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AN OVERVIEW ON "STAGES OF ANESTHESIA AND SOME NOVEL GENERAL ANESTHETICS DRUG"

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ABSTRACT

Anesthesia is a painless performance of medical producers. There are both major and minor risks of anesthesia. Anesthesia is a state of temporary induced loss of sensation or awareness. It gives analgesia i.e. relief from pain or prevention of pain and paralysis. General anaesthesia is a medically induced state of unconsciousness. It gives loss of protective reflux. It is carried out to allow medical procedures or medical surgery. It can be classified into 3 types like Intravenous Anesthetics Drug; Miscellaneous Drug; and Inhalational anesthetic Drug. Sodium thiopental is an ultra-short-acting barbiturate and has been used commonly in the induction phase of anesthesia. Methohexital is an example of barbiturates derivatives. It is classified as short-acting, and has a rapid onset of action.

KEYWORDS

Anesthesia, Sodium thiopental, Methohexital and Propofol.

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INTRODUCTON

Anesthesia is a state of temporary induced loss of sensation or awareness. It gives analgesia i.e. relief from pain or prevention of pain and paralysis[1]. A patient under the effects of anesthetic drug is known as anesthetized. Anesthesia enables the painless performance of medical producers that would cause severe pain to an unanesthetized patient[2]. Anesthesia can be divided into two risks like major and minor risks of anesthesia. In major risks gives death, heart attacks and pulmonary embolism of the patient and minor risks like nausea and vomiting[3]. Anesthesia means stopping of sensation and feeling.

It can be given in various ways and does not always make you unconscious. It includ**es.**

- Local anesthesia
- Regional anesthesia
- General anesthesia

General anesthesia gives a state of controlled unconsciousness. It is essential for some operations. Patients are unconscious and feel nothing[4]. A local anesthetic is an example of medication which was used to control the pain sensation during surgery. It is also gives anesthetic nerve block and paralysis i.e. loss of muscle power. General anaesthesia or general anesthesia is a medically induced state of unconsciousness with loss of protective reflux. It is carried out to allow medical procedures or medical surgery[5].

Stages of anesthesia[6,7]

According to Guedel's classification, it can be divided into four stages of anesthesia**;**

Stage 1

In Stage 1 is the period between the administration of induction agents and loss of consciousness. It is also known as induction. During this stage, the patient progresses from analgesia without amnesia to analgesia with amnesia. Patients can carry on a conversation or talk at this time.

Stage 2

Stage 2 is also known as the excitement stage. It gives loss of consciousness and marked by excited and delirious activity. During this stage, the patient's heart rate may become irregular; uncontrolled movements, vomiting and pulmonary dilation.

Stage 3

In Stage 3 is also known as surgical anesthesia. During this stage, the skeletal muscles relax, vomiting stops, respiratory depression occurs, and eye movements slow and then stop. The patient is unconscious and ready for surgery. This stage is divided into four planes:

- The eyes roll, then become fixed.
- Corneal and laryngeal reflexes are lost.
- The pupils dilate and light reflex is lost.
- Body paralysis.

Stage 4

Stage 4 is also known as overdose. It occurs when too much anesthetic medication is given.

Classification of General anaesthesia

General anaesthesia or general anesthesia is a medically induced state of unconsciousness with loss of protective reflux. It is carried out to allow medical procedures or medical surgery. It can be classified into 3 types like

- Intravenous Anesthetics Drug
- Miscellaneous Drug
- Inhalational anesthetic Drug

Intravenous Anesthetics[8,9]

Sodium thiopental

Another name of this Sodium thiopental is Sodium Pentothal, thiopental, thiopentone, or Trapanal. It gives rapid-onset of action from barbiturates category general anesthetics drug. Sodium thiopental is an ultra-short-acting barbiturate and has been used commonly in the induction phase of anesthesia. Sodium thiopental was historically used to induce mental coma. Thiopental rapidly and easily crosses the blood brain barrier i.e. BBB. Sodium thiopental is mainly metabolized to Pentobarbital; 5-ethyl-5-(1'-methyl-3'-hydroxybutyl)-2-thiobarbituric acid, and 5-ethyl-5-(1'-methyl-3'-carboxypropyl)-2-thiobarbituric acid. It gives some side effects like cardiovascular and respiratory depression, headache, nausea and vomiting.

Mechanism of action

Sodium thiopental is a member of the barbiturate class of drugs. It binds to $GABA_A$ receptor channel. The $GABA_A$ receptor is an inhibitory channel that decreases neuronal activity, and barbiturates enhance the inhibitory action of the $GABA_A$ receptor.

Thiamylal

Thiamylal is an example of barbiturates derivatives. It was discovered in the 1950s. It gives sedative, hypnotic effects. It is used in the surgery as surgical anesthetic drug. It is the thiobarbiturate analogue of Secobarbital.

Methohexital

Methohexital is also known as methohexitone. It was sold under the brand names like

Brevital and Brietal. Methohexital is an example of barbiturates derivatives. It is classified as short-acting, and has a rapid onset of action.

Miscellaneous Drug[10]

Propanidid

Propanidid is an example of ultra short acting general anesthetic drug. It was discovered In 1963 by the scientist Bayer.

Propofol

Propofol is an example of general anesthetic drug. It decreased level of consciousness and lack of memory events. It gives common side effects like irregular heart rate, low blood pressure, and burning sensation. It appears to be safe for using during pregnancy. Propofol was discovered in 1977 and approved for use in the United States in 1989.

Ketamine

Ketamine is an example of general anesthetic drug. It was sold under the brand names like Ketalar. It is used for starting and maintaining anesthesia. It gives on set of action within five minutes when given by injection and this effects lasting up to 25 minutes. It gives common side effects like confusion, hallucination, and Agitation. Ketamine was discovered in 1962, first tested in humans in 1964. It was approved for use in the United States in 1970. Ketamine may be used for postoperative pain management.

Inhalational anesthetic Drug[11,12]

It gives effects via inhalation. It is an example of chemical compound possessing general anesthetic effect.

Classification of Inhalational anesthetic Drug

Currently-used agents

- Desflurane
- Isoflurane
- Nitrous oxide
- Sevoflurane

Previously-used agents

- Ethyl Chloride or chloroethane
- Chloroform
- Cryofluorane
- Diethyl Ether
- Enflurane
- Halothane
- Methoxy Flurane
- Methoxy propane
- Trichloro ethylene
- Vinyl Ether

Desflurane

Desflurane is an example of highly fluorinated ether. It was used maintenance of general anesthesia. It is available in the form of racemic mixture. It has the most rapid onset of action. Desflurane act on $GABA_A$ receptors.

Isoflurane

Isoflurane is an example of highly fluorinated ether. It was used maintenance of general anesthesia. It was sold under the brand names like Forane. It is used by inhalation. It gives some side effects like decreases the breath, low blood pressure and irregular heart beat. Isoflurane was approved for medical use in the United States in 1979. Similar to many general anesthetics, the exact mechanism of the action has not been clearly understood. Isoflurane likely binds to $GABA_A$ receptors which decreases motor function. It inhibits receptor activity in the NMDA receptors which decreases motor function. Isoflurane inhibits conduction in activated potassium channels.

Sevoflurane

Sevoflurane is a sweet-smelling, nonflammable drug. It is used as inhalation anesthetics drug. it is the volatile anesthetic with the fastest onset of action. Sevoflurane was discovered by the scientist Ross Terrell. It acts as positive allosteric modulator of the $GABA_A$ receptors. it also acts as an NMDA antagonist.

Nitrous oxide

Nitrous oxide is also known as laughing gas. It is an example of chemical compounds it contains oxide of nitrogen with molecular formula N_2O. At room temperature, it is a colorless and non-flammable gas. It gives anesthetic effect and analgesic effects. Nitrous oxide occurs in small amounts in the atmosphere.

Chloroethane

Chloroethane is also known as monochloroethane or ethyl chloride. It is an example of chemical compounds. It is a colorless, flammable gas or refrigerated liquid with a faintly sweet odor. It gives anesthetic effect.

Chloroform

Chloroform is also known as trichloromethane. It is an example of organic compounds. It is a colorless, sweet-smelling, dense liquid. The anesthetic qualities of chloroform were first described in 1842 in a thesis by the scientist Dr. Robert Glover.

Cryofluorane

Cryofluorane is also known as R-114 or 1, 2-Dichlorotetrafluoroethane. It is used as refrigerant. It is a non-flammable gas with chloroform odor. It is a colorless liquid. It gives anesthetic effect.

Diethyl ether

Diethyl ether is an example of organic compounds of ether class. It is a colorless, highly volatile in nature. It is used as solvent in laboratories. It used as a general anesthetic.

Enflurane

Enflurane is an example of halogenated ether. It was discovered by the scientist Ross Terrti in 1963. It was used for inhalational anesthesia during the 1970s and 1980s. Enflurane acts as a positive allosteric modulator of the $GABA_A$ receptors.

Halothane

Halothane is used as general anesthetic drug. It can be used to start or maintain anaesthesia. It is used by inhalation. Halothane was discovered in 1955.

Methoxyflurane

Methoxyflurane is an example of halogenated ether. It is used clinically and volatile inhalational anesthetic drug. It was discovered by the scientist Joseph Artusio in 1960. Methoxyflurane is an extremely potent and highly lipid soluble anesthetic effect.

Methoxypropane

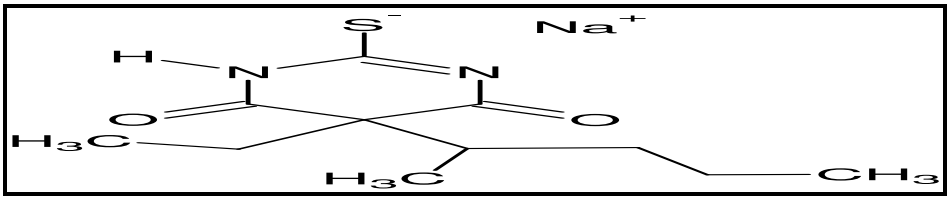
Methoxypropane is also known as methyl propyl ether. Methoxyflurane is an example of ether. It gives anesthetic effect. It was sold under the trade names like Metopryl and Neothyl.

Trichloroethylene

Trichloroethylene is an example of halocarbon. It is used as industrial solvent. It is a clear non-flammable liquid with a sweet smell. It gives anesthetic effect.

Vinyl Ether

Vinyl ether is also known as divinyl ether, divinyl oxide. In the United States, vinyl ether was sold under the trade name Vinethene. Vinyl ether intended for anesthetic use. Vinyl ether has a rapid onset with little excitement upon induction. Induction causes little coughing. Vinyl ether is a potent anesthetic drug.



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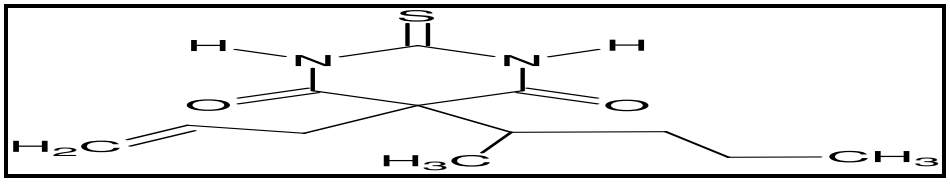

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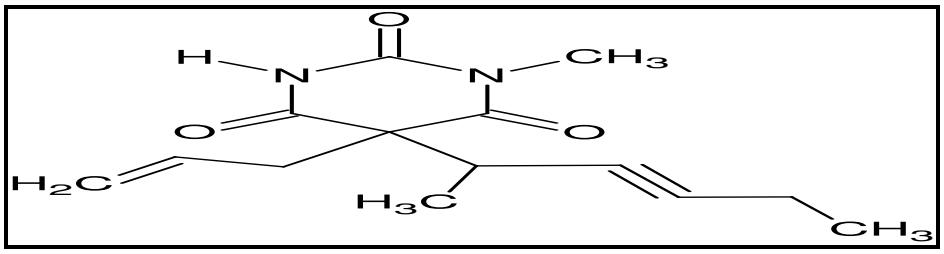

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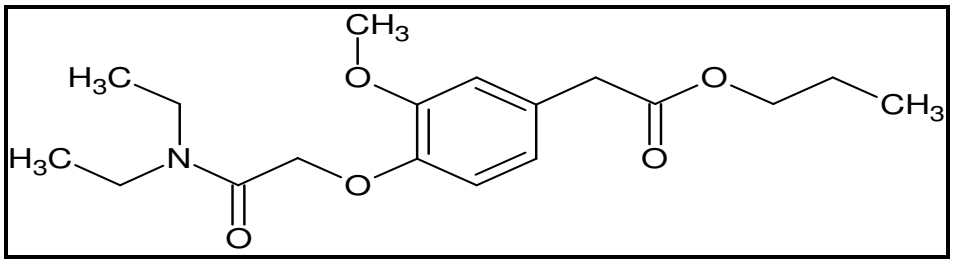
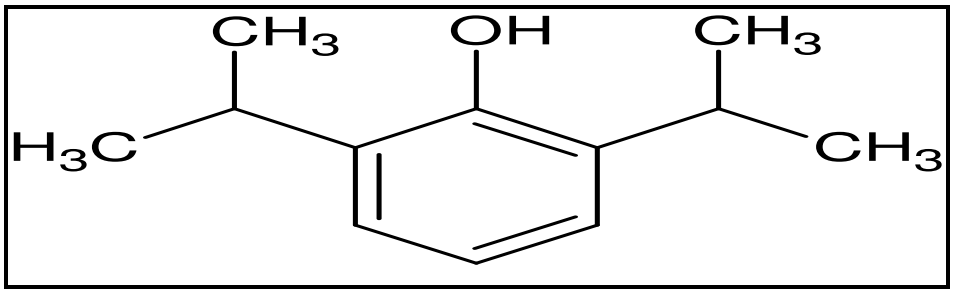


Systematic (IUPAC) name
Systematic (IUPAC) name
Propyl {4-[2-(diethylamino)-2-oxoethoxy]-3-methoxyphenyl}acetate



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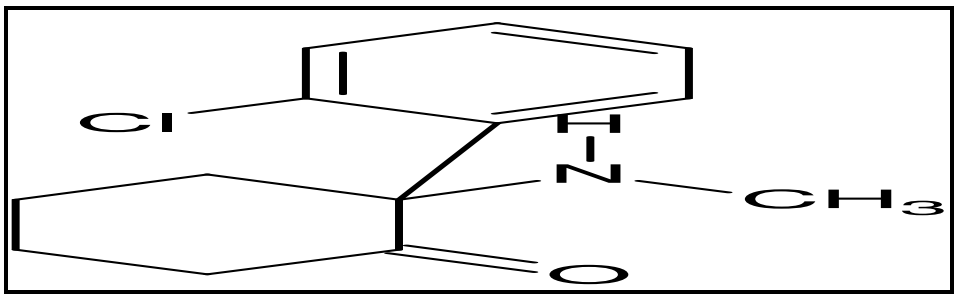
2,6-diisopropylphenol



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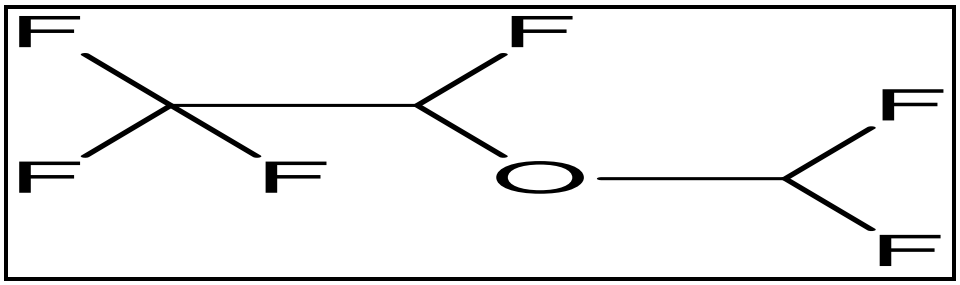

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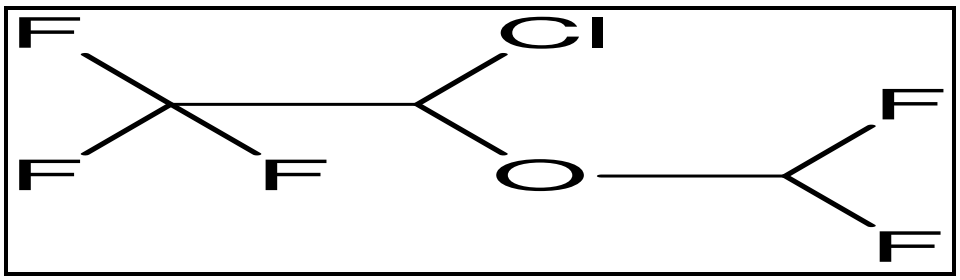
2-(difluoromethoxy)-1,1,1,2-tetrafluoro-ethane



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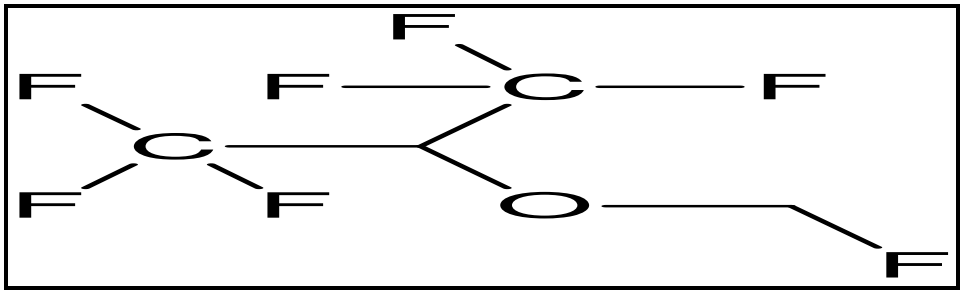

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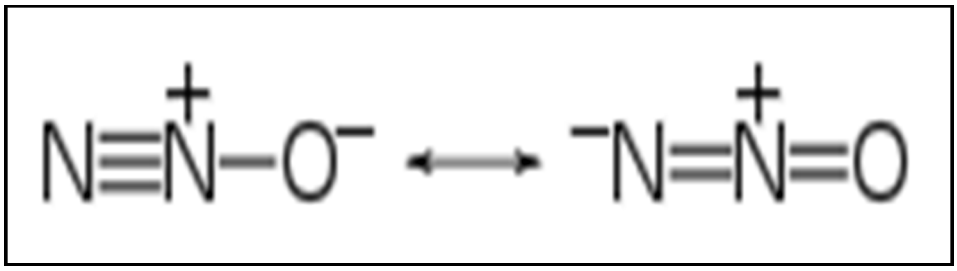
1,1,1,3,3,3-Hexafluoro-2-(fluoromethoxy) propane



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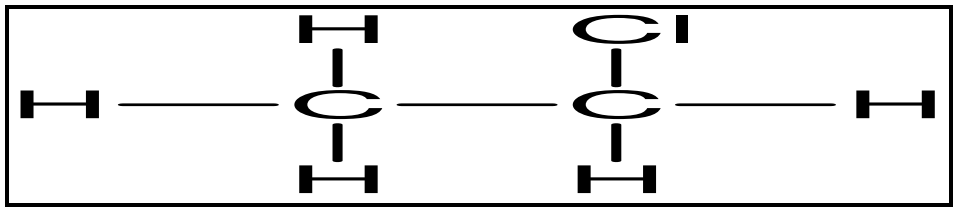

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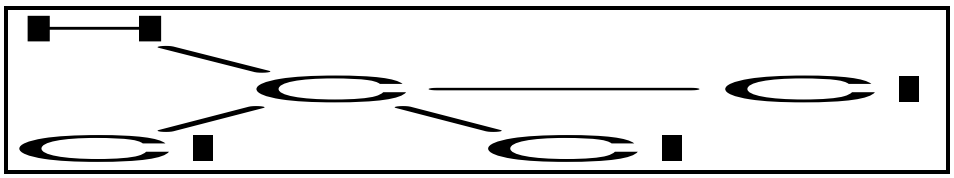
Chloroethane



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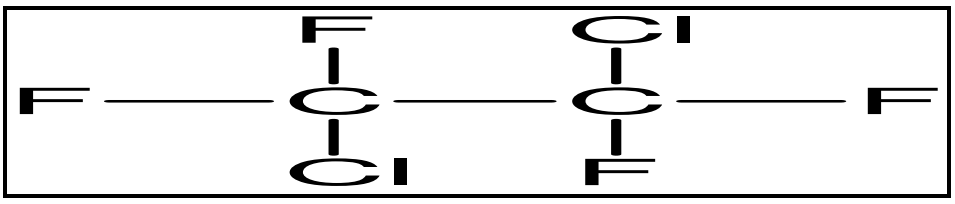

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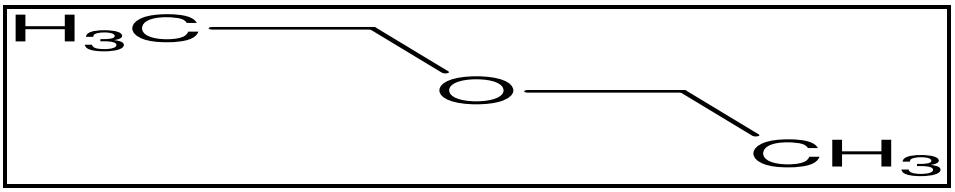
1,2-Dichlorotetrafluoroethane



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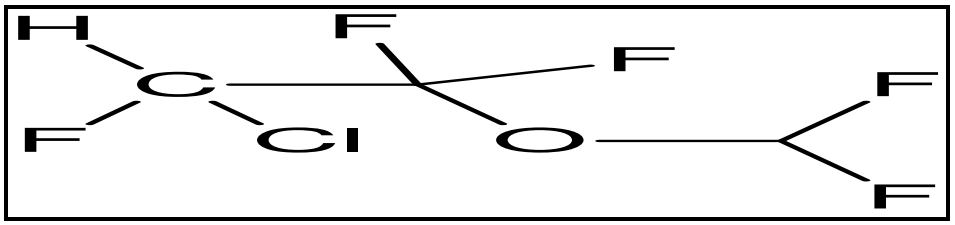
Ethoxyethane



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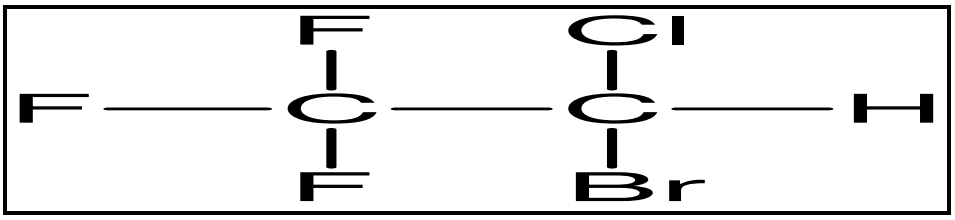

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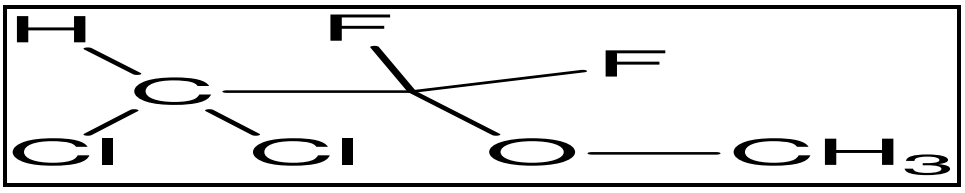
2-Bromo-2-chloro-1,1,1-trifluoroethane



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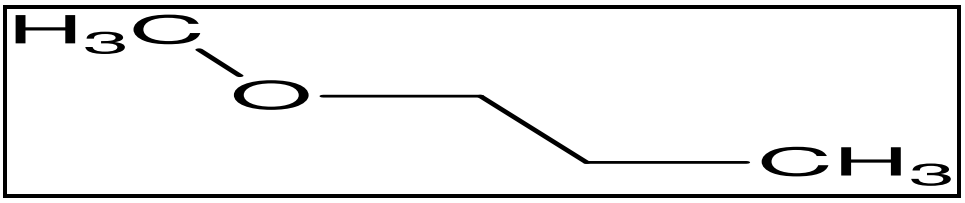
2,2-dichloro-1,1-difluoro-1-methoxyethane



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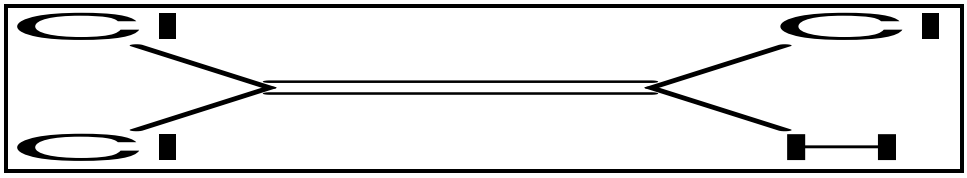
1-Methoxypropane



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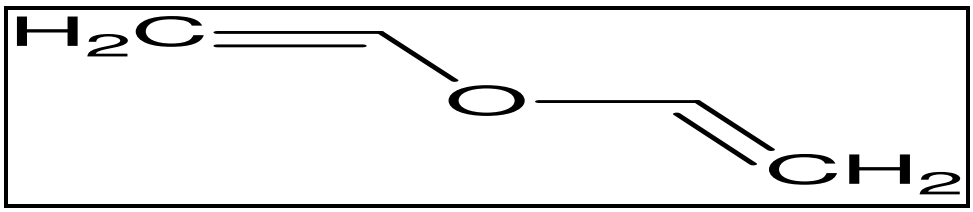
Trichloroethene



Systematic (IUPAC) name
ethenoxyethene

CONCLUSION

General anesthesia involves injections that numb a small part of patient body. Patient stays conscious but free from pain. General anesthesia involves injections that numb a larger or deeper part of the body. Patient stays conscious but free from pain. General anesthetics produce anesthesia by inhibiting excitation of nerve endings or by blocking conduction in peripheral nerves. It was achieved or done by anesthetics reversibly binding to sodium channels and inactivating sodium channels. Sodium influx through these channels is necessary for the depolarization of nerve cell membranes and subsequent propagation of impulses along the course of the nerve. There are many drugs which are used to produce anesthesia with the help of Sodium thiopental; Thiamylal; Methohexital; Propofol; Ketamine; Desflurane; Isoflurane; Nitrous oxide; Sevoflurane; Chloroform; Cryofluorane; and Diethyl Ether etc.

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CONFLICT OF INTEREST

We declare that we have no conflict of interest.

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