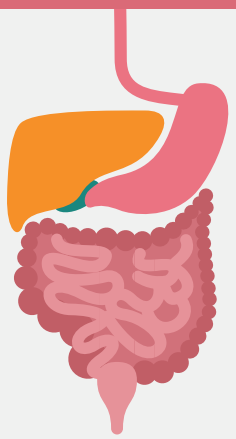
# Key words summary



These summaries **do not include the whole lecture**, we just wrote what we think it is important.

**"It will be updated after each lecture"**

Good luck

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Editing file

⊗ Inhibition \ blockage ★ Drug of choice

« **باذلًا وسعي** في استنقاذها من الهلاك والمرض، والألم والقلق »

| Subclass | Drug | Indication | Comment |
|---|---|---|---|
| **L1 \| Drugs used in peptic ulcer** | | | |
| **Proton Pump Inhibitors** Irreversible ⊗ of proton pump ($H^+$/ $K^+$ ATPase) | Omeprazole<br>Lansoprazole<br>Pantoprazole | - As a combination therapy for eradication of H.pylori<br>- Hypersecretory conditions (ZE syndrome). | ADRs: Achlorhydria, Diarrhea, Increase risk of infection.<br>Long use: Vit.$B_{12}$ deficiency. |
| **$H_2$ blockers** Reversibly and competitively ⊗ $H_2$ receptors on the parietal cells. | Cimetidine<br>Ranitidine<br>Famotidine<br>Nizatidine | - Acute ulcer healing in moderate cases.<br>- Preanesthetic medication.<br>- Prevention of bleeding from stress gastritis. | - It blocks 90% of nocturnal acid secretion (given before sleep)<br>- ADRs (cimetidine): Galactorrhea, gynecomasteia, impotence. |
| **Prostaglandin analogues (PGE1)** Increase the protective measures, lowers HCl secretion. | Misoprostol | Used for NSAIDs-induced peptic ulcer. | ADRs: abdominal cramps, diarrhea, uterine contraction.<br>C.I: pregnant. |
| **Antacids** Direct chemical neutralization of HCl. | $NaHCO_3$<br>$CaCO_3$<br>$Al(OH)_3$<br>$Mg(OH)_2$ | To Relief pain of peptic ulcer & for dyspepsia | - $NaHCO_3$ (C.I in CVS pts)<br>- $Al(OH)_3$ (constipation)<br>- $Mg(OH)_3$ (diarrhea) |
| **L2 \| Anti-emetic drugs** | | | |
| **(5-$HT_3$) antagonists** ⊗ 5-$HT_3$ Rs centrally (CTZ) & peripherally. | Ondansetron<br>Granisetron | ★ Prevent moderate to sever emesis due to chemotherapy \ post-radiation | Their effect is augmented by corticosteroids & NK1 antagonist |
| **$D_2$ receptor antagonists** ⊗ $D_2$ dopamine receptors in the CTZ. | Chlorpromazine<br>Droperidol<br>Domperidone<br>Metolclopramide | Used for postoperative vomiting and chemotherapy-induced emesis | All these drugs act peripherally & centrally except Domperidone (peripherally) |
| **(NK1) receptor blockers** Substance P antagonist by blocking NK1R in vagal afferent. | Aprepitant | Combined with 5-HT3 RA & corticosteroids in chemotherapy induced vomiting. | — |
| **$H_1$-receptor antagonists** ⊗ competitively $H_1$ R. | Meclizine<br>Promethazine | Motion sickness.<br>Morning sickness in pregnant. | ADRs: Sedation.<br>Not effective w\ chemotherapy. |
| **Muscarinic RAs** ↓ impulses from vestibular apparatus. | Hyoscine (scopolamine) | Motion sickness (patches) | Not effective w\ chemotherapy |

| Subclass | Drug | Indication | Comment |
|---|---|---|---|
| **L3 \| Treatment of dysentery and amebiasis** | | | |
| **Tissue or Systemic Amebicides** (Act on the ameba in tissues -intestinal & extra intestinal wall) | Metronidazole<br>Tinidazole → (longer duration, better toxicty profile) | ★ invasive amebic infections<br>- Giardia<br>★ Trichomoniasis<br>★ Pseudo-membranous colitis | - ADRs: Has Disulfiram-like effect, dysuria, dark urine, CYP-450 enzyme inhibitor<br>- C.I: Pregn., hepatic & renal disease. |
| | Cholroquine | Amebic liver disease | - Anti-malaria |
| | Emetine & Dehydroemetine* (C.I: preg. CVS ds) | * Severe forms of amebiasis. | - Irreversible ⊗ of protein synthesis.<br>- Never given IV.<br>- Serious toxicities. |
| **Luminal amoebicides** (Act on the parasites in the lumen of the bowel only) | ★ Diloxanide furoate | ★ Asymptomatic intestinal infection (cyst passers) | - ADRs: Flatulence.<br>- C.I: Preg., child (<2 yrs) |
| | Iodoquinol | | - ADRs: Pptic neuritis, interference with thyroid function tests. |
| | Paromomycin sulphate | - Chronic amebiasis to eliminate cysts. | - Direct amebicidal, Indirect killing of bacterial flora. |
| **Fluoroquinolones** | Ciprofloxacin | - Bact. diarrhea. | - ADRs: Arthropathy. |
| **L4 \| Drugs used in constipation and IBS** | | | |
| **Bulk forming laxatives** (Increase the bulk of intestinal contents by water retention → evacuation of soft stool) | Psyllium seed<br>Methyl cellulose<br>Carboxymethyl Cellulose (CMC) | - Not used in acute constipation → delayed onset of action. | - ADRs: Interfere with other drug absorption e.g. iron, cardiac glycosides. |
| **Osmotic Laxatives** They remain in the bowl attract water by osmosis → increase the volume of feces → increase peristalsis & evacuation | Lactulose | - Liver cirrhosis & hepatic encephalopathy | - It prevents the absorption of ammonia. |
| | Saline Laxatives | - Acute constipation. | - Rapid effect.<br>- C.I: Mg salts → NMJ blockers. |
| | PEG | - Used in bowel cleaning for colonoscopy. | |
| **Stimulant Laxatives** Direct stimulation of ENS | Senna | C.I → breast feeding. | - ADRs: Dependence & destruction of myenteric plexus leading to Atonic Colon. |
| | Castor oil | C.I → pregnant | |
| | Bisacodyl | -- | |
| **Fecal softeners** Alter the consistency of feces → easier to pass | Docusate<br>Paraffin oil<br>Glycerin | Paraffin oil → good for radiology preparation.<br>→ Not palatable. | |
| **Alosetron** → ⊗ $5HT_3$ | | - IBS with diarrhea. | - ADRs: sever constipation & ischemic colitis. |
| **Tegaserod** → $5HT_4$ agonist | | - IBS with constipation. | - ADRs: CVS side effects. |

## L5 | Drugs used in inflammatory bowel disease

| Subclass | Drug | Indication | Comment |
|---|---|---|---|
| **1- Aminosalicylates**<br>Topical anti-inflammatory, absorbed in the proximal SI → needs specific formulation (Azo compounds or Mesalamines) | Sulfasalazine<br>Balsalazide<br>Olsalazine<br>Asacol<br>Pentasa<br>Canasa<br>Rowasa | - For Induction & maintenance of IBD.<br>- Rhumatoid arthritis (Sulfasalazine only) | - ADRs of 5-ASA: Interstitial nephritis.<br>- ADRs of Sulfasalazine: Crystalluria, oligospermia. |
| **2- Glucocorticoids**<br>⊗ phospholipase A2, NO synthesis, COX-2, inflammatory cytokines. | Prednisone<br>Hydrocortisone<br>Methyl prednisolone<br>Budesonide | - **Acute** flares of disease. (not maintenance)<br>- Organ transplantation. | - Rectal formation is preferred.<br>- Budesonide has extensive 1st pass metabolism. |
| **3- Immuno-modulators**<br>A- ⊗ dihydrofolate reductase.<br>B- ⊗ purine synthesis. | A- Methotrexate<br>B- Azathioprine (6-mercaptopurine) | - For induction & maintainance of IBD in active and moderate-to-severe conditions or steroid dependent or steroid resistant | - ADRs of A: Megaloblastic anemia.<br>- ADRs of B: Hepatic dysfunction. |
| **4- Monoclonal antibodies**<br>TNF-α inhibitors | Infliximab<br>chimeric mouse-human<br>Adalimumab<br>Fully humanized IgG<br>Certolizumab pegol<br>Fab fragment of a humanized antibody | Moderate to sever ACTIVE IBD. (not used for maintenance) | ADRs of Infliximab:<br>- Allergic reactions.<br>- Activation of latent TB, sepsis, HBV.<br>- Sever hepatic failure. |

## L6 | Cytochrome System & Drug Metabolism

| Substrates | Inhibitors | Inducers |
|---|---|---|
| ○ Azole Antifungals;<br>• Fluconazole<br>○ Antibiotics;<br>• Erythromycin, Clarithromycin<br>○ $Ca^{2+}$ channel blockers<br>• Amlodepine, Verapamil<br>○ Statins; Atorvastatin<br>○ Antiarrhythmic; Amidarone<br>○ Non-Sedating Antihistaminics<br>• Astamizole<br>○ Benzodiazipines<br>• Midazolam, Clonazepam | ○ Immunosuppressant;<br>• Cyclosporine<br>○ Azole Antifungals;<br>• Fluconazole<br>○ Antibiotics;<br>• Erythromycin, Clarithromycin<br>○ Protease Inhibitors<br>• **Ritonavir**<br>○ Cimetidine<br>○ Chloramphenicol<br>○ Nefazadone<br>○ Grape Fruits | ○ Rifampicin<br>○ Phenytoin<br>○ Carbamazepine<br>○ Barbiturates<br>○ Dexamethasone<br>○ Progestins |

| Subclass | Drug | Indication | Comment |
|---|---|---|---|
| **L7 \| hepatotoxic drugs** | | | |
| **Hepatic injury** | **Hepatocellular** | **Cholestatic** | **Mix** |
| Clinical manifestations | - Flu-like, **malaise**<br>- m. aches **weakness**<br>- Loss of appetite<br>- GIT symptoms<br>- Diarrhea<br>- Jaundice<br>- **urine discolored** | - **Yellowish discoloration of skin**<br>- **Dark urine**<br>- Rash<br>- **Pruritus**<br>- Stool may be light | |
| **ALT** (Alanine aminotransferase) | **≥ 3 fold rise** | **Normal** or slight ↑ | **≥ 3 fold rise** |
| **ALP** (Alkaline phosphatase) | **Normal** | **≥ 2 fold rise** | **≥ 2 fold rise** |
| Example | ANIA = آنيا<br>- **Acetaminophen**<br>- **NSAIDs**<br>- **Isoniazid**<br>- **Amiodarone** | ChERO<br>- **Chlorpropamide**<br>- **Erythromycin**<br>- **Rifamycin**<br>- **Oral contraceptives** | PASCa (pasta)<br>- **Phenytoin**<br>- **ACE Inhibitors**<br>- **Sulfonamides**<br>- **Carbamazepine** |
| **L8 \| Anti-malarial drugs** | | | |
| **Artemisinin** endoperoxide bridges that are cleaved by haem iron to yield carbon-centered free radicals | Artesunate Artemether → Converted to Dihydroartemisinin | 1- Monotherapy, used repeatedly.<br>2- combining the drug w\ long acting anti-malarial drug. | - Effective against all forms of plasmedium.<br>- Has very short T½.<br>- High recrudescence rate. |
| **Chloroquine** ⊗ polymerization of heme | - Mech of resis.: mutation in PfCRT → efflux of Chloroquine from food vacuole.<br>- Eradicate blood schizonts of Plasmodium.<br>- Safe in pregnancy. | | - ADRs: Short peroid → pruritis, urticaria. Long period: ocular toxicity & ototoxicity. |
| **Quinine** ⊗ polymerization of heme | - IV → sever falciparum malaria.<br>- Oral → mild to moderate falciparum malaria.<br>- Nocturnal leg cramps.<br>- C.I: Prolonged QT Interval, ↓ G6PD.<br>- Interactions: Antacids, Mefloquine (QT), warfarin | | - ADRs: therapeutic dose: bitter taste. Higher dose: cinchonism syndrom & blackwater fever. |
| **Primaquine** Generate ROS (damage), ⊗ energy, no food vacuoles. | ⋆ Radical cure of relapsing malaria (P.v, P.o)<br>- In falciparum malaria → kill gametes,<br>- ADRs: Regular dose: hemolytic anemia in ↓ G6PD.<br>Larger dose: cyanosis, methemoglobinemia. | | - C.I:<br>- Pregnancy → don't give it at all!<br>- ↓ G6PD → give to at specific doses. |

| Subclass | Drug | Indication | Comment |
|---|---|---|---|
| **L9 \| Anti-coagulant drugs** | | | |
| **Heparin (UFH)**<br>indirectly by ↑ the activity of the endogenous anticoagulant "Antithrombin III" → inhibits activated clotting factors mainly thrombin (factor IIa) and Xa | | - It has rapid onset of action → Initiate immediate anticoagulation in thromboembolic disease.<br>- Prevention of postoperative DVT. & coagulation during renal dialysis or cardiac surgery.<br>- Drug of choice as an anticoagulant during pregnancy. | - DisAdvn.: risk of (HIT), The need for regular monitoring (aPTT).<br>- ADRs: Bleeding, allergy, osteoporosis, HIT (rare)<br>- Anti-dote: Protamine Sulfate |
| **Heparin (LMWH)**<br>Increase the action of anti-thrombin III on factor Xa, but there's no action on IIa. | Enoxaparin<br>Dalteparin | Advantages | - Without frequent laboratory monitoring (outpatient therapy).<br>- Better bioavailability & longer t1/2<br>Less platelet activation and Lower risk of HIT |
| | Fondaparinux | Advantages | - Less likely to trigger HIT than UFH & LMWH |
| **Direct thrombin inhibitors**<br>Direct binding to **thrombin** | Hirudin<br>**Lepirudin** | - Used as IV anticoagulant in patients with **HIT**. | |
| **Vitamin K antagonist (Warfarin)**<br>inhibits the synthesis of vitamin K-dependent clotting factors II, VII, IX and X | | - Has slow onset & offset of action.<br>- Needs regular INR monitoring.<br>- C.I: pregnancy.<br>- Drug interactions:<br>✓ Potentiate its action: ⊗ vK synth: PO antibiotics. ⊗ vK absorp.: paraffin. Microsomal enzyme inhibitor: chloramphenicol, cimetidine. Displacement from protein binding: phenylbutazone & salicylates.<br>✓ Weaken its action: ⊗ warfarin absorption: cholystyramine, colestipol. ↑ synth. of clotting factors: vK, oral contraceptive. Microsomal enzyme inducers: Carbamazepine, barbiturates, rifampicin. | |
| **L10 \| Anti-platelet drugs** | | | |
| **Arachidonic acid pathway inhibitors**<br>Irreversible inhibition of cyclooxygenase enzyme (COX-1) | **Aspirin** | - Prophylaxis of thromboembolism<br>- Prevention of ischemic events in patients with unstable angina. | - ADRs: risk of peptic ulcer & GIT bleeding. |
| **ADP pathway inhibitors**<br>irreversibly inhibit ADP receptor of subtype P2Y12 | Ticlopidine<br>**Clopidorgel** | - Both: Secondary prevention of ischemic complications.<br>- Clopidorgel: Acute coronary syndrom. | - ADRs: Sever neutropenia (w\ ticlopidine)<br>- They are pro-drugs. |
| **New ADP Pathway Inhibitors**<br>1- Irreversible inhibitor of P2Y12 R.<br>2- Reversible inhibitor of P2Y12 R. | 1- Prasugrel<br>2- Ticagrelor | - They have rapid onset of action → reduce the rate of thrombotic cardiovascular events. | They're not prodrugs.<br>- ADRs of (#2): dyspnea. |
| **GP IIb/IIIa receptor inhibitors**<br>Inhibits platelet aggregation by preventing the binding of fibronigen | 1- Abciximab<br>2- Tirofiban<br>3- Eptifibatide | Allare given **IV**:<br>#1: Used with heparin and aspirin as adjunct to PCI for the prevention of cardiac ischemic complications.<br>#2,3: For the reduction of incidence of thrombotic complications during coronary angioplasty (PCI). | |