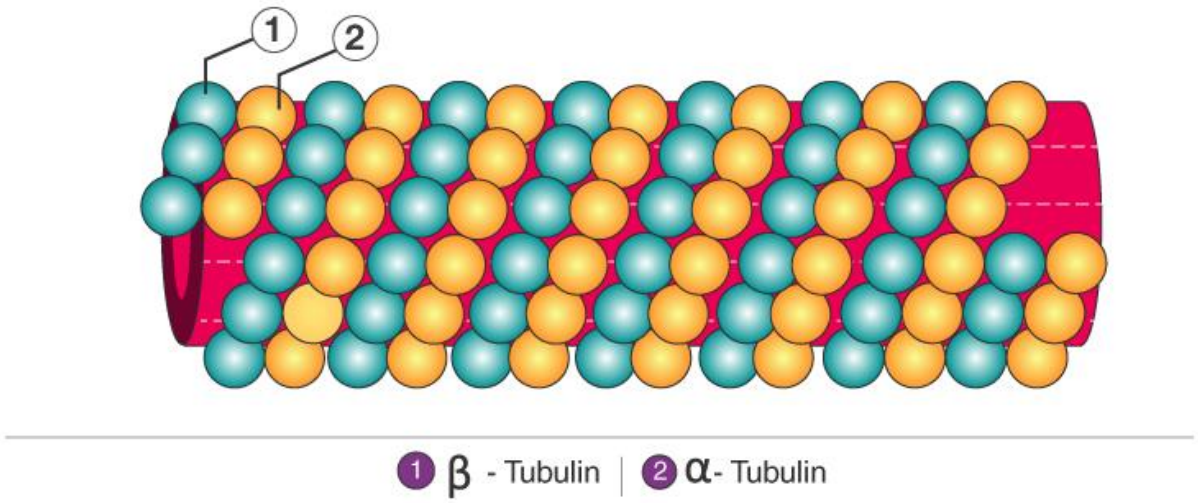
OTC Drugs
And
Their Uses

Anthelmintics (anti-worm):

1. Mebendazole

Brand Names in BD: Vermox, Wormex, Meben, etc.

MOA: Inhibits microtubule synthesis (β-Tubulin) in worms, impairing glucose uptake → leads to energy depletion and death of the worm.



Dosage:

- **Adults & children >2 years**:
  - *Single dose of **100 mg***, repeat after 2 weeks if needed (for **pinworm**).
  - For **roundworm** or **hookworm**: **100 mg twice daily for 3 days**.

Side Effects:

- Abdominal pain
- Nausea
- Diarrhea
- Rare: Rash, dizziness, hypersensitivity

Caution:

- **Pregnancy**: Avoid the **first trimester**; use only if clearly needed.
- **Liver impairment**: Use with caution in **chronic liver disease**.
- **Children <2 years**: Risk of convulsions; generally, not recommended.
- **Anemia or malnutrition**: Can worsen side effects.
- **Drug interactions**: May reduce efficacy of **antiepileptics** like carbamazepine or phenytoin.

Remember:

Anthelmintic drugs (used to treat worm infections) are generally **not recommended for children under 2 years** of age due to several important reasons:

1. Liver and Kidney Immaturity

- Babies under 2 years have **immature liver and kidney functions**.
- These organs are not yet fully capable of metabolizing and excreting the drugs efficiently.
- This increases the **risk of drug accumulation and toxicity**.

2. Lack of Safety Data

- Clinical trials for many anthelmintic drugs (like **albendazole**, **mebendazole**, etc.) often **exclude very young children**.
- Therefore, **no strong safety or efficacy data** exists for this age group.
- Regulatory bodies are cautious when **recommending drugs without solid evidence**.

3. Potential Neurotoxicity

- Some anthelmintics (e.g., **ivermectin**) can cross the immature **blood-brain barrier** in infants.
- This may lead to **central nervous system side effects**, including seizures or coma in rare cases.

4. Poor Nutritional Status

- In some regions, children under 2 are **malnourished**, which can:
  - Increase drug toxicity.
  - Decrease the body's ability to tolerate side effects.
  - Lead to more serious complications if worms are suddenly killed in large numbers.

5. Risk-Benefit Concern

- In many cases, **worm burden is lower in infants** compared to older children.
- So, **routine deworming may not be necessary** unless the child is showing clear signs of worm infection (e.g., anemia, visible worms in stool).
- The potential **harm may outweigh the benefit** in very young children.

What to Do Instead?

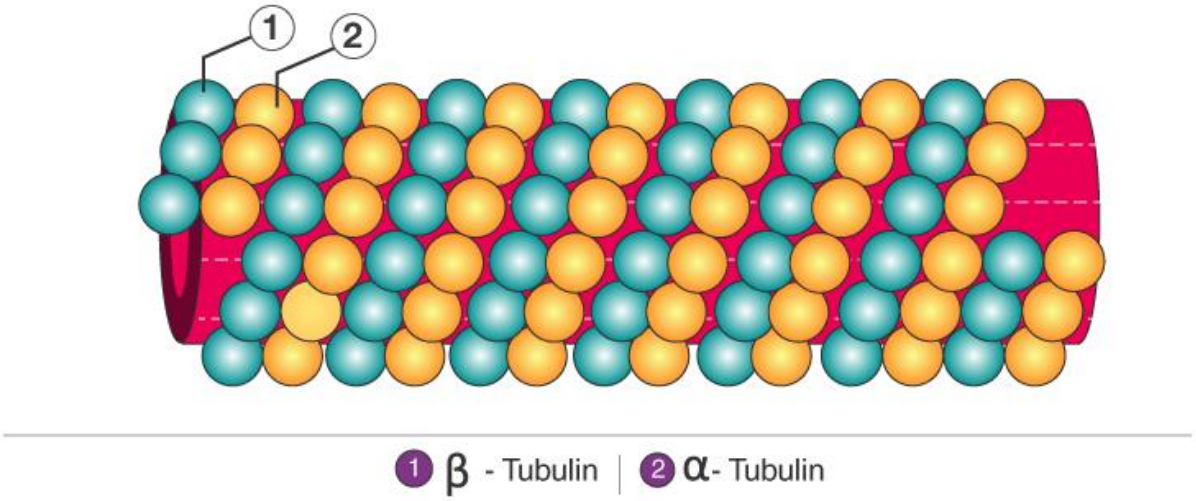
If a child under 2 is suspected of having a worm infection:

- **Pediatric consultation is essential**.
- In some special cases, a doctor may prescribe **lower, carefully calculated doses** of certain anthelmintics.
- Proper hygiene, clean food and water, and monitoring symptoms are crucial at this age.

2. Albendazole

Brand Names in BD: Alzental, Wormnil, Zentel, Albentel

MOA: Inhibits tubulin polymerization → blocks glucose uptake → depletes glycogen stores → worm death.



Dosage:

- **Adults & children >2 years**:
  - *Single **400 mg** dose* for common intestinal worms.
  - In **hydatid disease** or **neurocysticercosis**: 400 mg **twice daily for 28 days**, repeat as needed.

Side Effects:

- Abdominal discomfort
- Nausea
- Dizziness
- Headache
- Liver enzyme elevation (with prolonged use)

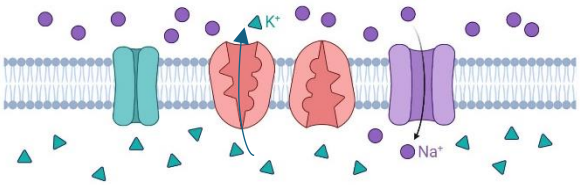
Caution:

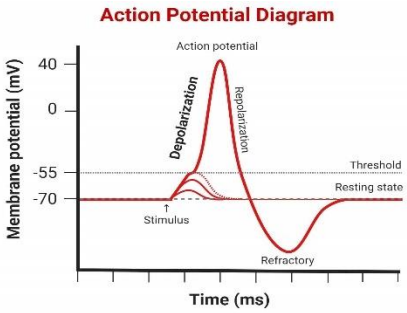
- **Pregnancy**: **Contraindicated** in the **first trimester**; animal studies show teratogenicity.
- **Breastfeeding**: Use with caution; limited data available.
- **Long-term use**: Monitor **liver function tests (LFTs)** and **blood counts** (risk of liver damage, bone marrow suppression).
- **Children <2 years**: Use only under medical supervision.
- **Retinal lesions**: Before treating neurocysticercosis, exclude **ocular involvement** (risk of vision loss if inflammation occurs).
- **Drug interactions**: Increased toxicity with **cimetidine**, **dexamethasone**, or **praziquantel**.

3. Pyrantel Pamoate

Brand Names: Combantrin, Helmintox (less common in BD OTC)

MOA: Depolarizing neuromuscular blocking agent → causes spastic paralysis of worms → expelled from GI tract.





Dosage:

- **Single dose** of **10 mg/kg (max 1 g)**.
- Repeat in 2 weeks for pinworms.

Side Effects:

- GI upset (nausea, cramps)
- Drowsiness
- Dizziness
- Rash (rare)

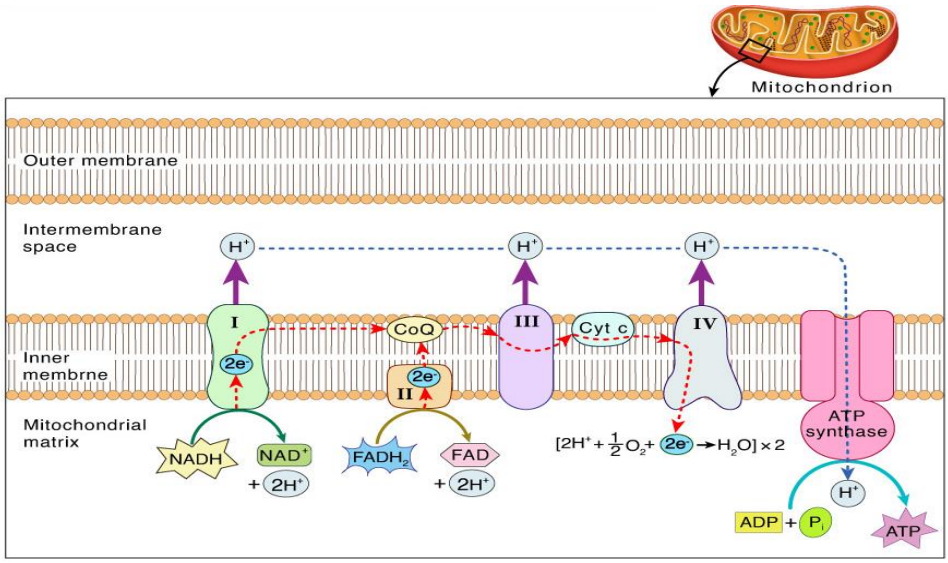
Caution:

- **Pregnancy**: Appears safe but use with caution; limited human data.
- **Liver disease**: Use cautiously in hepatic impairment.
- **Neuromuscular disorders**: May worsen **myasthenia gravis** or similar conditions.
- **Children <6 months**: Use under medical supervision.
- **Concomitant use**: Avoid with **piperazine** (antagonistic action).

4. Niclosamide (used for tapeworms)

Brand Names: Niclosan, Yomesan (less common OTC now)

MOA: Inhibits oxidative phosphorylation in tapeworms → energy depletion.



Oxidative phosphorylation is a metabolic pathway that uses the energy from the oxidation of nutrients to produce adenosine triphosphate (ATP), the primary energy currency of the cell. It's the final stage of cellular respiration and takes place within the mitochondria. The process involves the electron transport chain and chemiosmosis, ultimately leading to the generation of ATP.

Dosage:

- **Adults**: 2 g single dose after light breakfast, chew thoroughly.
- **Children (2–6 yrs)**: 1 g; **(6–12 yrs)**: 1.5 g.

Side Effects:

- GI discomfort
- Nausea
- Headache
- Allergic reactions (rare)

Caution:

- **Pregnancy & breastfeeding**: Use only if clearly needed.
- **Children <2 years**: Not recommended.
- **GI diseases**: Use cautiously in patients with **ulcers** or **severe diarrhea**.
- **Alcohol**: Avoid alcohol consumption during and for at least 24 hours after treatment.

Antacids & Acid-Reducers

1. Antacid Chewable Tablet / Suspension

Examples: Magnesium Hydroxide + Aluminum Hydroxide (e.g., *Maalox*, *Gaviscon*, *Gestid*)

MOA:
Neutralizes stomach acid by direct chemical reaction, increasing gastric pH temporarily.

Dosage Regimen (Adult):
1–2 tablets or 5–10 mL suspension **1 hour after meals and at bedtime**, or as needed.

Side Effects:

- **Mg hydroxide:** Diarrhea
- **Al hydroxide:** Constipation
- Nausea, chalky taste, abdominal cramping (rare)

Cautions:

- Avoid long-term use without medical supervision.
- Caution in **renal impairment** (risk of Mg/Al accumulation).
- May interfere with absorption of other drugs (e.g., iron, tetracyclines, fluoroquinolones).

2. Milk of Magnesia Suspension

Generic Name: Magnesium Hydroxide
Brand Examples: *Milk of Magnesia*, *Laxicon*

MOA:
Acts as an **osmotic laxative** and **acid neutralizer**. Retains water in the intestines and increases peristalsis.

Dosage Regimen (Adult):

- For constipation: **15–30 mL at bedtime**
- As an antacid: **5–15 mL up to 4 times/day**

Side Effects:

- Diarrhea
- Abdominal cramps
- Electrolyte imbalance (with long-term use)

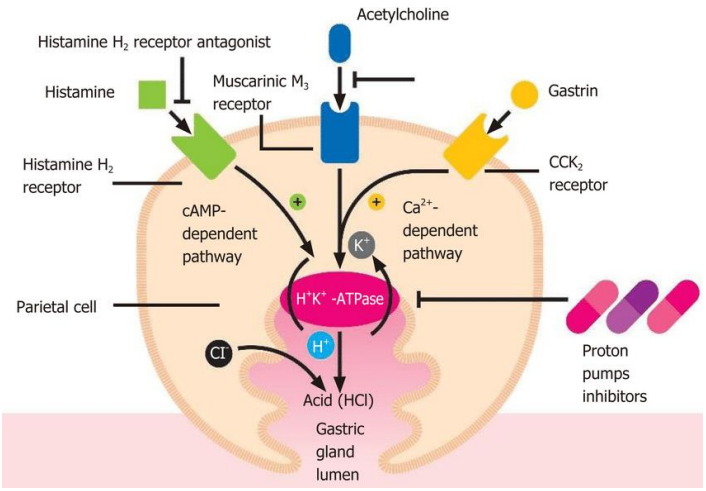
Cautions:

- Not for long-term use
- Avoiding **renal impairment**
- Risk of **hypermagnesemia** with frequent use

◇ 3. Ranitidine Tablet *(Note: Use restricted or banned in many countries)*

Generic Name: Ranitidine Hydrochloride
Brand Examples: *Rantac*, *Histac*

MOA:
H2-receptor antagonist; **blocks histamine (H2) receptors** in gastric parietal cells → reduces acid secretion.



Mechanism of H_2 Antagonists

- H_2 antagonists **competitively block** histamine from binding to **H_2 receptors** on the **basolateral membrane** of the parietal cell.
- This inhibits the **cAMP pathway**, thereby:
  - Reducing activation of **protein kinase A (PKA)**
  - Decreasing **H^+/K^+ ATPase** activity
  - Resulting in **less HCl secretion** into the gastric lumen

Dosage Regimen (Adult):
150 mg **twice daily** or 300 mg **once at bedtime**
(OTC use: 75–150 mg once/twice daily for heartburn)

Side Effects:

- Headache, dizziness
- GI upset
- Rare: Confusion in elderly, blood dyscrasias

Cautions:

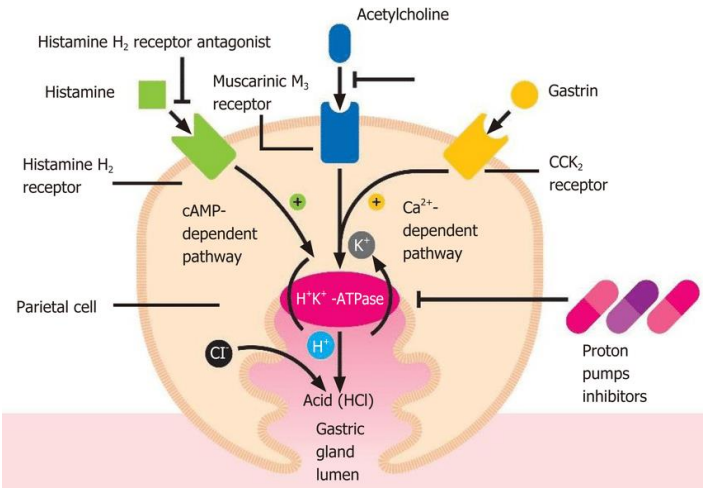
- Many countries have banned ranitidine due to **NDMA contamination risk**
- Avoid patients with liver or kidney issues
- Should not be used without medical advice long-term

[Note: H_2 receptor antagonists are- Cimetidine, Ranitidine, Famotidine]

4. Omeprazole Capsule

Generic Name: Omeprazole
Brand Examples: *Omez*, *Ocid*, *Losec*

MOA:
Proton Pump Inhibitor (PPI); **irreversibly inhibits H^+/K^+-ATPase** in gastric parietal cells → suppresses acid secretion.



Proton pump inhibitors (PPIs) work by reducing the amount of acid produced in the stomach. They achieve this by irreversibly blocking a specific enzyme called H+/K+-ATPase, also known as the proton pump, which is responsible for pumping acid into the stomach. By inhibiting this pump, PPIs effectively lower the overall acidity of the stomach and help to alleviate symptoms and promote healing in acid-related disorders.

Dosage Regimen (Adult):
20 mg once daily **before meals**, usually in the morning
Duration: 2–4 weeks for OTC use

Side Effects:

- Headache, nausea, diarrhea
- Abdominal pain
- Long-term: **B12 deficiency**, **hypomagnesemia**, **osteoporosis/fracture risk**

Cautions:

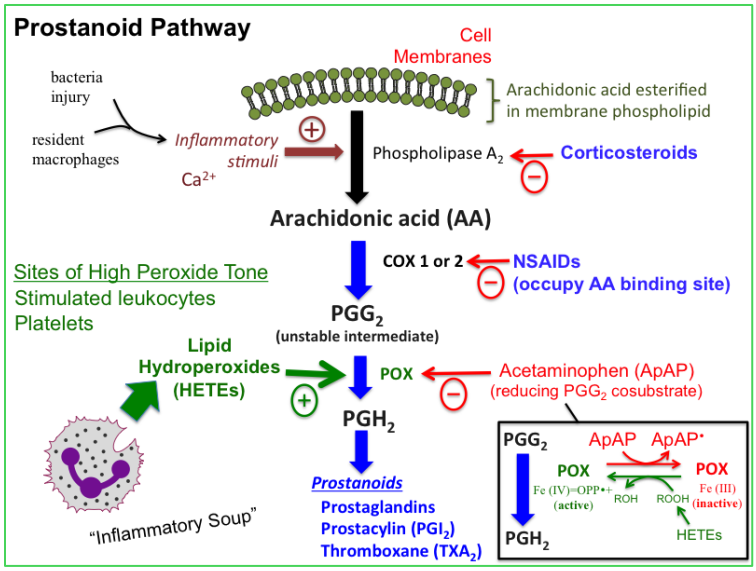
- Don't use more than **14 days without medical supervision**
- May interact with drugs like **clopidogrel**, **warfarin**, **phenytoin**
- Not advised in pregnancy unless necessary.

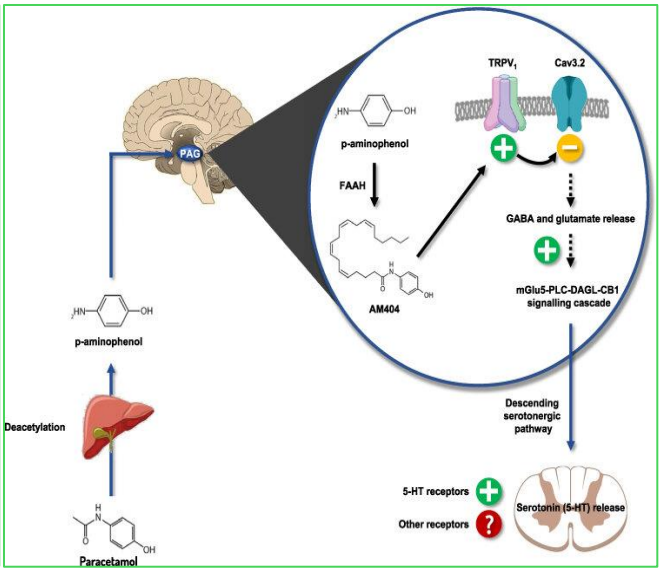
Analgesics & Antipyretics

1. Paracetamol (Acetaminophen)

Mechanism of Action (MOA):

- Inhibits prostaglandin synthesis in the **central nervous system (CNS)**.
- Acts on the **hypothalamic heat-regulating center** to reduce fever.
- Minimal anti-inflammatory action compared to NSAIDs.





Dosage Regimen:

Age Group	Dosage
Adults	500 – 1000 mg every 4-6. Max: 4 g/day
Children (Syrup)	10–15 mg/kg/dose every 4–6 hours. Max: 5 doses/day
Suppository	125–500 mg depending on age and weight

Side Effects:

- Rare at therapeutic dose
- Nausea, rash
- **Hepatotoxicity** (at high doses or overdose)

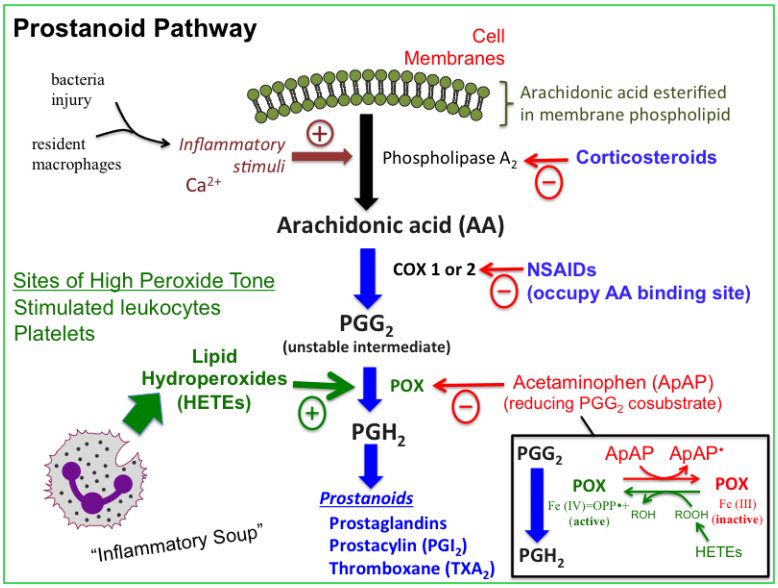
Cautions:

- **Liver disease** (including hepatitis, cirrhosis)
- Chronic alcohol use
- Avoid exceeding recommended dose

2. Diclofenac Gel (Topical NSAID)

Mechanism of Action (MOA):

- Inhibits **cyclooxygenase (COX-1 and COX-2)** enzymes.
- Reduces **prostaglandin synthesis**, which mediates inflammation and pain.
- Topical use minimizes systemic exposure.



Dosage Regimen:

- Apply **2–4 g** to affected area **3–4 times daily**.
- Max duration of use: typically, **7–14 days** (for OTC use)

Side Effects:

- Local skin reactions: itching, redness, burning
- Rare systemic effects (when overused)

Cautions:

- Avoid contact with eyes/mucous membranes
- Do not apply to broken/damaged skin
- Avoid excessive use over large areas
- Not recommended for children under 12 without physician advice

[N.B: NSAIDs: Ibuprofen, Naproxen, Diclofenac, Ketoprofen, Indomethacin, Celecoxib;

Coriticosteroids:

Corticosteriods	Generic Name
Oral and Injectable Corticosteroids/ Glucocorticoids	Prednisolone, Prednisone, Dexamethasone, Methylprednisolone, Hydrocortisone, Betamethasone
Topical Corticosteroids	Hydrocortisone, Betamethasone, Clobetasol, Desonide, Triamcinolone, Fluticasone
Inhaled Corticosteroids (Used for asthma, COPD):	Beclomethasone, Budesonide, Fluticasone, Mometasone, Ciclesonide
Nasal Corticosteroids (Used for allergic rhinitis, sinusitis)	Fluticasone, Budesonide, Mometasone, Beclomethasone, Triamcinolone
Ophthalmic Corticosteroids (Used for eye inflammation)	Dexamethasone, Prednisolone acetate, Fluorometholone

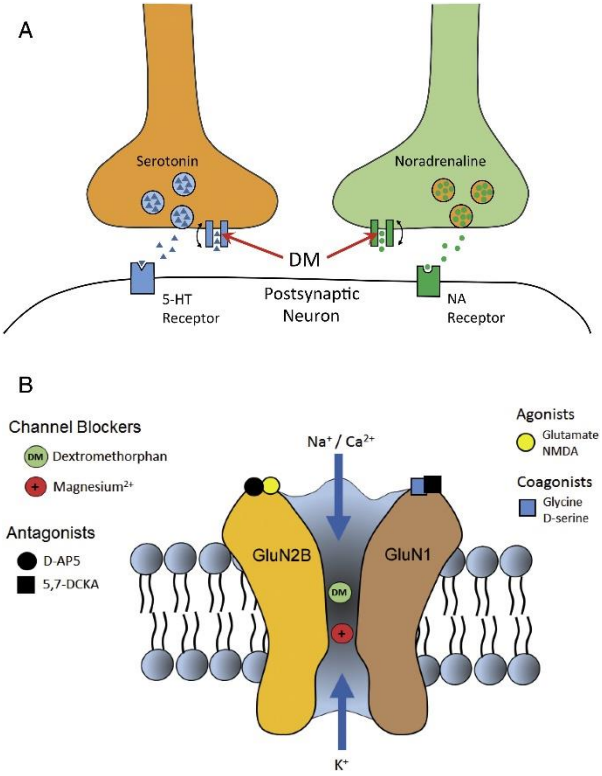
Cold, Cough & Allergy Preparations

1. Dextromethorphan Syrup

Class: Antitussive (Cough Suppressant)

Mechanism of Action:

Dextromethorphan acts on the cough center in the **medulla oblongata** to suppress the cough reflex. It is a **non-opioid** derivative of morphine with **no analgesic or addictive** properties at therapeutic doses.



Dextromethorphan (DXM) has multiple mechanisms of action. It functions as an NMDA receptor antagonist, a sigma-1 receptor agonist, and an antagonist of certain nicotinic receptors. Additionally, it acts as a serotonin and norepinephrine reuptake inhibitor. These diverse actions contribute to its antitussive effects and potential for other therapeutic applications, though its complex pharmacology also gives rise to potential side effects and interactions. The specific contribution of each mechanism to DXM's overall effects is an area of ongoing research.

Dosage Regimen:

- **Adults and children >12 years:** 10–20 mg every 4–6 hours or 30 mg every 6–8 hours.
  Max: 120 mg/day.
- **Children 6–12 years:** 5–10 mg every 4–6 hours.
  Max: 60 mg/day.
- **Children 2–6 years:** 2.5–5 mg every 4 hours.
  Max: 30 mg/day.
  (Use pediatric formulation for children)

Side Effects: Drowsiness**,** Dizziness**,** Nausea, vomiting**,** Constipation (rare)

Cautions:

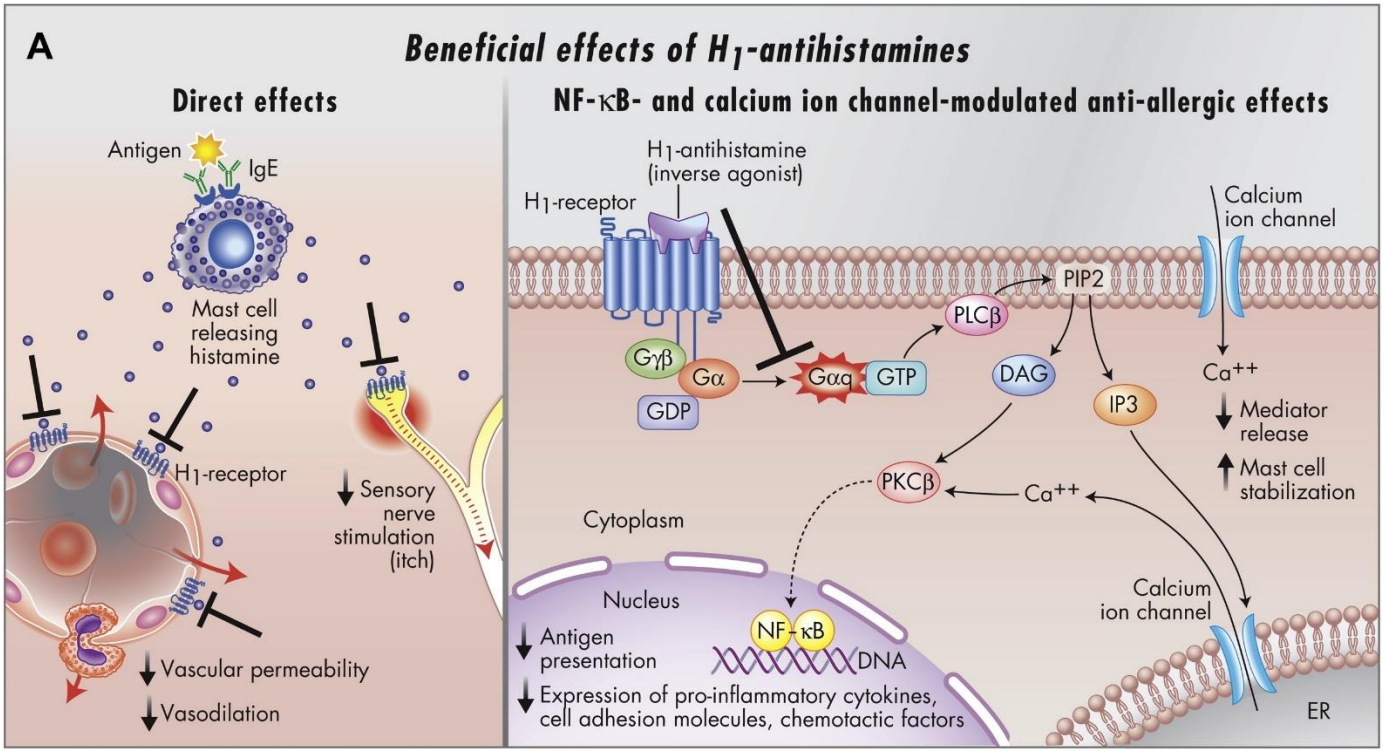
- Do not use with **MAO inhibitors** or **SSRIs** (risk of serotonin syndrome)
- Avoid **productive cough** (can trap mucus)
- Not recommended for children <2 years
- Overdose can cause **CNS depression or hallucination**

2. Chlorpheniramine Maleate (Tablet/Syrup)

Class: First-generation H1 Antihistamine
Common Brands in BD: Histacin, Piriton, Allerfen

Mechanism of Action:

Blocks **histamine (H1) receptors**, preventing the allergic response (runny nose, sneezing, watery eyes). Also, it causes **sedation** due to CNS penetration.



Dosage Regimen:

- **Adults:** 4 mg every 4–6 hours.
  Max: 24 mg/day
- **Children 6–12 years:** 2 mg every 4–6 hours
- **Children 2–6 years:** 1 mg every 4–6 hours

Side Effects:

- Drowsiness, sedation
- Dry mouth, throat
- Dizziness, headache
- Constipation or blurred vision (anticholinergic effects)

Cautions:

- Avoid driving or operating machinery
- Caution in **elderly** (increased fall risk)
- Avoid alcohol and other CNS depressants
- Use with caution in **glaucoma, asthma, prostate enlargement**

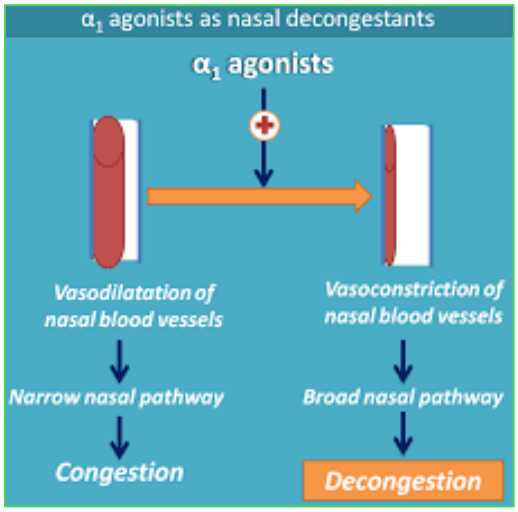
[N.B: First-generation H1 Antihistamine: diphenhydramine, chlorpheniramine]

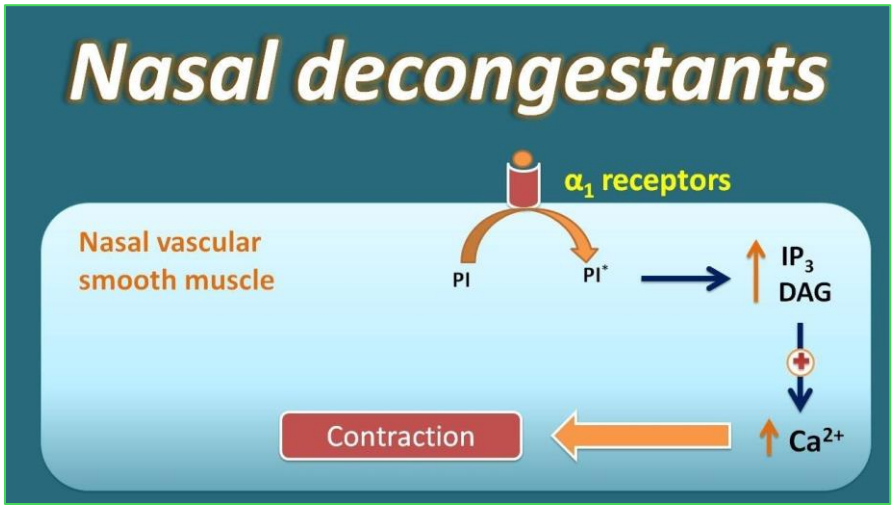
3. Xylometazoline 0.01% Nasal Drops

Class: Nasal Decongestant (Sympathomimetic)
Common Brands: Otrivin Baby, Xylo-baby

Mechanism of Action:

Stimulates α-adrenergic receptors, causing vasoconstriction in nasal blood vessels → reduces swelling and nasal congestion.





Dosage Regimen:

- **Infants (up to 1 year):** 0.01% solution – 1–2 drops in each nostril **1–2 times daily** (max 3x/day)
- **Children (1–6 years):** Use 0.025% or 0.05% if directed by physician

Side Effects:

- Nasal irritation
- Sneezing
- Rebound congestion with prolonged use
- Headache (rare)

Cautions:

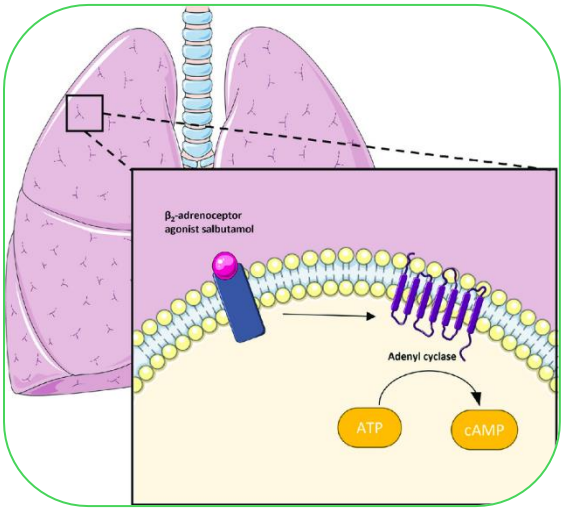
- Do **not use for >5 days** (risk of rebound congestion/rhinitis medicamentosa)
- Avoid **hypertension**, **hyperthyroidism**, **cardiac disease**
- For **nasal use only**

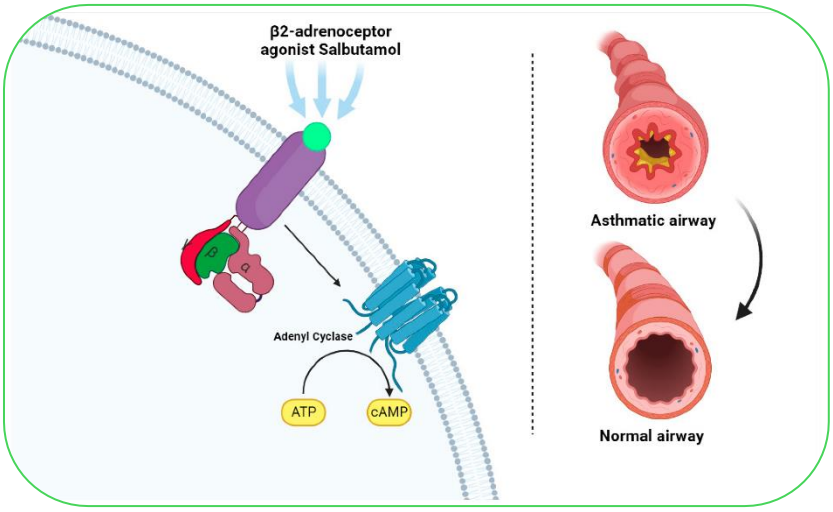
4. Salbutamol Tablet (2 mg, 4 mg)

Class: Short-acting β2-adrenergic agonist (Bronchodilator)
Common Brands: Ventolin, Salbuta, Aerolin

Mechanism of Action:

Activation of Beta-2 adrenergic receptors→Activation of adenyl cyclase→Increase intracellular concentration of cAMP→Activation of protein kinase A→Inhibits phosphorylation of myosin→Decreased intracellular ionic calcium concentrations→Relaxation of bronchial smooth muscle.





Dosage Regimen:

- **Adults:** 2–4 mg tablet 3–4 times/day
  Max: 8 mg/dose, 32 mg/day
- **Children 6–12 years:** 2 mg 3–4 times/day
- **Children 2–6 years:** 1–2 mg 3–4 times/day

Side Effects:

- Tremor
- Palpitations
- Headache
- Muscle cramps
- Nervousness
- Rare: Paradoxical bronchospasm

Cautions:

- Use with caution in patients with **cardiac disease**, **hyperthyroidism**, **diabetes mellitus**
- Overuse can lead to **tachycardia** and **hypokalemia**

Anti-inflammatory/Topical Musculoskeletal

Methyl Salicylate Gel (often combined with menthol, camphor, or diclofenac)

Drug Class:

- **Topical counterirritant**
- **NSAID (in broader anti-inflammatory category)**

Mechanism of Action (MOA):

Methyl salicylate is a **counterirritant**. When applied topically:

- It **causes irritation of the skin**, which distracts the brain from deeper musculoskeletal pain.
- It is **converted to salicylic acid**, which **inhibits cyclooxygenase (COX)** enzymes, reducing **prostaglandin synthesis**, and thus **inflammation and pain**.
- It increases **blood flow** to the applied area, aiding pain relief.

Dosage Regimen (Topical Use):

- **Adults and children over 12 years:**
  - Apply a thin layer to the affected area **3 to 4 times daily**.
  - Gently massage into the skin.
- **Do not apply more than 4 times in 24 hours**.
- **Maximum duration** without medical supervision: **7 days**.

Common Brand Names in Bangladesh:

- **Relaxyl Gel**
- **Moov**
- **Iodex**
- **Counterpain**
- **Fast Gel (often with diclofenac)**

Cautions:

- **Do not apply on** broken, wounded, or irritated skin.
- **Avoid contact with eyes, mouth, and mucous membranes**.
- **Do not use with heating pads or tightly bandage the area** — increases absorption risk.
- **Not suitable for children under 12 years** without medical advice.
- **Avoid aspirin-sensitive patients** or those with salicylate allergies.
- **Pregnancy:** Use with caution (especially in 3rd trimester).
- **Do not use before or after heart surgery** due to salicylate risks.

Side Effects: Usually mild if used properly. Can include:

- Local skin **irritation**, **burning**, **stinging**
- **Allergic reactions** (rash, redness)
- **Systemic salicylate toxicity** (rare; mostly if overused or applied under occlusion)

Symptoms of **salicylate toxicity** (if absorbed in excess):

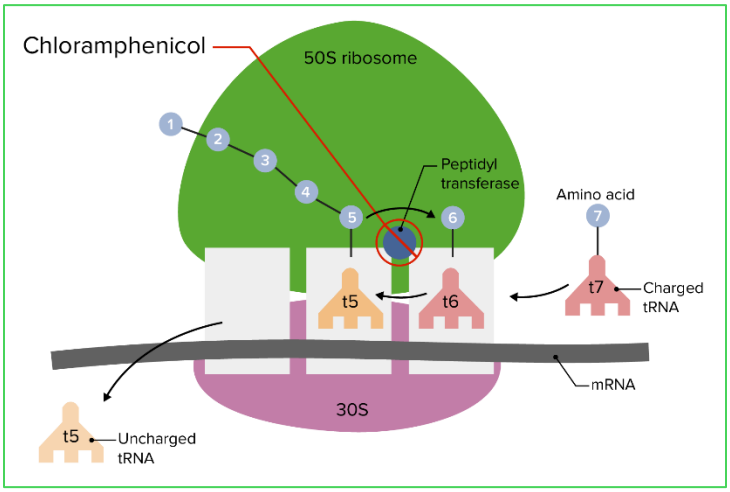
- Tinnitus (ringing in ears)
- Hyperventilation

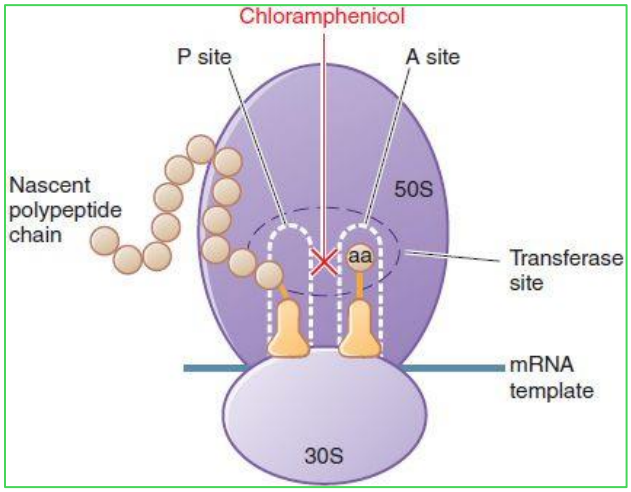
Antibacterials (topical)

1. Chloramphenicol (Eye/Ear Drops or Ointment)

MOA:

Chloramphenicol is a broad-spectrum antibiotic that inhibits bacterial protein synthesis(inhibits microbial protein synthesis by binding to the 50 S subunit of the 70 S ribosome and inhibiting the action of peptidyl transferase, thus preventing peptide bond formation). It achieves this by binding to the bacterial ribosome, specifically blocking peptidyl transferase. This action prevents the bacteria from producing essential proteins, thereby stopping its growth. Chloramphenicol is used to treat superficial eye infections like bacterial conjunctivitis and otitis externa.





Dosage Regimen:

- **Eye drops:** 1–2 drops in the affected eye every 2–6 hours for 5–7 days.
- **Ointment:** 1–1.5 cm ribbon into conjunctival sac 3–4 times daily.
- **Ear drops:** 2–3 drops into affected ear 2–3 times daily.

Side Effects:

- Local irritation
- Burning or stinging
- Rarely: Bone marrow suppression (with systemic absorption)

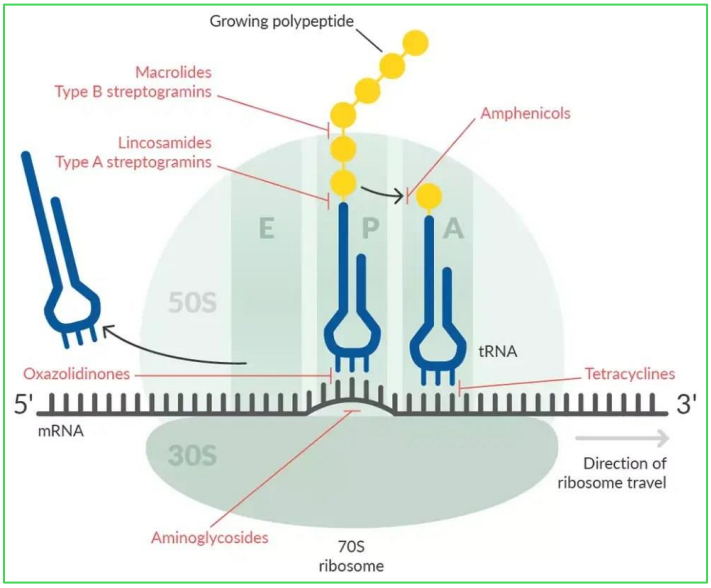
Cautions:

- Avoid prolonged use.
- Not recommended in neonates (gray baby syndrome).
- Do not use it in viral or fungal infections.

2. Neomycin / Gentamicin / Bacitracin (Topical Combination)

MOA:

- **Neomycin/Gentamicin** is an aminoglycoside antibiotic that works by disrupting bacterial protein synthesis. It binds to the 30S ribosomal subunit, interfering with the translation process and leading to bacterial cell death. This mechanism is similar to other aminoglycosides, but neomycin is typically administered topically orally due to its potential for systemic toxicity.
- **Bacitracin:** Inhibits bacterial cell wall synthesis.



Dosage Regimen:

Apply thin layer to affected area 2–3 times daily for up to 7 days.

Side Effects:

- Skin irritation
- Allergic contact dermatitis
- Ototoxicity (if used in large wounds or ears with perforation)

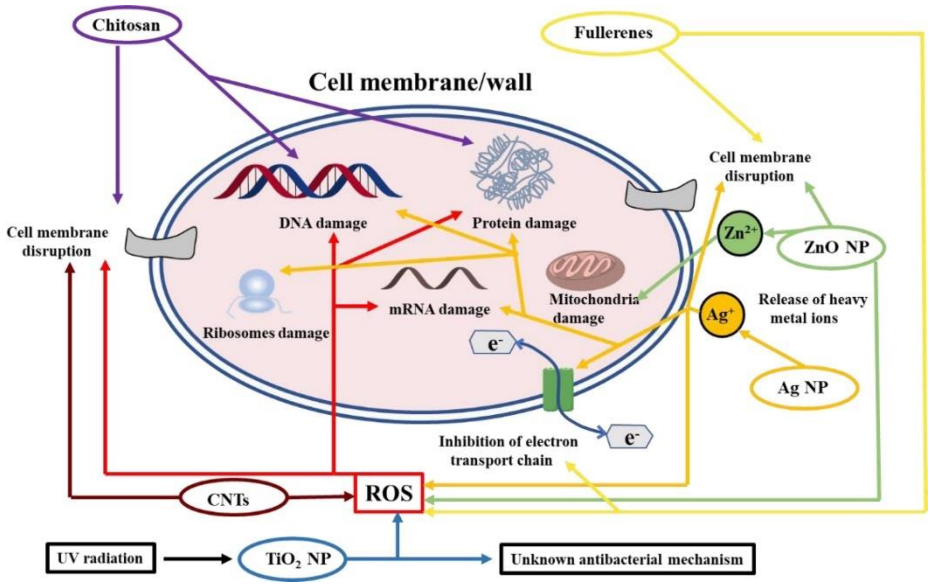
Cautions:

- Avoid large areas or open wounds.
- Discontinue if rash or itching occurs.
- Avoid long-term use (resistance risk).

3. Silver Sulfadiazine Ointment

MOA:

Silver ions inhibit multiple bacterial enzymes and DNA/RNA replication. Sulfadiazine is a sulfonamide that inhibits folic acid synthesis.



Application: Silver sulfadiazine ointment is primarily used to treat and prevent infections in burn wounds, specifically for **second- and third-degree burns**. It acts as a topical antibiotic, providing antibacterial management and **preventing bacterial colonization**. It's crucial for the topical prophylaxis against bacterial infections in burn patients.

Dosage Regimen:

Apply 1–2 times daily on cleaned burn/wound area (1–2 mm thick layer), cover with sterile gauze.

Side Effects:

- Burning sensation
- Rash
- Leukopenia (rare)
- Argyria with prolonged use

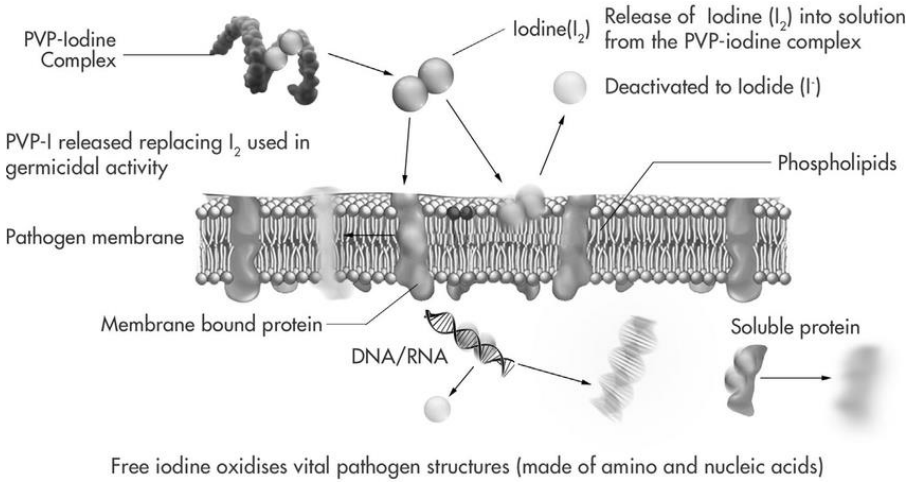
Cautions:

- Avoid sulfa allergy
- Not for use in pregnant women (especially near term)
- Not for use in neonates (<2 months)

4. Povidone Iodine (Ointment/Lotion/Solution)

MOA:

Releases free iodine → oxidizes cell components and kills bacteria, fungi, viruses, and protozoa.



Free iodine oxidises vital pathogen structures (made of amino and nucleic acids)

Application:

1. Wound Care:

- Minor cuts, scrapes, and abrasions: Povidone iodine helps prevent infection and promotes healing.
- Burns: It's used to disinfect and prevent infection in burn wounds.
- Surgical incisions: It's applied before and after surgery to degerm the skin and prevent infection.

2. Skin Preparation:

- Pre-operative skin disinfection: It's used to clean and disinfect the skin before surgical procedures.
- Other procedures: used to degerm the skin before other procedures like catheter insertion or injections.
- Surgical scrubs: It's used by healthcare professionals for handwashing before surgery.

3. Oral Hygiene:

- Mouthwash/gargle: used to relieve sore throats and treat mouth and throat infections.
- Post-operative oral care: It can be used after dental or oral surgery to prevent infection.

4. Other Uses:

- Vaginal infections: Povidone iodine is used to treat certain types of vaginitis.
- Antimicrobial in nanomaterials: its potential in wound healing applications involving nanomaterials.

Dosage Regimen:

Apply directly to wound/affected skin 1–2 times daily. For mucosal use, dilute according to instructions.

Side Effects:

- Skin irritation
- Iodine allergy (rash, itching)
- Thyroid dysfunction (with prolonged use or large wounds)

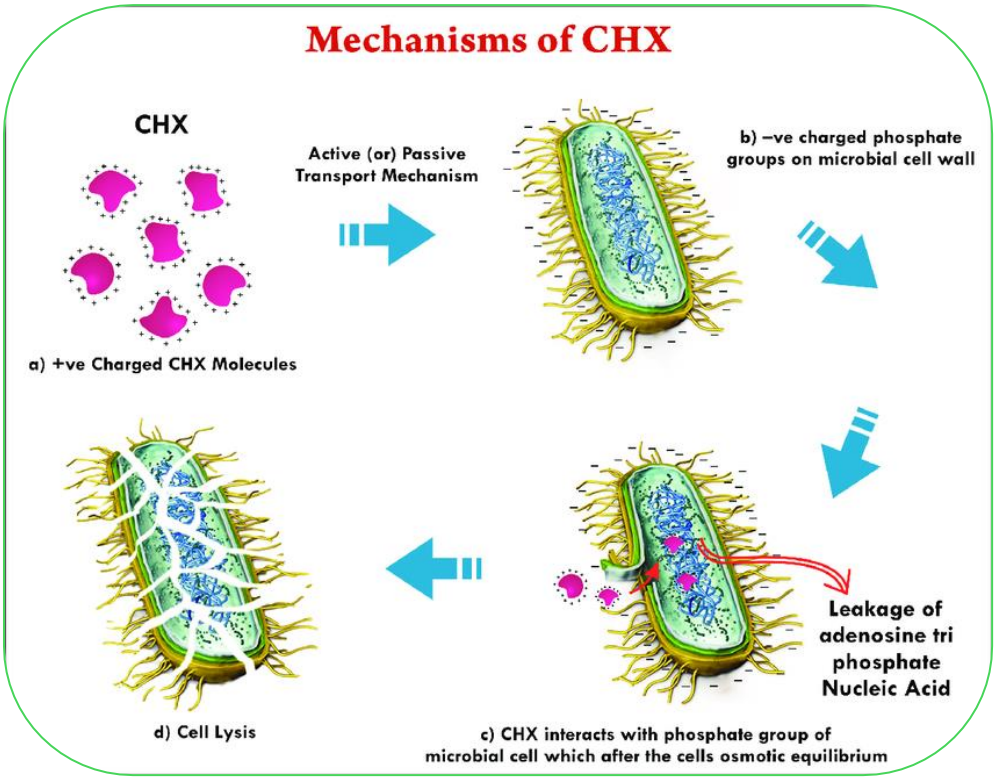
Cautions:

- Avoid in iodine-sensitive patients
- Not for deep wounds or puncture wounds

5. Chlorhexidine (Lotion/Cream/Solution)

MOA:

Binds to bacterial cell membranes, causing leakage and cell death. Broad spectrum including Gram-positive & Gram-negative bacteria.



Initial Attraction: Chlorhexidine, in its cationic form, is attracted to the negatively charged bacterial cell wall.

Membrane Disruption: This attraction leads to the disruption of the cell membrane's integrity.

Leakage of Cellular Contents: The disrupted membrane allows vital cellular components, like potassium ions, to leak out of the cell.

Cell Death: At higher concentrations, chlorhexidine can coagulate and precipitate cellular components, leading to cell death.

Substantivity: Chlorhexidine's ability to bind to oral surfaces (teeth, mucous membranes) provides a sustained antimicrobial effect, even after rinsing.

Applications:

Wound Cleansing:

- Chlorhexidine can be used to clean minor cuts, scrapes, and other wounds to help prevent infection.

Surgical Site Preparation:

- It is applied to the skin before surgical procedures to reduce the risk of infection at the surgical site.

Oral Hygiene:

- Chlorhexidine mouthwash can be used to treat gingivitis (gum inflammation), reduce plaque buildup, and manage mouth ulcers and oral thrush. It can also be used to clean dentures.

Hand Hygiene:

- It can be used as a surgical hand scrub to reduce the number of germs on healthcare professionals' hands before procedures.

Other Applications:

- Chlorhexidine may also be used for disinfecting medical devices, such as catheters, and for bathing patients in healthcare settings to reduce the risk of hospital-acquired infections.
- Important Considerations:

Duration of Use:

- Chlorhexidine mouthwash is typically used for a limited period (e.g., up to 4 weeks) to avoid staining of teeth.

Proper Use:

- When using chlorhexidine for wound care or skin preparation, it's important to follow the instructions carefully, including rinsing thoroughly after application.

Dosage Regimen:

- Skin: Apply 1–2 times daily.
- Surgical prep: Use as per instruction.

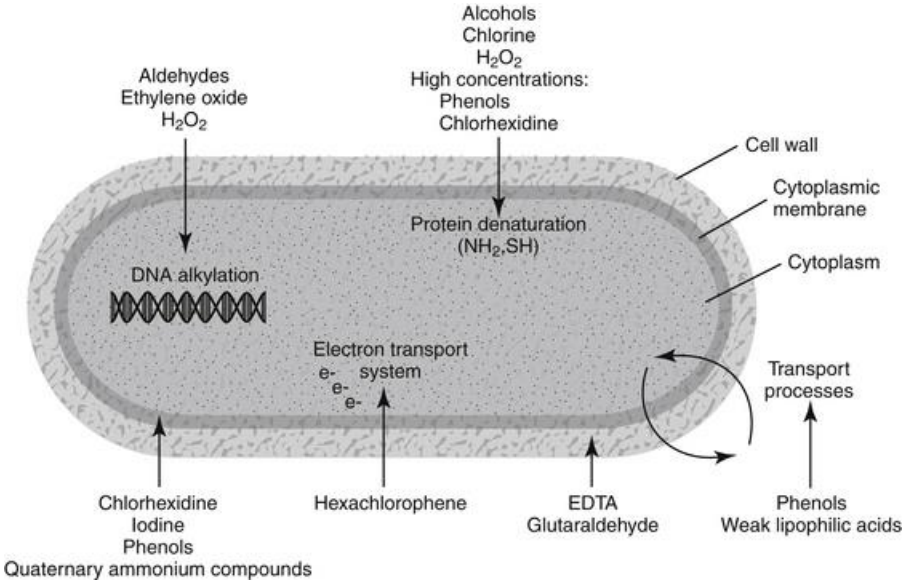
Side Effects:

- Local irritation
- Contact dermatitis
- Rare: Hypersensitivity or anaphylaxis
- Chlorhexidine can cause temporary side effects, such as staining teeth, taste changes, and mouth irritation. It's important to discuss any concerns with a healthcare professional.

Cautions:

- Avoid contact with eyes and middle ear.
- Do not apply on mucosal surfaces unless prescribed.

Chloroxylenol (e.g., Dettol Lotion/Cream/Solution)



MOA

Cell Membrane Disruption:

Chloroxylenol, as a phenol antiseptic, is thought to bind to proteins on the bacterial cell membrane, causing it to become leaky and allowing cellular contents to escape.

Enzyme Inactivation:

Chloroxylenol also inactivates cellular enzymes, further disrupting the bacterial cell's function.

Limited Spectrum

While effective against gram-positive bacteria, it has limited activity against gram-negative bacteria and does not have significant antifungal properties.

Application

Skin Disinfection:

- Chloroxylenol is used to disinfect skin, including minor cuts, scrapes, and burns, to prevent infection.

Surgical Instrument Disinfection:

- It's used for cold sterilization of heat-sensitive surgical instruments.

Household Disinfection:

- Chloroxylenol is a key ingredient in products used to sanitize bathrooms, diaper pails, laundry equipment, pet living areas, and other household surfaces.

Antiseptic Soaps:

- Many antibacterial soaps contain chloroxylenol to help reduce the spread of germs.

Wound Cleansing:

- It is used to clean and disinfect minor wounds, cuts, and abrasions.

Control of Fungal Infections:

- Chloroxylenol can help reduce the growth of fungi, such as Malassezia associated with dandruff.

Other Applications:

- It's also used in industrial settings for controlling algae, bacteria, and fungi in wash tanks and other applications.

Dettol:

A well-known brand of antiseptic liquid, Dettol, uses chloroxylenol as its active ingredient.

Dosage Regimen:

- Apply to affected area 2–3 times/day.
- For cleaning wounds: dilute solution (as per label) and apply.

Side Effects:

- Local irritation
- Allergic reactions (rare)

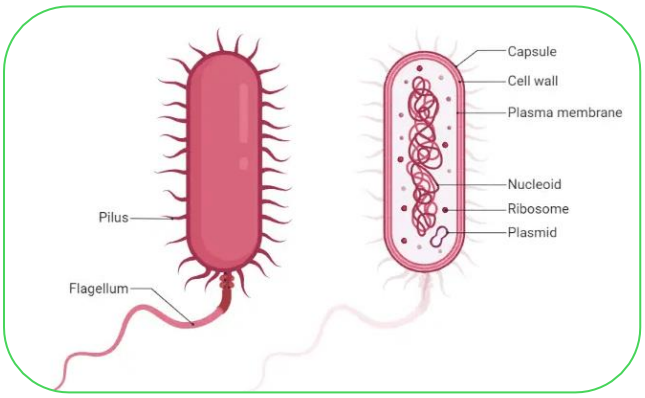
Cautions:

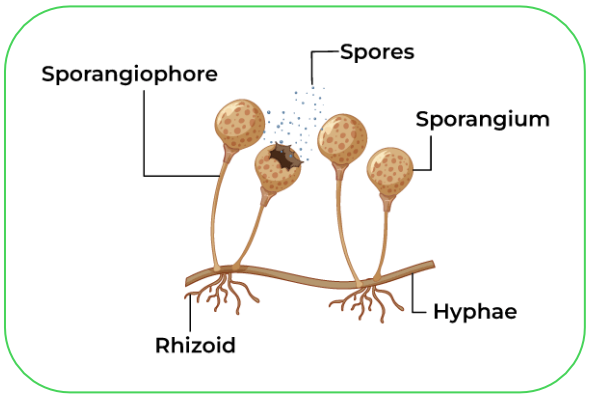
- External use only
- Avoid eyes and deep wounds

7. Gentian Violet (Topical solution)

MOA:

Acts as a dye with antifungal and antibacterial properties. Binds to DNA, interfering with cell replication.





DNA Binding and Inhibition of Cell Growth: Gentian violet dissociates into positive (GV+) and negative (Cl-) ions in aqueous solutions. The positively charged GV+ ions are attracted to and penetrate the negatively charged components of microbial cells, including the lipopolysaccharide (in Gram-negative bacteria), peptidoglycan (in Gram-positive bacteria), and crucially, DNA. By binding to DNA, gentian violet is thought to interfere with DNA replication, cause mutations, and act as a mitotic poison, ultimately inhibiting cell growth and leading to cell death. This DNA interaction is a primary mechanism for its antimicrobial effects on both bacteria and fungi.

Mitochondrial Dysfunction and Respiratory Inhibition: Gentian violet can dissipate the membrane potential of bacterial and mitochondrial membranes, leading to increased permeability and subsequent respiratory inhibition. This anti-mitochondrial activity helps explain its efficacy against various microbes, including bacteria and yeast, while having relatively milder effects on mammalian cells.

Inhibition of NADPH Oxidases: In mammalian cells, gentian violet has been shown to block the activity of NADPH oxidases (specifically NADPH oxidases 1, 2, and 4). This inhibition reduces the conversion of molecular oxygen to superoxide, which in turn decreases the oxidation of IkB, leading to NF-kB inhibition and anti-inflammatory activity. This mechanism contributes to its use in certain inflammatory skin conditions.

Covalent Adducts with Thioredoxin Reductase 2 (TRX2): In bacterial, fungal, and parasitic cells, gentian violet forms a covalent adduct with thioredoxin reductase 2 (TRX2). TRX2 is a vital protein involved in cellular activity and redox regulation. By disrupting TRX2 function, gentian violet leads to cell malfunction and ultimately, cell death in these microorganisms.

Alteration of Redox Potential: Some hypotheses suggest that gentian violet's bacteriostatic effect is due to an unfavorable alteration of the oxidation-reduction potential within the microbial cell.

Anti-angiogenic and Anti-tumor properties: Gentian violet can decrease the production of angiopoietin-2, a protein involved in angiogenesis (new blood vessel formation), which contributes to its anti-angiogenic properties. Its anti-tumor effects are linked to mechanisms like inducing apoptosis (programmed cell death) of tumor cells, inhibiting NADPH oxidases, decreasing mitochondrial thioredoxin 2, and inhibiting the STAT3/SOX2 axis.

In summary, gentian violet exerts its effects through a combination of mechanisms that primarily involve disrupting microbial DNA, impairing mitochondrial function, and inhibiting key enzymatic pathways, leading **to broad antimicrobial and other therapeutic actions.**

Application:

Antifungal Agent:

- **Oral Thrush (Candidiasis):** This is a very common use, especially in infants and individuals with weakened immune systems (e.g., HIV-positive patients). It helps reduce the growth of Candida fungus in the mouth.
- **Fungal Skin Infections:** It's used to treat conditions like athlete's foot, ringworm, and other fungal rashes on the skin.
- **Vaginal Thrush**: Can be used topically for vaginal candidiasis.

Antibacterial Agent:

- Minor Skin Infections: Used as an antiseptic for minor cuts, scrapes, and burns to help prevent infection.
- Boils, Chronic Ulcers, and Wounds: Can be applied to these to aid in disinfection and healing.
- Impetigo: A superficial bacterial skin infection.
- MRSA (Methicillin-Resistant Staphylococcus aureus): Studies have shown its effectiveness against this resistant bacterium.
- Umbilical Cord Care: Historically used to prevent bacterial colonization of the umbilical stump in newborns.

Antihelminthic Agent: In some cases, it has been used orally to treat certain parasitic worm infections (e.g., pinworm).

Blood Additive: Used in blood banks to prevent the transmission of Chagas' disease.

Other Dermatological Conditions:

- Infected Eczema: Can reduce severity by targeting bacterial colonization.
- Oral Hairy Leukoplakia: A condition affecting the tongue, particularly in immunocompromised individuals.
- Rashes and Sores: Can help soothe and promote healing of various rashes, including those from chickenpox.

Non-Medical / Laboratory Uses:

- **Gram Staining:** A fundamental technique in microbiology to differentiate bacteria into Gram-positive and Gram-negative based on their cell wall properties. Gentian violet is the primary stain used.
- **Histological Staining:** Used in laboratories to stain and highlight specific components of cells and tissues for microscopic examination.
- **Forensics:** Used in fingerprinting.
- **Industrial Dyes:** Used for dyeing wood, silk, and in inks.

Important Considerations:

- **Staining:** Gentian violet is a strong dye and will stain skin and clothing purple. This staining can be permanent on some surfaces.
- **Not for Open Wounds on Face:** It should generally not be applied to ulcerative lesions on the face as it can cause permanent "tattooing" of the skin.
- **Safety:** While generally safe for topical external use, it's a mutagen and mitotic poison in laboratory studies, though serious side effects are rare with typical topical application.
- **Availability**: In some countries, more modern treatments are favored, and gentian violet may no longer be readily available for medical purposes. Always follow your doctor's instructions or the product label for proper use.

Dosage Regimen:

Apply to affected area once or twice daily with a cotton swab.

Side Effects:

- Skin staining (purple)
- Mild burning or irritation

Cautions:

- External use only
- Avoid mucosal surfaces and eyes
- Avoid in infants with open wounds

Antiprotozoals

Metronidazole

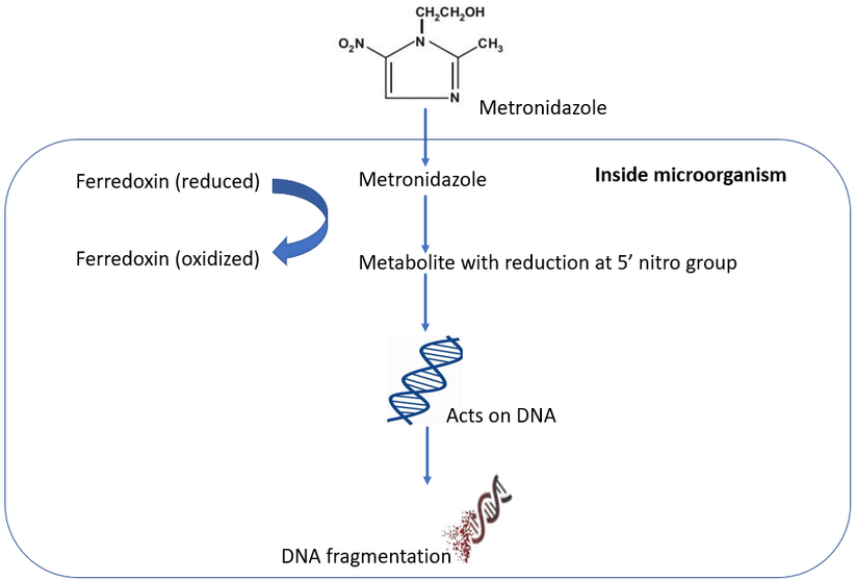
Dosage Forms: Tablet (200 mg, 400 mg), Suspension (200 mg/5 mL or similar)
Brand Names in Bangladesh (OTC available): Flagyl, Metrogyl, Metronid, Metrox, Nidagyl, etc.

Therapeutic Class:

- Antiprotozoal
- Antibacterial (especially anaerobic bacteria)

Mechanism of Action (MOA):

Metronidazole is a **prodrug** that is **activated by anaerobic organisms**. Its active form interacts with DNA, causing strand breakage and inhibition of nucleic acid synthesis, leading to **cell death** in **protozoa and anaerobic bacteria**.



Prodrug Activation (Selective Toxicity):

- Metronidazole is a prodrug, meaning it's inactive in its original form.
- It enters the microbial cell, often by passive diffusion.
- Crucially, only anaerobic bacteria and certain protozoa possess specific intracellular electron transport proteins (like ferredoxin or pyruvate-ferredoxin oxidoreductase, PFOR) with a sufficiently negative redox potential to reduce the nitro group of metronidazole.
- In an anaerobic environment, these enzymes transfer electrons to metronidazole, converting it into its active, highly reactive form. This reductive activation creates a concentration gradient that further drives the uptake of more drug into the cell.

Formation of Cytotoxic Metabolites (Free Radicals):

- The reduction of metronidazole leads to the formation of unstable, highly reactive intermediate compounds, including nitro radical anions and other free radicals.
- These active metabolites are cytotoxic, meaning they are toxic to the cell.

DNA Damage and Synthesis Inhibition:

- The highly reactive free radicals produced by activated metronidazole interact with the microorganism's DNA.
- This interaction causes DNA strand breakage and a loss of the DNA's helical structure.
- The damage to DNA inhibits essential cellular processes like DNA replication and transcription (the synthesis of RNA from a DNA template).
- This ultimately disrupts the microorganism's ability to synthesize proteins and carry out vital functions, leading to cell death.

Applications:

Metronidazole is a versatile antibiotic and antiprotozoal medication with a wide range of uses, primarily targeting anaerobic bacteria and certain parasites. It's available in various forms, including oral tablets, capsules, suspensions, topical creams/gels, vaginal gels/suppositories, and injections.

Here are the key uses of Metronidazole:

1. Bacterial Infections (Anaerobic):

Metronidazole is highly effective against obligate anaerobic bacteria, which can cause serious infections in various parts of the body. These include:

- Intra-abdominal infections: Such as peritonitis, abdominal abscesses, and diverticulitis. Often used in combination with other antibiotics.
- Pelvic infections: Like pelvic inflammatory disease (PID), tubo-ovarian abscesses, and endometritis.
- Skin and soft tissue infections: Including infected leg ulcers, pressure sores, and necrotizing infections.
- Bone and joint infections.
- Respiratory tract infections: Such as lung abscesses and aspiration pneumonia.
- Central nervous system infections: Like brain abscesses and meningitis.
- Septicemia and bacteremia (bloodstream infections).
- Dental infections: Including dental abscesses and acute ulcerative gingivitis.
- Surgical prophylaxis: Used before and after certain surgeries (especially gastrointestinal or gynecological) to prevent anaerobic bacterial infections.

2. Parasitic Infections (Protozoal):

Metronidazole is a first-line treatment for several important protozoal infections:

- Trichomoniasis: A common sexually transmitted infection caused by *Trichomonas vaginalis*. Treatment often includes the patient's sexual partner(s).
- Amebiasis: Infections caused by *Entamoeba histolytica*, including intestinal amebiasis (amebic dysentery) and amebic liver abscesses.
- Giardiasis: An intestinal infection caused by *Giardia intestinalis* (also known as *Giardia lamblia*).

3. Specific Conditions:

- Bacterial Vaginosis (BV): A very common vaginal infection caused by an imbalance of bacteria in the vagina. Metronidazole is a primary treatment, available as oral tablets or vaginal gel/ovules.
- Clostridioides difficile (C. difficile) infection: For mild to moderate cases of *C. difficile* colitis (pseudomembranous colitis), especially if vancomycin or fidaxomicin are unavailable. For severe cases, it might be used intravenously in combination with oral vancomycin.

- Rosacea: Topical metronidazole creams, gels, or lotions are used to treat the inflammatory lesions (redness and bumps) of rosacea.
- Helicobacter pylori eradication: As part of multi-drug regimens (e.g., triple or quadruple therapy) to eradicate *H. pylori*, a bacterium implicated in peptic ulcers and gastritis.

Important Notes:

- Prescription Only: Metronidazole is a prescription medication and should only be used under the guidance of a healthcare professional.
- Not for Viral Infections: It is an antibiotic and will not work against viral infections like colds, flu, or COVID-19.
- Alcohol Interaction: A strong interaction exists with alcohol, leading to a "disulfiram-like reaction" (nausea, vomiting, flushing, headache, abdominal cramps). Alcohol should be avoided during treatment and for at least 48-72 hours after the last dose.
- Side Effects: Common side effects include nausea, metallic taste in the mouth, headache, and dizziness. More serious side effects are rare but can occur.
- Complete the Full Course: It's crucial to complete the entire prescribed course of metronidazole, even if symptoms improve, to prevent the development of antibiotic resistance and ensure complete eradication of the infection.

Pediatric Dose (Suspension):

- **Giardiasis:** 15–20 mg/kg/day in 3 divided doses
- **Amoebiasis:** 35–50 mg/kg/day divided 3 times

Side Effects:

- Common:
- Nausea, vomiting
- Metallic taste
- Abdominal cramps
- Headache
- Diarrhea

Less common but serious:

- Seizures, peripheral neuropathy (long-term/high dose)
- Allergic reactions
- Urine discoloration (reddish-brown)

Important Notes (Bangladesh Context):

- Though **OTC access** exists in many local pharmacies, Metronidazole **should ideally be used under physician supervision**.
- Misuse leads to resistance, masking symptoms, or ineffective treatment.
- Often self-medicated for **diarrhea, vaginitis, or dental infections**, but inappropriate use can delay correct diagnosis.

Cautions & Warnings:

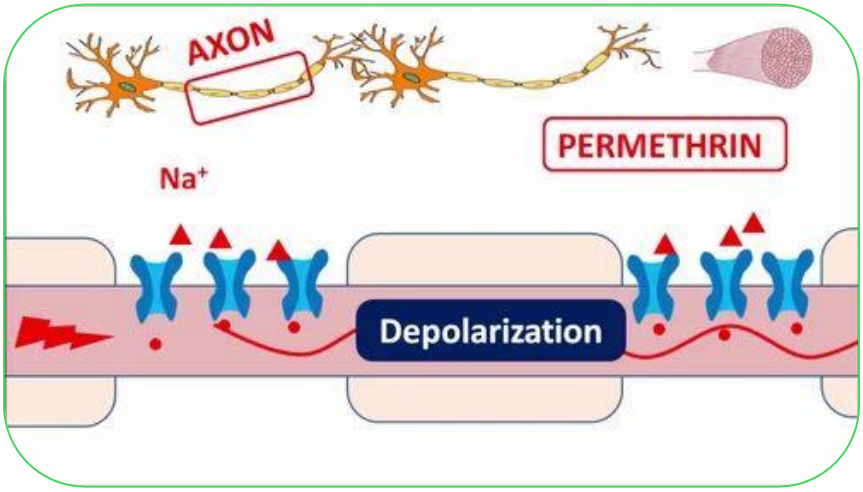
- **Avoid alcohol**: Causes **disulfiram-like reaction** (flushing, vomiting, palpitation).
- **Pregnancy**: Avoid in 1st trimester unless necessary.
- **CNS disease**: Use with caution in epilepsy or other neurological conditions.
- **Renal/Hepatic impairment**: Dose adjustment may be needed.
- **Breastfeeding**: Enters breast milk—use with caution or avoid.

Scabicides/Ectoparasiticides

1. Permethrin (Ointment/Cream 5%)

Mechanism of Action (MOA):

Permethrin is a **synthetic pyrethroid** that **disrupts sodium channel repolarization** in the nerve membranes of parasites, leading to **paralysis and death** of scabies mites or lice.



Elaboration of MOA: Permethrin is a synthetic pyrethroid insecticide that works by targeting the nervous system of insects and mites. Its mechanism of action (MOA) is based on disrupting the normal function of their nerve cells, leading to paralysis and death.

Here's a detailed breakdown of permethrin's MOA:

1. **Voltage-Gated Sodium Channel Modulation:**
    - The primary target of permethrin is the voltage-gated sodium channels (VGSCs) located in the nerve cell membranes of insects and mites. These channels are crucial for the generation and conduction of nerve impulses.
    - Normally, sodium channels open briefly to allow sodium ions (Na+) to flow into the nerve cell, causing depolarization (a change in electrical potential) and initiating a nerve impulse. They then quickly approached the nerve to repolarize and prepare for the next impulse.
2. **Prolonged Channel Opening and Hyperexcitation:**
    - Permethrin binds to the open state of these sodium channels.
    - Instead of allowing the channels to close quickly, permethrin prolongs the opening of the sodium channels. This means that sodium ions continue to flow into the nerve cell for an extended period.
    - This sustained influx of sodium ions leads to delayed repolarization of the nerve membrane and repeated, uncontrolled firing of nerve impulses. The nerve cells become hyperexcited.

3. **Disruption of Nerve Transmission and Paralysis:**
    - The continuous and chaotic firing of nerve impulses due to the prolonged open state of sodium channels disrupts normal nerve transmission.
    - This overstimulation of the nervous system leads to:
        - Muscle spasms: Initial uncontrolled muscle contractions.
        - Tremors: Involuntary shaking.
        - Ataxia: Loss of coordination.
        - Paralysis: Eventually, the muscles become exhausted and paralyzed.
4. **Death:**
    - The continuous neurological disruption and paralysis ultimately lead to the death of the insect or mite, often due to respiratory failure.

Dosage Regimen:

- **Scabies:**
    - **Apply** a thin layer of **5% cream** to **the entire body** from **neck to toe** (for infants: include scalp).
    - **Leave for 8–14 hours** (usually overnight).
    - Wash it off with soap and water.
    - **Repeat after 7 days** if needed.
- **Pediculosis (Lice):**
    - Add **scalp and hair**, leave for **10 minutes**, then rinse.
    - Comb out lice/nits with a fine-tooth comb.

Cautions:

- Avoid **contact with eyes, mouth, or mucous membranes**.
- Not recommended in **infants under 2 months** unless prescribed.
- Use with caution in people with **severely inflamed skin** or **eczema**.
- May cause **transient burning** in sensitive skin.

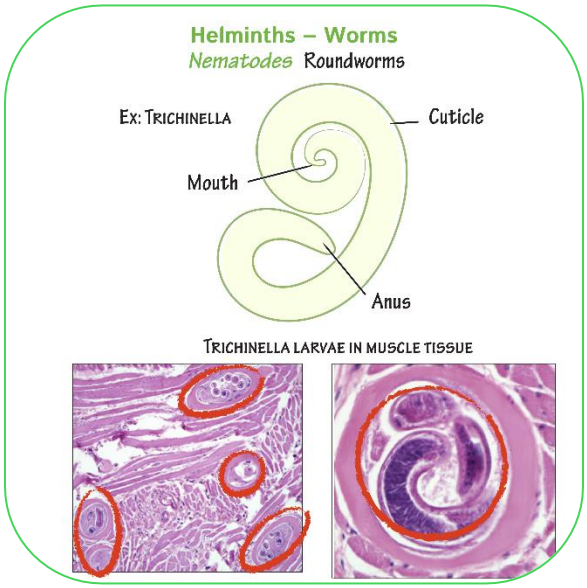
Side Effects:

- Itching or burning sensation
- Mild erythema (redness)
- Tingling or numbness
- Rare: Rash or swelling (hypersensitivity)

2. Benzyl Benzoate Lotion (10–25%)

Mechanism of Action (MOA):

Benzyl benzoate is toxic to **Sarcoptes scabiei** mites and **Pediculus humanus** (lice). It penetrates the parasite's cuticle and **acts as a neurotoxin**, causing death.



Dosage Regimen:

- **Scabies:**
  - Apply **25% lotion** to the **whole body below the neck** at bedtime.
  - Allow to **dry naturally** and **do not wash off** until the next day.
  - **Repeat it on the 2nd or 3rd day** if needed.
- **Pediculosis (Lice):**
  - Apply 25% lotion to **scalp and hair**.
  - Leave for **24 hours**, then rinse off.
  - Repeat after 7 days if lice persist.

Cautions:

- **Irritating to skin**, especially in **children**—often diluted to 10–12.5% for pediatric use.
- Avoid eyes, mucosa, and **damaged/inflamed skin**.
- Avoid in infants under 6 months unless prescribed.
- Not recommended for **face or genital areas** due to irritation risk.

Side Effects:

- Skin irritation (burning, stinging)
- Eczema-like reaction
- Allergic contact dermatitis
- Blistering in sensitive areas (rare)

Dermatologic Keratolytics

Salicylic Acid 3% + Benzoic Acid 6% (Topical Ointment)

Mechanism of Action (MOA):

Salicylic Acid:

- **Keratolytic**: Softens and loosens the outer layer of the skin by breaking down keratin.
- Promotes **desquamation** (shedding) of the stratum corneum.
- It has **mild antiseptic** and **comedolytic** activity.
- Enhances the penetration of benzoic acid by removing the skin's outer layer.

Benzoic Acid:

- **Fungistatic** and **bacteriostatic** properties.
- Inhibits the growth of **dermatophytes** and **bacteria** by disrupting microbial metabolism and enzyme function.

Also acts as a **preservative** in the formulation.

Together, they are effective for **fungal infections**, **calluses**, **corns**, and **thickened skin lesions**.

Dosage Regimen:

Condition	**Dosage Frequency**	**Duration**
Tinea pedis (Athlete's foot)	Apply 1–2 times daily	For 2–4 weeks
Calluses, corns, keratotic lesions	Apply once or twice daily	Until resolution or for 7–10 days
General use	Thin film to affected area	Follow doctor's advice if there is no improvement in 7 days

Administration:

- Clean and dry the affected area before application.
- Apply a **thin layer** and gently rub in.
- Occlusion (covering with a bandage) may be used if recommended.

Cautions & Contraindications:

Cautions:

- **Avoid contact with eyes, mucous membranes, broken skin**, and open wounds.
- Do not use **large areas** or under **occlusive dressings** unless advised.
- Use with caution in **children** and **elderly** due to increased absorption risk.
- **Not suitable for inflamed or oozing skin** unless prescribed.
- May cause **skin irritation** or **contact dermatitis**.

Contraindications:

- Hypersensitivity to salicylic acid, benzoic acid, or any excipients.
- **Pregnancy & breastfeeding**: Use with caution — limited data available.
- **Diabetic patients** or those with **poor circulation** should avoid use on feet unless under medical advice.

Side Effects:

Common	Less Common / Rare
Mild irritation	Burning or stinging sensation
Dryness or peeling	Allergic contact dermatitis
Redness	Erosion/ulceration (overuse)
Itching	Systemic salicylate toxicity (rare, in large area use or occlusion)

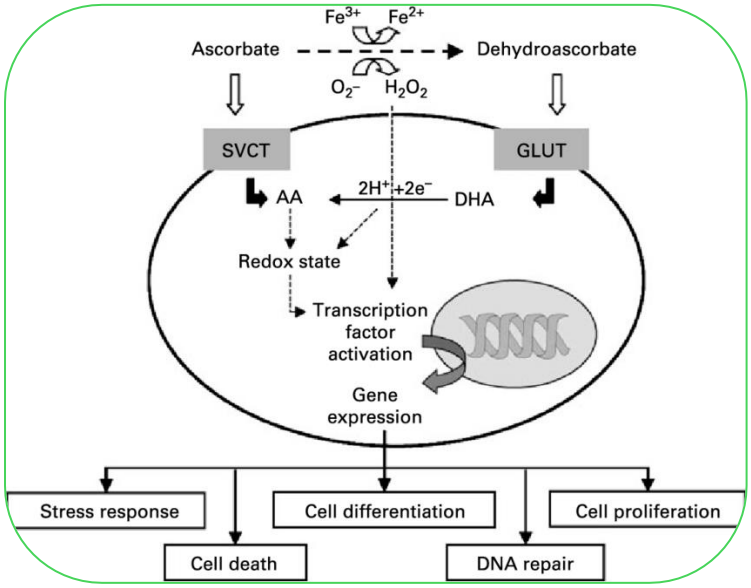
Vitamins & Minerals

1. Ascorbic Acid (Vitamin C)

Form: Chewable tablet / Syrup

MOA:

Acts as an antioxidant; cofactor in enzymatic reactions (collagen synthesis, norepinephrine synthesis); enhances iron absorption.



Dosage Regimen:

- Adults: 500–1000 mg/day
- Children: 100–250 mg/day

Side Effects:

- Diarrhea (high dose)
- Abdominal cramps
- Kidney stones (long-term high dose)

Cautions:

- Avoid high doses in renal impairment
- Monitor in patients with a history of kidney stones

2. Multivitamin Tablet/Capsule/Drops

Form: Tablet / Capsule / Drops (for children)

MOA:

Provides essential vitamins and minerals for metabolic processes and normal body function.

Dosage Regimen:

- Adults: 1 tablet/capsule daily
- Children (drops): 0.5–1 mL daily (depending on brand and age)

Side Effects:

- Nausea, vomiting
- GI upset
- Allergic reactions (rare)

Cautions:

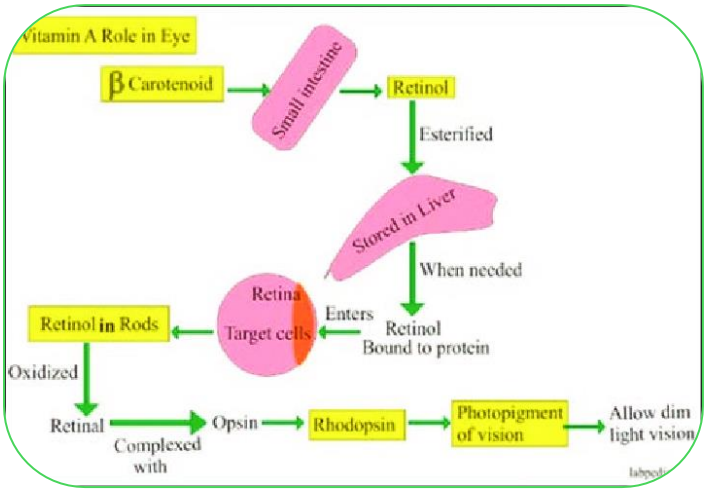
- Avoid megadoses
- Be cautious in patients with liver or kidney dysfunction
- Avoid concurrent similar supplements to prevent overdose

3. Vitamin A Capsule

Form: Capsule

MOA:

Essential for vision, immune function, reproduction, and cellular communication; supports epithelial integrity.



Dosage Regimen:

- Adults: 5000–10,000 IU/day (or as per deficiency)
- Children: WHO-recommended high-dose (100,000–200,000 IU every 4–6 months for prevention)

Side Effects:

- Hypervitaminosis A (nausea, liver damage, headache, dry skin)
- Teratogenic pregnancy (high doses)

Cautions:

- Avoid use in pregnancy (esp. >10,000 IU/day)
- Monitor for overdose symptoms

4. Vitamin B Complex (B1, B2, B3, B5, B6, B12, etc.)

Form: Tablet / Syrup / Drops

MOA:

Functions as coenzymes in metabolic pathways (carbohydrate, protein, and fat metabolism); supports nerve and blood health.

Dosage Regimen:

- Adults: 1 tablet daily
- Children: As per brand (typically 1–5 mL syrup/day or 0.5–1 mL drops)

Side Effects:

- Urine discoloration (B2)
- GI upset
- Rare allergic reactions

Cautions:

- High doses of B6 long-term can cause neuropathy
- Avoid unnecessary high doses

5. Calcium Tablet (e.g., Calcium Carbonate or Citrate)

MOA:

Essential for bone mineralization, muscle contraction, nerve transmission; works by supplementing calcium stores.

Dosage Regimen:

- Adults: 500–1000 mg/day elemental calcium
- Children: 200–800 mg/day depending on age

Side Effects:

- Constipation
- Hypercalcemia (high dose/prolonged use)
- Kidney stones

Cautions:

- Take with food (Calcium carbonate)
- Avoid excessive doses in renal impairment or elderly
- Monitor with Vitamin D supplementation

6. Ferrous (Iron) Tablet/Capsule/Syrup (e.g., Ferrous Sulfate, Fumarate, Gluconate)

MOA:
Replenishes body iron stores; required for hemoglobin and myoglobin synthesis.

Dosage Regimen:

- Adults: 60–200 mg elemental iron/day
- Children: 3–6 mg/kg/day divided doses

Side Effects:

- Constipation
- Black stools
- Abdominal discomfort, nausea

Cautions:

- Avoid milk/antacids (impairs absorption)
- Keep out of reach of children (toxic in overdose)
- Monitor hemoglobin levels

7. Riboflavin (Vitamin B2) Tablet

MOA:
Acts as coenzyme (FAD, FMN) in redox reactions for energy production and metabolism.

Dosage Regimen:

- Adults: 5–10 mg/day (varies by brand)
- Children: 1–5 mg/day

Side Effects:

- Harmless bright yellow urine
- Rare: itching, numbness

Cautions:

- Urine discoloration may cause alarm but is harmless
- Store in light-protected container (photosensitive)

Contraceptives

1. Low-Dose Oral Contraceptive Pills (OCPs)

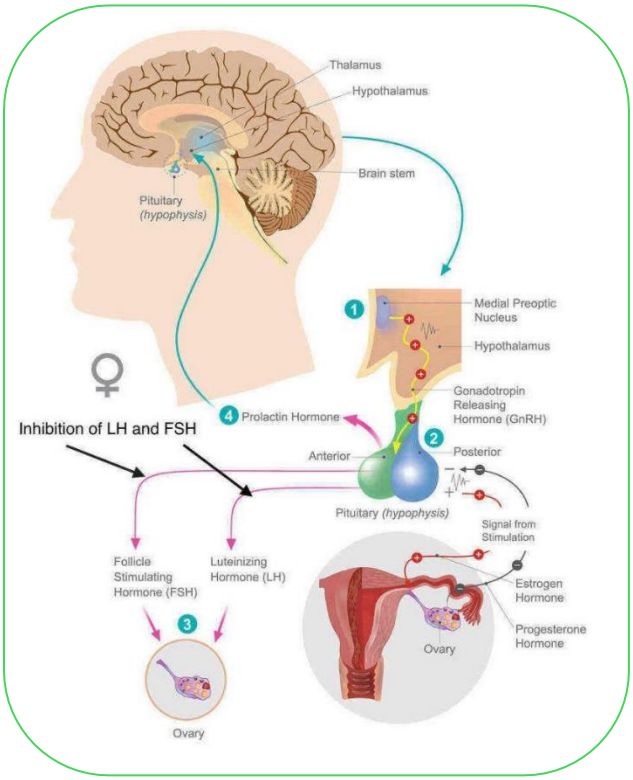
These are combined pills containing **low doses of estrogen and progestin**.

Common OTC Generic Names in Bangladesh:

- **Sukhi** (Ethinylestradiol 0.03 mg + Levonorgestrel 0.15 mg)
- **Femicon**
- **Marvelon** (Desogestrel + Ethinylestradiol)
- **Minicon** (Low-dose pill)

Mechanism of Action (MOA):

- **Suppress ovulation** by inhibiting LH and FSH via negative feedback.
- **Thicken cervical mucus**, making it harder for sperm to pass.
- **Alter endometrial lining** to prevent implantation.



Dosage Regimen:

- 1 pill **daily at the same time** for **21 days**, followed by 7 pill-free days (or placebo pills).
- Start on the **first day of menstruation** or **Sunday after period starts** (as per instructions).

Cautions:

- Not suitable for smokers over 35 years old.
- Avoid if you have **thrombosis history**, **breast cancer**, **liver disease**, or **uncontrolled hypertension**.
- Drug interactions with **antibiotics**, **anti-seizure meds**, **rifampicin**, **St. John's Wort**.

Common Side Effects:

- Nausea, headache
- Breast tenderness
- Spotting or breakthrough bleeding
- Mood changes, weight changes
- Rare: blood clots (DVT, stroke)

2. Condoms

Available without prescription at pharmacies, health centers, and general stores.

Common Brands in Bangladesh:

- **Sensation**
- **Panther**
- **U&Me**
- **Rainbow**
- **Sultan**

Mechanism of Action (MOA):

- Acts as a **barrier** that prevents sperm from entering the uterus.
- Also protects against **STIs**, including **HIV**.

Dosage/Use Instructions:

- Use **a new condom** for each act of intercourse.
- Put on an **erect penis before any genital contact**.
- Dispose of immediately after use; do not reuse.

Cautions:

- Store in a **cool, dry place**—avoid heat.
- Check **expiry date** and integrity of the package.
- Use **water-based lubricants only** (oil-based can break latex).

Common Side Effects:

- Allergic reactions (latex allergy)
- Irritation (from spermicide or lubricants)
- Slippage or breakage if used incorrectly

Additional Notes:

- While condoms are 98% effective with perfect use, real-life effectiveness is ~85%.
- OCPs are over 99% effective with perfect use, ~91% in typical use.
- For emergency contraception (like Postinor or E-pill), timing and correct use are crucial.

Gastrointestinal Support

1. Oral Rehydration Salt (ORS) Sachets

Generic Content:

- Sodium chloride
- Potassium chloride
- Sodium citrate (or bicarbonate)
- Glucose anhydrous

MOA (Mechanism of Action):
ORS works via **co-transport of sodium and glucose in the intestines**, enhancing water and electrolyte absorption, correcting dehydration and electrolyte imbalance caused by diarrhea, vomiting, or sweating.

Dosage Regimen (Adults & Children):

- Mix **1 sachet in 500 ml or 1 liter of clean water** (as directed on pack).
- Give **50–100 mL/kg** body weight over 4–6 hours (initial rehydration).
- Then continue with smaller frequent sips after every episode of diarrhea.

Side Effects:

- Overhydration (rare, if used excessively)
- Electrolyte imbalance (if improperly diluted)
- Nausea/vomiting (rare)

Cautions:

- Use **clean water** only.
- Do **not mix half** a sachet.
- Discard solution after **24 hours**.
- Not a substitute for IV fluid in severe dehydration.

2. Glycerin Suppository

Generic: Glycerol

MOA:
Glycerin acts as a **hyperosmotic laxative** that draws water into the rectum, softening stools and stimulating bowel movement by local irritation of the mucosa.

Dosage Regimen:

- **Adults:** 1 adult suppository (2–3g) rectally once daily.
- **Children (above 1 year):** 1 child suppository (1–1.5g) rectally once daily.
- Acts within **15–60 minutes**.

Side Effects:

- Rectal irritation
- Cramps
- Rarely: burning sensation

Cautions:

- Not for prolonged use (may cause dependence).
- Do not use it in case of **rectal bleeding**, severe abdominal pain, or bowel obstruction.

3. Mouthwash Preparations (e.g., Chlorhexidine Gluconate)

Common OTC Agents in Bangladesh:

- **Chlorhexidine gluconate** (0.12%–0.2%)
- **Benzydamine**
- **Sodium bicarbonate**
- **Essential oil-based (Thymol, Menthol, etc.)**

MOA:

- **Chlorhexidine**: disrupts bacterial cell membranes and inhibits plaque formation.
- **Benzydamine**: anti-inflammatory, local analgesic.
- **Sodium bicarbonate**: alkalinizes and reduces acidity.
- **Essential oils**: mild antiseptic and anti-plaque action.

Dosage Regimen:

- Rinse **10–15 mL** undiluted solution for **30 seconds** twice daily.
- Avoid eating or drinking for **30 minutes** after use.

Side Effects:

- Temporary **tooth staining** (with chlorhexidine)
- Altered taste
- Oral irritation or burning

Cautions:

- Do **not swallow**.
- Avoid long-term use of chlorhexidine (tooth discoloration, altered taste).
- Not suitable for children **under 6 years** unless directed by a doctor.

4. Potassium Permanganate Granules (for gargle or wound cleansing)

MOA:

Acts as a **strong oxidizing agent**, releasing nascent oxygen which has **antiseptic** and **deodorizing** effects. It is useful for infected gums, ulcers, or minor wounds.

Dosage Regimen:

- **Dilution required**: Use a **very dilute solution** (1:5000 to 1:10,000 = ~0.01%).
- For **gargle**: Dissolve a small crystal (or according to pack instructions) in warm water until it becomes light pink.
- Rinse **2–3 times/day**.

Side Effects:

- Mucosal irritation
- **Tissue burns** if used in high concentration
- Brown staining of skin/mucosa

Cautions:

- **Never use undiluted.**
- **Not for internal use** (swallowing can be fatal).
- Avoid contact with eyes.
- Discontinue use if irritation occurs.

Dermatologic Sun Protection

Common OTC Sunscreen Agents in Bangladesh:

Generic sunscreens are usually combinations of **organic (chemical)** and **inorganic (physical)** agents. Some widely available generics include:

Generic Name	Type
Zinc Oxide	Physical
Titanium Dioxide	Physical
Avobenzone	Chemical
Oxybenzone	Chemical
Octinoxate	Chemical
Octocrylene	Chemical
Homosalate	Chemical
Tinosorb S/M	Chemical

Mechanism of Action (MOA):

Agent	Mechanism of Action
Zinc Oxide	Reflects & scatters UVA & UVB rays (broad spectrum)
Titanium Dioxide	Reflects UVB & short UVA rays
Avobenzone	Absorbs full UVA spectrum
Oxybenzone	Absorbs UVB & short UVA; potential estrogenic activity
Octinoxate	Absorb UVB rays
Octocrylene	Absorbs UVB and short UVA, stabilizes Avobenzone
Homosalate	Absorb UVB rays
Tinosorb S/M	Absorbs UVA and UVB, photostable, effective in broad range

Dosage Regimen (Application Instructions):

- **Amount**: Use approximately **2 mg/cm²** (about 1/2 teaspoon for face and neck).
- **Timing**: Apply **15–30 minutes before sun exposure**.
- **Reapplication**: Every **2 hours**, or immediately after:
    - Swimming
    - Sweating
    - Towel drying
- **Daily Use**: Recommended even on cloudy days or indoors (if near windows or screens).

Common Side Effects:

Effect	Details
Allergic Contact Dermatitis	Especially with Oxybenzone, Avobenzone
Acne / Folliculitis	More with oily formulations
Eye Irritation	If applied too close to the eyes
Photosensitivity Reaction	Rare, but possible with some chemical filters
Skin Whitening (Physical Blockers)	Temporary whitening or residue with Zinc/Titanium dioxide

Precautions and Warnings:

1. **Infants <6 months**: Avoid chemical sunscreens; use physical blockers or keep infants out of direct sunlight.
2. **Sensitive Skin / Allergies**:
    - Prefer **mineral sunscreens** (Zinc Oxide, Titanium Dioxide).
    - Avoid products with **fragrance, preservatives, alcohol**.
3. **Acne-prone skin**: Use **non-comedogenic, gel-based, or water-based** sunscreens.
4. **Use in Pregnancy**: Prefer **physical blockers**.
5. **Environmental Concerns**: Oxybenzone and Octinoxate are harmful to coral reefs; avoid swimming in natural bodies of water.

Sedative / Antiemetic

Promethazine Theoclate

Brand Names in Bangladesh (examples):

- Avomine
- Vomisafe
- Vomikill

Pharmacological Class:

- **Sedative-hypnotic** (Phenothiazine derivative)
- **Antihistamine (H1 receptor antagonist)**
- **Antiemetic**

Mechanism of Action (MOA):

Promethazine Theoclate works primarily through:

1. **Histamine H1 receptor blockade** in the central nervous system (CNS) and vestibular apparatus → prevents motion-induced nausea and vomiting.
2. **Dopamine D2 receptor antagonism** in the chemoreceptor trigger zone (CTZ) → reduces nausea and vomiting stimuli.
3. Mild **anticholinergic** and **sedative** effects due to CNS depression.

Dosage Regimen (Adults):

Indication	Typical Dose	Route	Frequency
Motion sickness	25 mg tablet	Oral	1–2 hours before travel. May repeat after 6–8 hours. Max: 100 mg/day
Nausea/Vomiting	25–50 mg	Oral	6 to 8 hours if required
Sedation (pre-op)	25–50 mg at bedtime prior to surgery	Oral	Single dose

Pediatric Dose (use with caution):

- Children (6–12 yrs): 12.5–25 mg every 6–8 hours.
- Not recommended under 2 years (due to **respiratory depression** risk).

Cautions:

1. **Not for children under 2 years** of **fatal respiratory depression**.
2. **Use cautiously in elderly** — increased sensitivity to CNS effects.
3. Avoid patients with:
    - Narrow-angle glaucoma
    - BPH with urinary retention
    - Asthma or respiratory disorders
    - Epilepsy (lowers seizure threshold)
4. **Avoid alcohol** and other CNS depressants — additive sedation risk.
5. May cause **false-negative** pregnancy test or **urine screen** interference.

Side Effects:

System	Common Side Effects	Serious Side Effects
CNS	Drowsiness, dizziness, confusion	Seizures, extrapyramidal symptoms (EPS)
GI	Dry mouth, constipation	Jaundice (rare)
Respiratory	Respiratory depression (esp. in kids)	Apnea in overdose or infants
Cardiovascular	Hypotension, palpitations	Tachycardia (rare)
Skin	Photosensitivity, allergic rash	Severe dermatitis (rare)

Drug Interactions:

- Additive effects with **CNS depressants** (e.g., alcohol, benzodiazepines)
- May interfere with **anticonvulsants** and **anticholinergics**
- Potentiates the effects of **opioids** (risk of sedation and respiratory depression)

Important Notes for OTC Use in Bangladesh:

- Though **promethazine** is **available OTC** in Bangladesh (e.g., Avomine), it **should be used responsibly** due to the risks in certain populations (children, elderly, those with respiratory diseases).
- Always **read package inserts** and **do not exceed 100 mg/day** for adults without a doctor's advice.
- Should **not be used chronically** without medical supervision.