



# **SNS COLLEGE OF ALLIED HEALTH SCIENCES**

SNS Kalvi Nagar, Coimbatore - 35

Affiliated to Dr MGR Medical University, Chennai



**DEPARTMENT : OPERATION THEATRE AND ANAESTHESIA  
TECHNOLOGY**

**COURSE NAME : PHARMACOLOGY**

**UNIT : INHALATIONAL GASES**

**TOPICS : AGENTS - ETHER, HALOTHANE, ISOFLURANE,  
SEVOFLURANE, DESFLURANE**



# INHALATIONAL GASES



- Inhalational gases, also known as inhalation anesthetics or volatile anesthetics, are substances that are administered through inhalation to induce and maintain general anesthesia during surgical or medical procedures.
- These gases are designed to cause a reversible loss of consciousness and sensation, allowing patients to undergo procedures without experiencing pain or awareness.



## **ETHER (Diethyl Ether)**



### **Chemical Structure:**

Diethyl ether (C<sub>4</sub>H<sub>10</sub>O).

### **Mechanism of Action:**

Ether induces anesthesia by depressing the central nervous system. It enhances the inhibitory neurotransmitter gamma-aminobutyric acid (GABA) and reduces neuronal excitability.



## **Pharmacokinetics:**

Administered via inhalation. Ether has a low blood-gas solubility, allowing for rapid induction and recovery from anesthesia.

## **Clinical Use:**

Historically used for general anesthesia. However, its use has declined due to flammability, airway irritation, and the availability of safer alternatives.



# HALOTHANE



## **Chemical Structure:**

2-bromo-2-chloro-1,1,1-trifluoroethane.

## **Mechanism of Action:**

Halothane enhances GABAergic neurotransmission and inhibits excitatory neurotransmission. It also has myocardial depressant effects.



## **Pharmacokinetics:**

Administered by inhalation. Halothane has a moderate blood-gas solubility, resulting in a slightly longer induction and recovery compared to newer agents.

## **Clinical Use:**

Once widely used but has been largely replaced due to concerns about hepatotoxicity, especially in susceptible individuals.



# ISOFLURANE



## **Chemical Structure:**

1-chloro-2,2,2-trifluoroethyl difluoromethyl ether.

## **Mechanism of Action:**

Isoflurane, like other inhalation anesthetics, enhances GABAergic neurotransmission and inhibits excitatory neurotransmission. It has less myocardial depressant effects compared to halothane.



## **Pharmacokinetics:**

Administered by inhalation. Isoflurane has a low blood-gas solubility, leading to rapid induction and recovery.

## **Clinical Use:**

Commonly used for the maintenance of anesthesia during surgical procedures.





# SEVOFLURANE



## **Chemical Structure:**

1,1,1,3,3,3-hexafluoro-2-(fluoromethoxy)propane.

## **Mechanism of Action:**

Similar to other inhalation anesthetics, it enhances GABAergic neurotransmission and inhibits excitatory neurotransmission. Sevoflurane has a low blood-gas solubility.



## **Pharmacokinetics:**

Administered by inhalation. Sevoflurane has a pleasant odor and is often used for induction and maintenance of anesthesia, particularly in pediatric patients.

## **Clinical Use:**

Widely used in various surgical procedures.



# DESFLURANE



## **Chemical Structure:**

1,1,1,2,2,2-hexafluoro-2-(fluoromethoxy)ethane.

## **Mechanism of Action:**

Similar to other inhalation anesthetics, it enhances GABAergic neurotransmission and inhibits excitatory neurotransmission. Desflurane has the lowest blood-gas solubility among commonly used inhalation agents.



## **Pharmacokinetics:**

Administered by inhalation. Characterized by rapid induction and emergence due to its low blood-gas solubility.

## **Clinical Use:**

Mainly used for the maintenance of anesthesia, especially in fast-track surgery, where quick recovery is desired.



## TECHNICIAN ROLE



### Patient Monitoring:

- Continuous monitoring of the patient's respiratory rate, heart rate, blood pressure, and oxygen saturation.
- Anesthesia providers adjust the concentrations of agents based on individual patient needs and procedure requirements.



# ASSESSMENT



- What is the Pharmacokinetics of Ether ?
- What all are the Clinical use of Desflurane ?