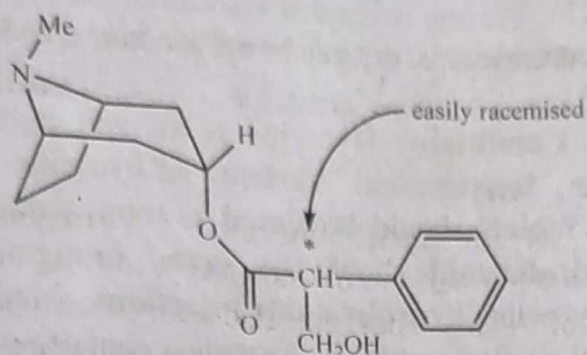


### 18.1.3.1. Atropine

Atropine is an endogenous alkaloid obtained synthetically from the plant, *Atropa belladonna*. It acts as a sympathetic, competitive antagonist of muscarinic cholinergic receptors, hence eliminate the effects of parasympathetic stimulation.

#### Chemical Structure



Atropine

**Molecular Formula:**  $C_{17}H_{23}NO_3$

**IUPAC Nomenclature:** [(1R,5S)-8-methyl-8-azabicyclo[3.2.1]octan-3-yl] 3-hydroxy-2-phenylpropanoate

**Properties:** Atropine occurs as a white coloured crystalline powder with no odour. It is faintly soluble in water; and very soluble in alcohol, benzene, ether, and chloroform.

**Uses:** Atropine induces tachycardia, inhibits secretions, and relaxes smooth muscles. It is frequently used in combination with an opioid to treat renal colic. It is used as an antidote for mushroom poisoning. It is frequently used for maintaining a dilated pupil and preventing posterior synechiae in older people before or after glaucoma surgery (trabeculectomy with peripheral iridectomy). It is also used for reducing gastric secretions before caesarean without creating any foetal or neonatal effects.

**Stability and Storage Conditions:** Atropine gets affected by light and heat, thus should be stored in well-closed, light- and heat-resistant containers.

**Types of Pharmaceutical Formulations:** Intramuscular, intravenous and subcutaneous injections, and ophthalmic solution.

**Brand Names:** AtroPen, Atreza, and Sal-Tropine.

### 18.1.3.2. Hyoscine

Hyoscine (or scopolamine) is an alkaloid derived from plants of Solanaceae family, particularly *Datura* and *Scopolia*. Hyoscine and its quaternary derivatives provide anti-muscarinic action similar to atropine, but it may have more effects on CNS.

**Molecular Formula:**  $C_{17}H_{21}NO_4$

**IUPAC Nomenclature:** (1R,2R,4S,5S,7R) 9-Methyl-3-oxa-9-azatricyclo[3.3.1.0<sup>2,4</sup>]nonan-7-yl (2S)-3-hydroxy-2-phenylpropanoate



**Properties:** Hyoscine occurs as colourless crystals or as a white powder or solid with a bitter, acrid taste and no odour. It undergoes efflorescence in dry air. It is very soluble in hot water; readily soluble in alcohol, chloroform, acetone, and ether; and faintly soluble in benzene and petroleum ether.

**Uses:** Hyoscine is used for treating excessive salivation, colicky abdominal pain, bradycardia, sialorrhoea, diverticulitis, irritable bowel syndrome, and motion sickness.

**Stability and Storage Conditions:** Hyoscine is air and light sensitive. The commercially available **transdermal system of hyoscine** and **hyoscine hydrobromide soluble tablets** should be stored at room temperature between 20-25°C. **Hyoscine hydrobromide** should be stored in tightly-closed, light-resistant containers. **Hyoscine hydrobromide injections** should be stored in light-resistant USP type I single or multiple-dose glass containers at 15-30°C.

**Types of Pharmaceutical Formulations:** Intramuscular, intravenous and subcutaneous injection, and transdermal patches.

**Brand Names:** Ancopan, Antipen, Bromid, and Brospan.

### 18.1.3.3. Homatropine

Homatropine is a synthetic tertiary amine alkaloid having anti-muscarinic properties. Homatropine blocks parasympathetic nerve stimulation by competitively inhibiting acetylcholine at the muscarinic receptors.

**Molecular Formula:**  $C_{16}H_{21}NO_3$

**IUPAC Nomenclature:** (1R,3S,5S) 8-methyl-8-azabicyclo[3.2.1]octan-3-yl] 2-hydroxy-2-phenylacetate

**Properties:** Homatropine occurs as a white coloured crystals or crystalline powder with a bitter taste and no odour. It is readily soluble in water; faintly soluble in alcohol and chloroform; and insoluble in ether. Its aqueous solution is slightly acidic to litmus.

**Uses:** Homatropine is used before eye inspections (e.g., refraction), for treating some eye conditions (e.g., uveitis), and in eye surgeries. Its hydrobromide salt dilates the eye pupil. It causes pupillary dilation (mydriasis) and paralysis of accommodation (cycloplegia) by blocking the responses of the sphincter muscle of iris and accommodative muscle of the ciliary body to cholinergic stimulation.

**Stability and Storage Conditions:** Homatropine is light-sensitive, thus should be stored in air-tight, light-resistant containers.

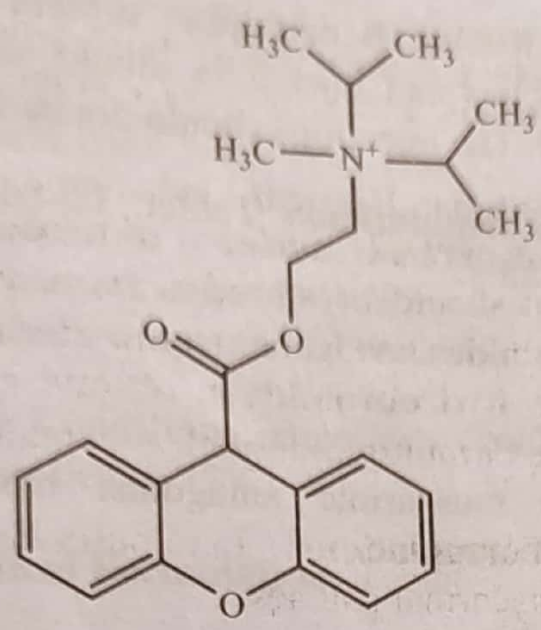
**Types of Pharmaceutical Formulation:** Ophthalmic solutions.

**Brand Names:** Homatropaire and Isopto Homatropine.

### 18.1.3.4. Propantheline

Propantheline is a muscarinic antagonist used as an antispasmodic, in rhinitis, in urinary incontinence, and for treating ulcers.

#### Chemical Structure



Propantheline

**Molecular Formula:**  $C_{23}H_{30}NO_3$

**IUPAC Nomenclature:** Methyl-di(propan-2-yl)-[2-(9H-xanthene-9-carboxyloxy)ethyl]azanium

**Properties:** Propantheline occurs as a white coloured crystalline powder or crystals. It is soluble in water; and insoluble in ether.

**Uses:** Propantheline is beneficial for treating peptic ulcer as it decreases gastric motility and relieves pain in this condition. It is used for treating enuresis, hyperhidrosis, and cramps or spasms of the stomach, intestines or bladder.

**Stability and Storage Conditions:** Propantheline should be stored in air-tight containers at room temperature (20-25°C).

**Types of Pharmaceutical Formulation:** Tablets.

**Brand Names:** Ulsedin, Pepler, Sere Banthine, and Probanthine.