

Week 6 Concepts: Intracranial Regulation

CNS Depressants

Prepare: CNS Depressants

CNS Depressants

Central Nervous System (CNS) Depressants are drugs that result in a calming effect by **inhibiting** the transmission of nerve impulses to the CNS.

Subclass of CNS Depressants

Barbiturates are the subclass of CNS Depressants which inhibit nerve impulses by acting on the brainstem and GABA receptors resulting in the inhibition of nerve impulses in the cerebral cortex.

Black Box Warning

Benzodiazepines carry a black box warning regarding what?

The combination of all opioids with all benzodiazepines can cause serious CNS depression (extreme sleepiness, respiratory depression, coma and death).

The use of benzodiazepines while driving can cause severe sleepiness.

The dosage of benzodiazepines.

The use of benzodiazepines in patients with a history of depression.

Self-Check: CNS Depressant

CNS Depressant

Choose the correct CNS Depressant (sedatives, hypnotics, or sedative-hypnotic) based on the degree to which it causes the inhibition of nerve impulses in the CNS.

Sedatives produce a sense of calm, reduce nervousness, excitability, and irritability without causing sleep unless given in a large enough dose.

Hypnotics cause sleep with a much more potent CNS effect than **sedatives**.

Sedative-Hypnotics can act as either a sedative or a hypnotic depending on the dose and patient responsiveness. In low doses, they calm the CNS without causing sleep. In high doses, they calm the CNS and cause sleep.

Self-Check: Sedative-hypnotics

Sedative-hypnotics

Sedative-hypnotics, the group of CNS depressants that have either a sedative or hypnotic effect, or both, depending on various factors, are broken into 3 groups based on their chemical makeup. Which of them carries the highest risk for dependence and are therefore used less?

Barbiturates

Sedative-hypnotics

Benzodiazepines

Hypnotics

Self-Check: Barbiturates: Safety Considerations

Barbiturates: Safety Considerations

Barbiturates carry with them many contraindications, risk for dependence and overdose, as well as many drug-drug interactions.

Drag the statements below that apply to barbiturates and drop them to the right side column:

Statements
Contraindicated in pregnancy
Barbiturates cause enzyme stimulation in the liver leading to a shortened duration of action of many drugs.
Barbiturates can be addictive if misused, but they are not a controlled substance.
Overdose of barbiturates typically leads to respiratory arrest, coma, and death.
Infusing barbiturates too rapidly can cause severe headache and nausea.
Their long term use can lead to harmful effects on sleep due to the deprivation of REM sleep.
When used with barbiturates, anticoagulants are metabolized slower resulting in possible excessive bleeding.
Pentobarbital (Nembutal) and phenobarbital help to treat insomnia, withdrawal symptoms, and to control status epilepticus.

Applicable to Barbiturates
Contraindicated in pregnancy
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Pentobarbital (Nembutal) and phenobarbital help to treat insomnia, withdrawal symptoms, and to control status epilepticus.

Self-Check: Benzodiazepines

Benzodiazepines

Choose all the statements below that are correct regarding Benzodiazepines. (Select all that apply.)

alprazolam, lorazepam, and temazepam are long-acting benzodiazepines

Produce more REM suppression than barbiturates

Affect the hypothalamic, thalamic, and limbic systems of the brain (GABA receptors)

Induce relaxation of skeletal muscles

clonazepam, diazepam, and flurazepam are short-acting benzodiazepine

Reduce excessive sensory stimulation which induces sleeps

Self-Check: Nonbenzodiazepines and Orexin Receptor Antagonists

Nonbenzodiazepines and Orexin Receptor Antagonists

Nonbenzodiazepines act on the CNS and act very much like benzodiazepines. Orexin Receptor Antagonists (also called hypocretins) act on the CNS and act very much like benzodiazepines.

Reflect: CNS Depressant

CNS Depressants

Pentobarbital is a short-acting barbiturate now used for preoperative anxiety and to produce sedative effects, to treat symptoms of withdrawal from other barbiturates and nonbarbiturates, control status epilepticus, and to prevent hyperbilirubinemia in neonates.

Phenobarbital is a long-acting barbiturate used to prevent generalized tonic-clonic seizures and fever-induced convulsions as well as treatment of hyperbilirubinemia in neonates. It is no longer used as a sedative or hypnotic.

Sedative-hypnotics

Choose the correct statement(s) below regarding sedative-hypnotics. (Select all that apply.)

Prolonged use of sedative-hypnotics can cause REM interference resulting in daytime fatigue.

Discontinuation of a sedative-hypnotic can cause REM interference resulting in daytime fatigue.

Discontinuation of a sedative-hypnotic can cause REM rebound resulting in too much REM sleep and frequent, vivid dreams.

Prolonged use of sedative-hypnotics can cause REM rebound resulting in too much REM sleep and frequent, vivid dreams.

Sedative-hypnotic Drugs

Which of the following are currently the more frequently prescribed sedative-hypnotic drugs?

Nonbenzodiazepines

Long-acting barbiturates

Ultrashort-acting barbiturates

Benzodiazepines

CNS Depressants

Select the true statement(s) regarding CNS depressants. (Select all that apply.)

Herbal supplements kava and valerian have CNS stimulant effects.

There are significant drug-drug interactions with benzodiazepines, especially with other CNS Depressants, due to the intensity of benzodiazepines and the combined CNS depressant effects.

There is a black box warning regarding the combination of all opioids with all benzodiazepines which can cause serious CNS depression (extreme sleepiness, respiratory depression, coma and death).

Alcohol should not be used with these CNS Depressants because the combination multiplies the CNS depressive effects.

Barbiturates

Which of the following statements are true regarding barbiturates? (Select all that apply.)

The long-term use of barbiturates can lead to harmful effects on sleep due to the deprivation of REM sleep.

Increased CNS depression occurs when administered with alcohol, antihistamines, benzodiazepines, opioids and tranquilizers.

Overdose of barbiturates typically leads to respiratory arrest, coma, and death.

MAOIs (antidepressants) result in a longer duration of action of barbiturates.

Barbiturates are a type of sedative-hypnotic.

Decreased CNS depression occurs when administered with alcohol, antihistamines, benzodiazepines, opioids and tranquilizers.

The long-term use of barbiturates can lead to harmful effects on sleep due to the prolongation of REM sleep.

Sedative-hypnotics

Select the true statement below regarding sedative-hypnotics.

Sedatives at low doses calm the CNS and cause sleep.

Hypnotics at high doses calm the CNS and cause sleep.

Hypnotics at low doses calm the CNS without causing sleep.

Sedatives at high doses calm the CNS without causing sleep.

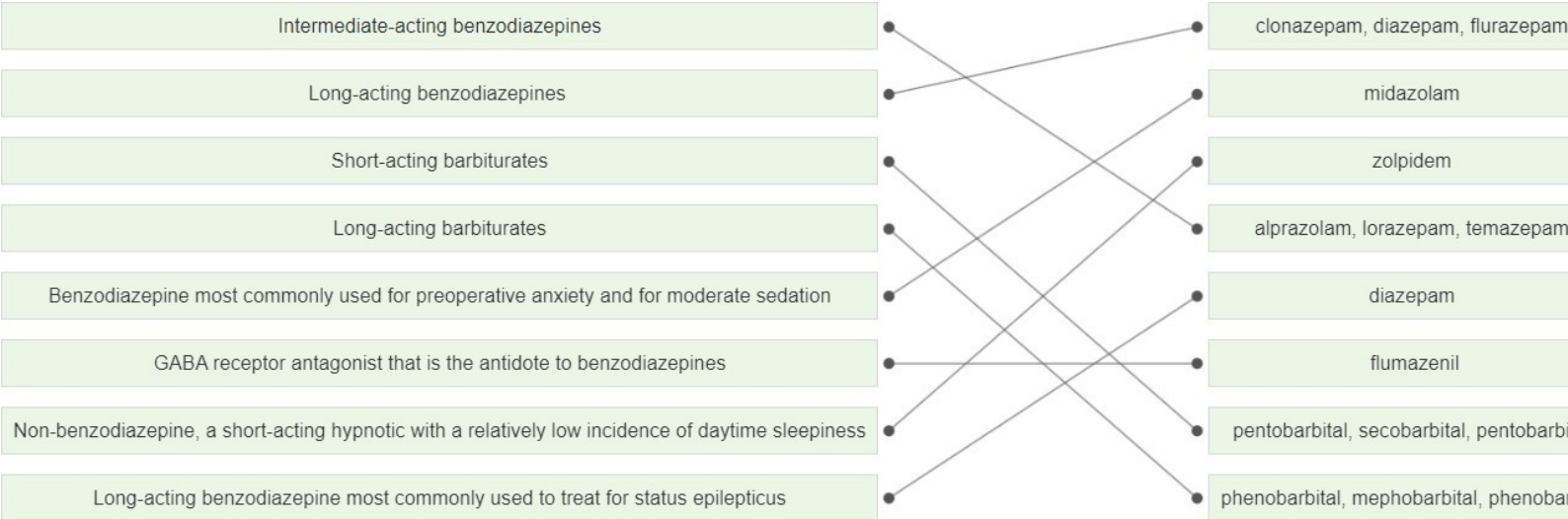
Barbiturates

Match each barbiturate drug to its common use.

	methohexital and thiopental	pentobarbital and secobarbital	butabarbital	phenobarbital and mephobarbital
Use	induction of anesthesia	prevent hyperbilirubinemia in neonates	sedation	prevention of seizures

Sedative-hypnotics

Match the sedative-hypnotic CNS Depressant medication to its subclass.



IF CAN'T READ

Intermediate-acting benzodiazepines - alprazolam, lorazepam, temazepam

Long-acting benzodiazepines - clonazepam, diazepam, flurazepam

Short-acting barbiturates - pentobarbital, secobarbital, pentobarbital

Long-acting barbiturates - phenobarbital, mephobarbital, phenobarbital

GABA receptor antagonist that is the antidote to benzodiazepines - flumazenil

Long-acting benzodiazepine most commonly used to treat for status epilepticus - diazepam

benzodiazepine most commonly used for preoperative anxiety and for moderate sedation - midazolam

Non-benzodiazepine, a short-acting hypnotic with a relatively low incidence of daytime sleepiness - zolpidem

Intermediate Acting Benzodiazepines (alprazolam)

Prepare: Intermediate Acting Benzodiazepines (alprazolam)

Which of these medications is an intermediate-acting benzodiazepines used for its anxiolytic effects?

- zolpidem
- butabarbital
- diazepam
- alprazolam

Benzodiazepines are contraindicated in pregnancy and lactation because they: (Select all that apply.)

- Cause CNS depression
- May cause sedation and respiratory issues in newborns
- Cross into breastmilk
- May cause anxiety in the mother

Benzodiazepines are most often used for which of these effects?

- Barbiturate
- Anxiolytic
- Sedative
- Hypnotic

Self-Check: Intermediate Acting Benzodiazepines

Intermediate-acting benzodiazepines are so called because:

There onset and duration of action takes much longer than those of short-acting benzodiazepines

They sometimes have an increased CNS depressive effect when taken with barbiturates

In relation to short- and long-acting benzodiazepines, their onset and duration of action take place over a period of time that is neither fast nor slow

They are sometimes less effective when taken with other CNS Depressants

Benzodiazepines