates are covered under CNS.

Antirheumatic Drugs		
Recommended Curriculum Equivalent: 0.5 hr		
Drug Classes and Drugs to consider		
COX Inhibitors	DMARDS (Disease Modifying Antirheumatic Drugs)	
	Biologics	Traditional
ASPIRIN IBUPROFEN NAPROXEN celecoxib	ANAKINRA ETANERCEPT INFLIXIMAB abatacept adalimumab rituximab	METHOTREXATE hydroxychloroquine leflunomide sulfasalazine
Learning Objectives		
Mechanism of action Explain the molecular mechanism of action common to all nonsteroidal antiinflammatory drugs (NSAIDs). Describe the likely mechanisms of antirheumatic action of the DMARDS.		
Pharmacokinetics List the routes of administration of drugs in each class. Recognize the time required before the onset of action of the DMARDS.		
Adverse effects, drug interactions and contraindications Describe the main adverse effects of the drugs of each class. Describe the clinically important drug interactions of the drugs of each class. Describe the principal contraindications or precautions of the drugs of each class.		
Therapeutic uses Outline the use of the NSAIDS and DMARDS in arthritic disorders.		
Clinical Pharmacology		
Relevance		
USMLE topic Musculoskeletal System	**Principles of therapeutics** Mechanisms of action and use of drugs for treatment of disorders of the musculoskeletal system- antigout therapy and immunosuppressive drugs	
AAMC Medical School Objectives Project Report X Patient Safety-Table 1	**Topic C** Drug treatment of common conditions and diseases, using frequently prescribed classes of drugs for the treatment and prevention of disease	
Notes Objectives for COX inhibitors are covered under Analgesic, Antipyretic, Antiinflammatory Drugs. Rasburicase is used in pediatric patients receiving cancer chemotherapy.		

Gout

Recommended Curriculum Equivalent: 0.5 hr

Drug Classes and Drugs to consider

Drugs for the gouty attack	Decrease urate formation	Increase urate excretion
INDOMETHACIN Colchicine	ALLOPURINOL Febuxostat Rasburicase	PROBENECID Sulfapyryrazone

Learning Objectives

Physiology and Pathophysiology

Describe the causes and pathophysiology of acute gouty arthritis and chronic tophaceous gout.

Mechanisms of action

Explain the molecular mechanism of action of each drug in each drug class.

Actions on organ systems

Describe the pharmacological effects of each drug in each class.
Differentiate the effects of the drugs in the treatment of gout.

Adverse effects, drug interactions and contraindications

Describe the principal adverse effects of the drugs of each class.
Describe the clinically important drug interactions of the drugs of each class
Describe the principal contraindications of the drugs of each class.
List the drugs that interfere with the renal excretion of uric acid.
Describe the mechanism of gouty flare-up associated with the treatment of chronic tophaceous gout.

Therapeutic uses

Differentiate the use of these drugs in the treatment of acute gout attacks and as prophylactic therapies.

Clinical Pharmacology

Probably Indomethacin is no longer the preferred NSAID due to its GI toxicity. Almost all NSAIDs will manage the acute symptoms of gout. Importance of colchicine is noted as an alternate drug therapy for chromic gout in patients allergic to allopurinol. In the elderly, probenecid is probably no longer indicated due to decreased renal function.

Relevance

USMLE topic Musculoskeletal System	**Principles of therapeutics** Mechanisms of action and use of drugs for treatment of disorders of the musculoskeletal system- antigout therapy and immunosuppressive drugs
AAMC Medical School Objectives **Project Report X Patient Safety-**Table 1	**Topic C** Drug treatment of common conditions and diseases, using frequently prescribed classes of drugs for the treatment and prevention of disease

Notes

Drugs for specific clinical entities					
Drugs for headaches					
Drug Classes and Drugs to consider					
Acute or Abortive Treatment			Prophylaxis		
Analgesics	Triptans	Ergot alkaloids	β-Blockers	Antiepileptics	Others
acetaminophen aspirin ibuprofen (NSAIDS) (N-acetylcysteine)	sumatriptan	ergotamine	propranolol	valproate	amitriptyline verapamil
Therapeutic uses Outline the use of these drugs in the acute and prophylactic treatment of headaches including migraine, tension and cluster headaches. Outline the management of treatment of overdose to acetaminophen.					
Drugs Used for Treating Alopecia					
Drug Classes and Drugs to consider					

Alopecia Areata	Androgenetic Alopecia
cyclosporine glucocorticoids	finasteride minoxidil
Therapeutic uses Outline the use of these drugs in the treatment of alopecia areata and androgenic alopecia.	
Drugs Used for Treating HPV & Molluscum, Actinic Keratoses, BCC and SCC, and Psoriasis	
Drug Classes and Drugs to consider	

HPV & Molluscum, Actinic Keratoses, BCC and SCC	Psoriasis	
	Topical	Systemic
5-fluorouracil imiquimod podofilox	calcipotriene glucocorticoids tazarotene	acitretin adalimumab alefacept cyclosporine etanercept infliximab methotrexate
Therapeutic uses Outline the use of these drugs in the treatment of HPV & molluscum, actinic keratoses, BCC and SCC, and psoriasis.		
Drugs Used for Treating Inflammatory Bowel Disease		
Drug Classes and Drugs to consider		

Mesalamine-based therapy	Steroids	Immuno-suppressives	Biologicals	Drugs altering balance of enteric bacteria

balsalazide mesalamine olsalazine sulfasalazine	budesonide hydrocortisone prednisone	azathioprine mercaptopurine methotrexate	infliximab natalizumab	ciprofloxacin metronidazole *lactobacillus* spp. *saccharomyces boulardii*

Therapeutic uses
Outline the use of these drugs in treating ulcerative colitis and Crohn's disease.

Drugs used for Nausea and Vomiting

Drug Classes and Drugs to consider

5-HT Antagonists	Substance P/NK_1 Antagonist	Corticosteroids	Others
granisetron ondansetron	aprepitant	dexamethasone	metoclopramide nabilone olanzapine prochlorperazine scopolamine

Therapeutic uses
Outline the use of these drugs in treating nausea and vomiting associated with chemotherapy, radiation, and postoperative.

Drugs used for treating Peptic Ulcer Disease and GERD

Drug Classes and Drugs to consider

Inhibitors of Acid Secretion				
H_2RAs	PPIs	Mucosal Protectants	Drugs for eradicating *H. pylori*	Antacids
cimetidine famotidine nizatidine ranitidine	omeprazole	bismuth salts misoprostol sucralfate	amoxicillin bismuth clarithromycin metronidazole tetracycline inhibitors of acid secretion	$CaCO_3$ $Al(OH)_3$ $Mg(OH)_2$ $NaHCO_3$

Therapeutic uses
Differentiate between the use of these drugs in peptic ulcer disease and GERD.

Drug Treatment for Erectile Dysfunction

Drug Classes and Drugs to consider

PDE5 Inhibitors	Prostaglandin Analog	Testosterone Replacement	Others
sildenafil tadalafil vardenafil	alprostadil	methyltestosterone testosterone topical testosterone enanthate	papaverine phentolamine

Therapeutic uses
Outline the use of these drugs in treating erectile dysfunction.

Drugs for Allergic Reactions

Drug Classes and Drugs to consider				
Glucocorticoids	Decongestants	Anticholinergics	Anaphylaxis	Autacoid Antagonists
fluticasone prednisone	phenylephrine pseudoephedrine	ipratropium	epinephrine	antihistamines modulators of histamine release It receptor antagonists

Therapeutic uses

Outline the use of the drugs in each class in treating allergic disorders.

Pharmacology of Tocolytics, Antenatal Drugs and Abortives

Drug Classes and Drugs to consider				
Tocolytics			Abortives	Antenatal/Neonatal Therapy
Ca^{++} Blockers	β-Agonists	COX inhibitors		
magnesium sulfate nifedipine	terbutaline	indomethacin	methotrexate mifepristone misoprostol	betamethasone indomethacin

Therapeutic uses

Outline the clinical uses of the drugs used in preventing preterm labor and in abortion.

Outline the uses of betamethasone and indomethacin in antenatal and neonatal therapy, respectively.

Clinical Pharmacology

Evidence for efficacy of tocolytics in humans is less than Impressive.

ACE inhibitors also contraindicated In pregnancy.