

## **ETHANOL (ETHYL ALCOHOL). PHARMACOLOGIC STRATEGIES IN MANAGING ALCOHOLISM. HYPNOTICS. ANTIEPILEPTICS. ANTICONVULSANTS. ANTIPARKINSON DRUGS**

**A. Actuality.** Medical and social aspects of use of ethyl alcohol requires a thorough study of the pharmacokinetics and its effects on the body. A separate problem is the interaction of alcohol and drugs.

Hypnotics require detailed study of the mechanisms of action and influence on sleep architecture to select rational correction of sleep disorders and the prevention of adverse effects of medicinal dependence of preparations hypnotics.

Combating unknown genesis convulsive seizures requires urgent medical attention and profound knowledge of the pharmacokinetic and pharmacodynamic properties of these drug classes.

Epilepsy, a medico-social disease, requires a detailed knowledge of pharmacokinetic and pharmacodynamic properties of antiepileptic drugs to ensure an effective and harmless treatment.

Treatment of Parkinson's disease or Parkinson's syndrome will be based on profound knowledge of the pharmacological properties of antiparkinsonian drugs.

Spasticity skeletal muscle is a difficult problem for the practitioner, because of which require extensive knowledge in pharmacology central muscle relaxants.

**B. The purpose of the training is** to familiarize the students with the pharmacological properties of hypnotics, symptomatic anticonvulsants, antiepileptics, antiparkinsonian drugs and ethyl alcohol.

### **C. Learning objectives:**

1) The student must **know:** the general characteristics of the hypnotics, symptomatic anticonvulsants, antiepileptics, antiparkinsonian drugs and ethyl alcohol, to classify them into distinct groups, all the while getting familiarized with their different nomenclatures, mechanisms of action, specific indications, contraindications, and adverse-reactions, as well as with their various dosage forms and ways of administration, finally including special peculiarities allowing to spot their overdose, followed by conventional methods of management.

2) The student must **be able to:** prescribe the compulsory drugs in all their clinically approved dosage forms, as well as to be able to select the optimal pharmacologic approach(es) in order to treat and/or manage a given disorder.

### **D. Initial level of knowledge required for interdisciplinary integration:**

**Human physiology.** Sleep as a physiological process: its phases and levels. Theories of sleep. Interaction between cerebral cortex, hypothalamus and reticular formation during sleep and waking.

### **E. Self-training questions:**

1. Hypnotic drugs. Principles of classification (by structure and duration of action).
2. Barbiturates. Classification by duration of action. Pharmacokinetics. Mechanism of action, influence on the structure of sleep, indications, side effects. Tolerance, drug addiction. Acute barbiturates intoxication: clinical

- picture, treatment. Particularities of barbiturates use in children. The particularities of intoxication with hypnotics in children.
3. Benzodiazepines. Classification by duration of action. Pharmacokinetics Mechanism of action, influence on the structure of sleep, indications, adverse reactions. Benzodiazepine antagonists. Drug addiction.
  4. Non-benzodiazepine hypnotics: Mechanism of action, influence on sleep structure, indications, adverse reactions, pharmacokinetics.
  5. Melatonin receptor agonists: mechanism of action, influence on the structure of sleep, indications, adverse reactions.
  6. Other groups of drugs with hypnotic action (antidepressants, H1-antihistamines, anxiolytics, antipsychotics, orexin antagonists, sedatives). Particularities of action and use.
  7. Symptomatic anticonvulsant medications(wide profile). Classification by group membership and influence on the respiratory center.Characterization of barbiturates, benzodiazepines and GABA derivatives. Peculiarities of use in children.
  8. Antiepileptic drugs: classification, mechanisms of action, indications, adverse reactions, pharmacokinetics.
  9. Antiparkinsonian drugs: classification, mechanisms of action, indications, adverse reactions, pharmacokinetics.
  10. Antispastics of striated muscles (central muscle relaxants): classification, mechanisms of action, indications.
  11. Ethanol (ethanol) pharmacokinetics (absorption, distribution, metabolism and elimination).
  12. Pharmacodynamics of alcohol (ethanol) (influence on the central nervous system, cardiovascular system, digestive tract organs, local, reflex, antiseptic and energetic action). Indications.
  13. The principles of treatment of acute alcohol intoxication and alcoholism. Interaction of alcohol with other drugs.

**F. The student's individual work** (points 2, 3 and 4 are done in writing during the preparation process)

**1.) Brief characteristics of compulsory drugs:** (Medicinal form. Ways of administration. Doses (maximum for one intake, for 24 hours, therapeutic). The mechanism of action. The indications. Contraindications.)

**Drug name.** 1. Phenobarbital 2. Sodium thiopental 3. Oxazepam 4. Nitrazepam 5. Zopiclon 6. Diazepam 7. Levodopa 8. Selegilin 9. Trihexifenidyl 10. Amantadine 11. Bromocriptine 12. Phenytoin 13. Carbamazepine 14. Sodium valproate 15. Etosuximide 16. Lamotrigine 17. Tolperison 18. Tizanidine. 19 Ethyl alcohol 20. Disulfiram. 21. „Nakom”.

**2.) Medical prescription exercises (done in writing during the preparation process):**

**To prescribe** the following drugs in all the possible medicinal forms:

1. Phenobarbital 2. Sodium thiopental 3. Oxazepam 4. Nitrazepam 5. Zopiclon 6. Diazepam 7. Levodopa 8. Trihexifenidyl 9. Selegilin 10. Amantadine 11. Phenytoin 12. Bromocriptine 13. Carbamazepine 14. Sodium valproate 15. Etosuximide 16. Lamotrigine 17. Tolperison 18. Tizanidine. 19 Ethyl alcohol 20. Disulfiram. 21. „Nakom”.

<b>Nº</b>	<b>Name of drug</b>	<b>Doses, medicinal forms</b>
<b>1</b>	<b>Phenobarbital</b>	Tablets 0.005; 0.05; 0.1; Sol. in vials 0.2%-100 ml for internal use Sol. in ampoules 10%-2 ml and 4%-1 ml
<b>2</b>	<b>Sodium thiopental</b>	Vials with lyophilized powder 0.5; 1.0
<b>3</b>	<b>Oxazepam</b>	Tablets 0.01; 0.015; 0.03
<b>4</b>	<b>Nitrazepam</b>	Tablets 0.005; 0.01
<b>5</b>	<b>Zopiclon</b>	
<b>6</b>	<b>Diazepam</b>	Tablets 0.001; 0.002; 0.005; 0.01 Sol. in ampoules 0.5%-2 ml; Gel in rectal tube 0.2 and 0.4% - 2.5 ml
<b>7</b>	<b>Levodopa</b>	Caps., Tab. 0,25; 0,5
<b>8</b>	<b>Trihexifenidyl</b>	Tab. 0,001; 0,002; 0,005
<b>9</b>	<b>Selegilin</b>	Tab. 0,005; 0,01
<b>10</b>	<b>Amantadine</b>	Tab., Caps. 0,1; Sol.in amp. 1%-5 ml; Sol. in vials 0,04%-500 ml
<b>11</b>	<b>Phenytoin</b>	Tablets 0.117; Sol.5%-5 ml in ampoules; Suspension 1.5%-50 ml in vials
<b>12</b>	<b>Bromocriptine</b>	Tablets 0.0025; 0.004; 0.01; Capsules 0.005; 0.01
<b>13</b>	<b>Carbamazepine</b>	Tablets 0.1; 0.2.
<b>14</b>	<b>Sodium valproate</b>	Tablets 0.15; 0.3; 0.5; Dragees (capsules) 0.15; 0.3; Syrup 5%-100 ml in vials; Powder in vials 0.4
<b>15</b>	<b>Etosuximide</b>	Capsules 0.25
<b>16</b>	<b>Lamotrigine</b>	Tablets 0.025; 0.05; 0.1
<b>17</b>	<b>Tolperison</b>	Dragees 0.05; 0.15; Sol. 10%-1 ml in ampoules
<b>18</b>	<b>Tizanidine</b>	Tablets 0.002;0.004;0.006
<b>19</b>	<b>Ethyl alcohol</b>	70%; 95%; 90%; 40% in bottles
<b>20</b>	<b>Disulfiram</b>	Tablets 0.15; 0.25
<b>21</b>	<b>„Nakom”</b>	Combined drug in tablets

**Drugs used in (for):** sleep deprivation (initial hyposomnia), early awakening (terminal hyposomnia), frequent nocturnal awakenings (intermittent hyposomnia), decreased sleep duration, superficial sleep, seizures of unknown genesis, major epilepsy attacks, minor epilepsy attacks, myoclonic seizures, (focal) epilepsy, epileptic seizure, Parkinson's disease, alcoholism, acute alcohol intoxication, benzodiazepine overdose, spastic states of the striated muscles (rigidity).

**3.) Tests** (Guidelines for Laboratory Work in Pharmacology).

**4.) Tables**

Table N1

**Comparative characteristic of hypnotic drugs**

Parameters	Barbiturates	Benzodiazepines	Non-benzodiazepines
Drugs with short duration			
Drugs with medium duration			
Drugs with long duration			
Influence on the slow sleep phase			
Influence on rapid sleep phase			
Influence on sleep installation			
Influence on sleep duration			
Influence on nocturnal awakening			
Degree of post-action syndrome (marked / reduced)			
Other pharmacological effects			
Enzymatic induction phenomenon (pronounced / low)			
Tolerance (characteristic / non characteristic)			
Drug addiction (psychic, physical)			
Inhibition of respiratory center (marked / reduced)			
Specific antagonists			

Table N2

### Comparative characteristic of antiepileptic drugs

Drug	Administration in epilepsy			Status epilepticus	Partial crises	Induction of microsomal enzymes
	Major crises	Minor crises	Psychomotor crises			
Phenobarbital						
Phenytoin						
Carbamazepine						
Clonazepam						
Diazepam						
Sodium valproate						
Etosuximide						
Lamotrigine						

Please express the presence of a pharmacologic effect with a “+” sign.

#### **G. Interactive activity**

**1. Experimental and virtual didactic film** (elaboration of conclusions)

**2. Clinical case** (Guide for laboratory work in pharmacology).

**3. Virtual situations** (Guide for laboratory work in pharmacology).

**4. Situational issues:**

##### **Clinical case 1**

A patient accused of sleep disorder (falling asleep over 1-1.5 hours) used a hypnotic drug who was given 10 minutes before sleep. Sleep occurred over 45 minutes, and in the morning when waking the patient noted the presence of drowsiness, decreased attention and work capacity.

What hypnotic drugs could use the patient?

What phenomenon occurred the next day?

What can be the causes of this phenomenon?

Which hypnotic drugs do you recommend to the patient?

##### **Clinical case 2**

In the emergency room, were brought to the hospital by the emergency team, 2 patients with convulsive syndrome and the doctor took parenteral drug A at the transport stage. The convulsions were juggled. In the admission clinic on examination, patient M was found to suffer from epilepsy, and patient N inadvertently ingested a chemical compound.

Which drug the emergency team doctor give?

What is the pharmacological group?

What is the mechanism of action of the drug?

What are the parenteral routes of administration of the drug and the particularities of the development of the effect and adverse reactions?