PHARM.D • YEAR 2

Pharmacology

CHAPTER 4

Pharmacology of Drugs Acting on the Central Nervous System

PPT CHAPTER COVER



General anaesthesia: balanced components

General anaesthesia produces a controlled, reversible loss of consciousness for procedures. The required components may include unconsciousness, amnesia, analgesia and immobility. No single agent reliably supplies every component equally.

Unconsciousness



Loss of awareness

Amnesia



No recall of events

Analgesia

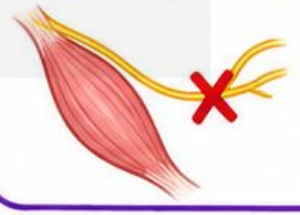


Blocks pain signals



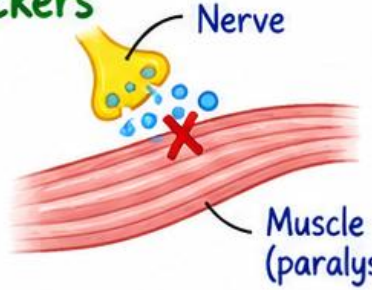
General anaesthesia

Immobility



Prevents movement

Neuromuscular blockers cause paralysis, not unconsciousness or pain relief.



Balanced anaesthesia combines medicines according to the procedure and patient.

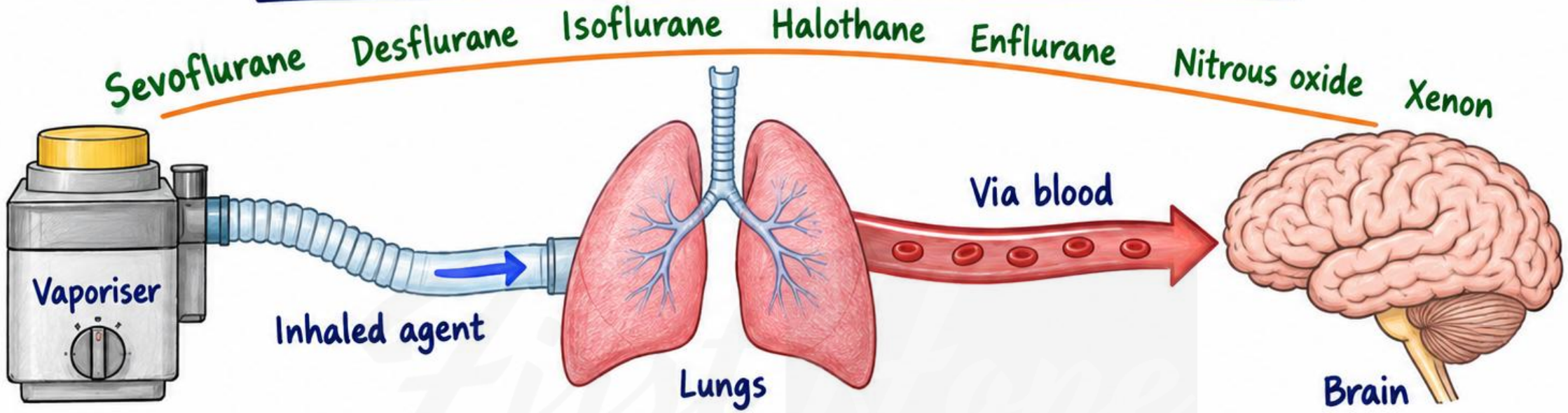
Airway support, ventilation and cardiovascular monitoring are essential.



Local anaesthesia blocks sensation in a limited region without intentionally causing unconsciousness.



Inhalational anaesthetics



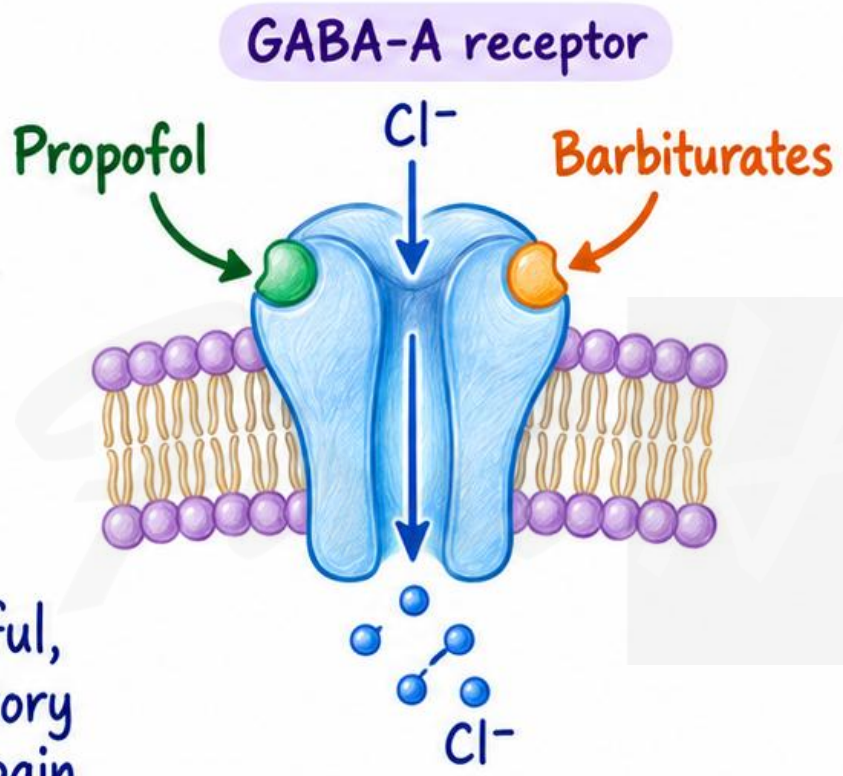
- **Volatile liquids:** sevoflurane, desflurane and isoflurane; halothane and enflurane are older examples.
- **Gases:** nitrous oxide and xenon.
- Agents enter through the lungs and reach the brain through blood.
- Lower blood–gas solubility generally permits faster changes in anaesthetic depth and recovery.
- Most elimination is by exhalation, but metabolism varies substantially between agents.
- Nitrous oxide is commonly an adjunct; it is not equivalent in potency to the volatile agents.

Propofol and barbiturate induction agents

Propofol

Propofol enhances GABA-A-mediated inhibition. It is used for induction, maintenance and selected sedation settings.

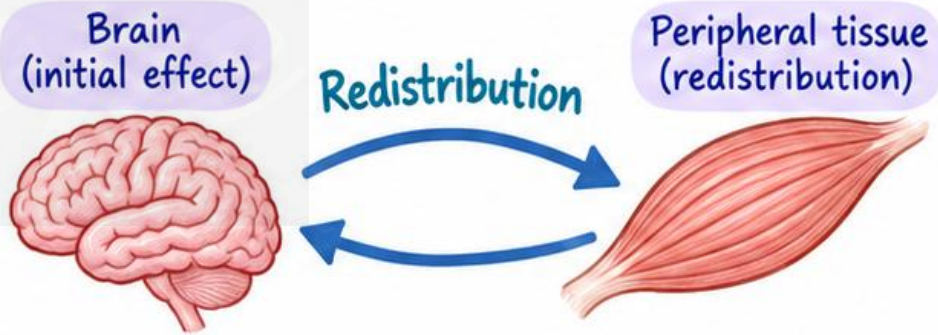
Its rapid recovery is useful, but hypotension, respiratory depression and injection pain are important.



Barbiturates

Thiopentone and methohexital are barbiturate anaesthetics.

After a single IV bolus, redistribution helps terminate the initial effect; repeated dosing may prolong recovery.

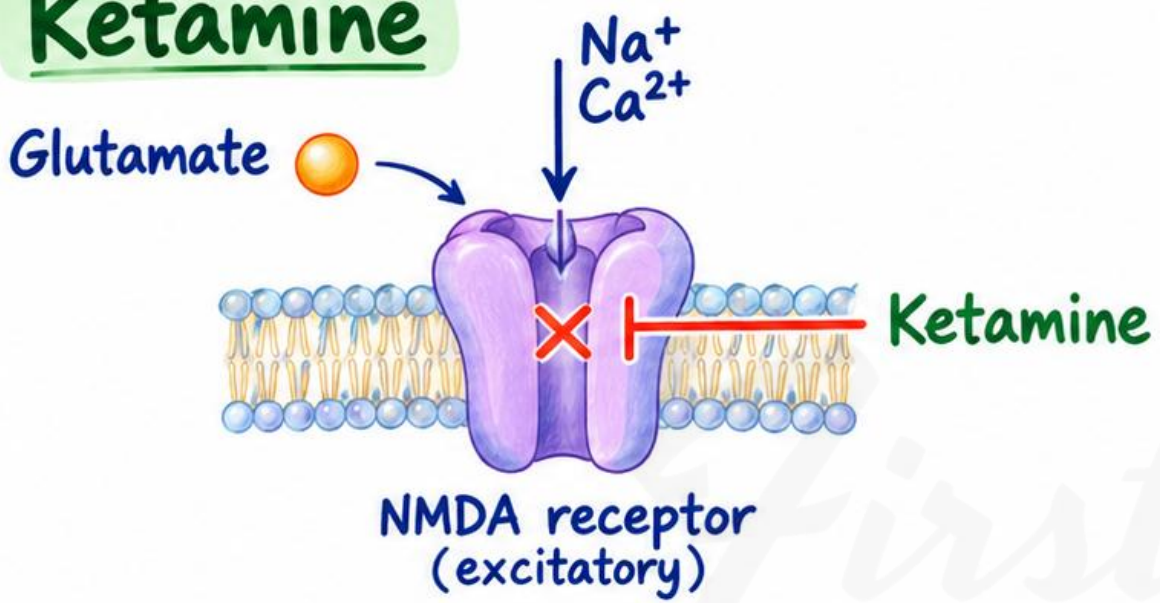


These drugs do not provide dependable analgesia. Dose requirements vary with age, circulation, comedication and the intended depth.

Monitoring | Blood pressure • Oxygenation • Ventilation • Level of consciousness

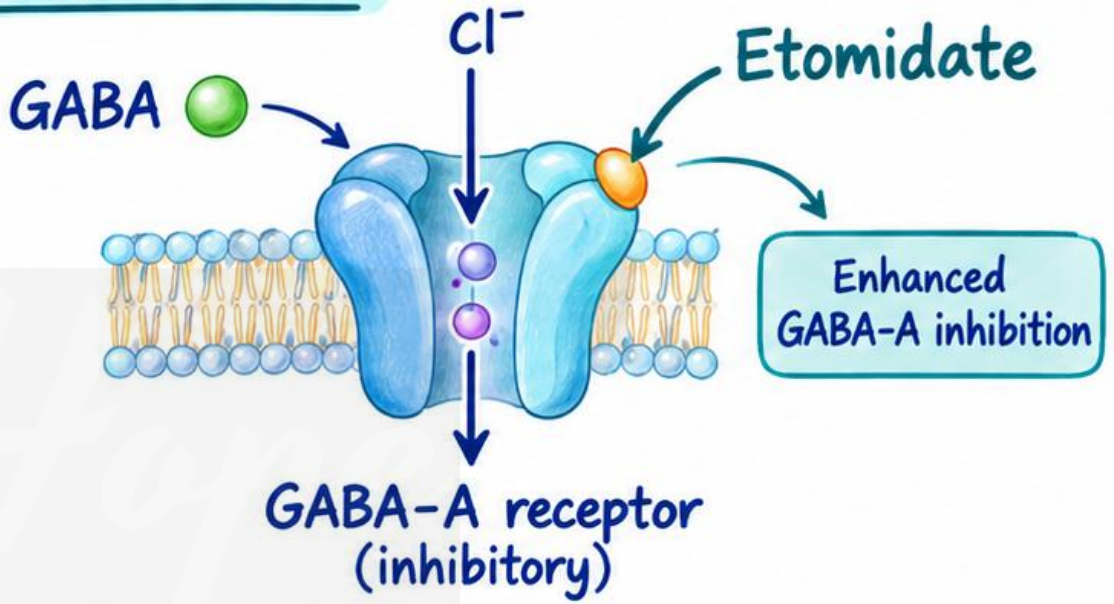
Ketamine and etomidate

Ketamine



- Ketamine mainly antagonises NMDA receptors, producing dissociative anaesthesia and analgesia.
- Sympathetic stimulation may raise heart rate and blood pressure; emergence reactions can occur.
- Airway reflexes and breathing may be relatively preserved, but airway complications and respiratory depression remain possible.

Etomidate



- Etomidate enhances GABA-A inhibition and often causes less cardiovascular depression.
- It lacks analgesia and can cause myoclonus, injection pain and adrenal suppression.
- Selection requires a clinical risk–benefit assessment.

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