

Doctoral School: **Biology Doctoral School**  
Doctoral Program: Neuroscience and Human Biology

Subject code: **BIO/7/42**

Subject title: **Neurotoxicology L**

Teacher and Neptun code: **Dr. Világi Ildikó (GYVVCB), Dr. Varró Petra (ZHZ80C)**

Credits: 4

Class hours: 2 hours/week, lecture

### Aims of the course

The lectures give a detailed overview about the types and effects of toxic substances, especially neurotoxic agents. Neurotoxicological experimental methods are also discussed.

### Contents of the course

- Introduction and basics of toxicology. History and terminology of toxicology, categorization of toxic substances, timescale of poisoning, characteristics of toxins, legal regulation in the European Union.
- Fate of poisons in the human body, symptoms of poisoning. Absorption routes, possibilities of distribution and elimination. Exposure of certain organs, effect of poisons on different organs.
- Toxicological aspects of pharmaceutical research. Main steps and toxicological aspects of drug development, occurrence of adverse effects and drug interactions, neurological adverse effects.
- Natural toxins – plant- and fungal toxins. Presentation of toxins produced by plants and fungi, poisoning symptoms.
- Natural toxins – microbial and animal toxins. Presentation of toxins produced by microbes and animals, poisoning symptoms.
- Xenobiotics, pesticides, other chemicals. Presentation of harmful synthetic substances to which humans may be exposed. Description of plastics, pesticides, food additives and their harmful effects.
- Metal poisoning. Description of potentially harmful metals. Characterization of heavy metals, presentation of their mechanism of effect and poisoning symptoms.
- Toxicology of stimulants and drugs of abuse. General and historic description of stimulants and drugs of abuse. Their general effect on the nervous system. Categorization of drugs, specific effects. Categorization and characterization of stimulants.
- Toxicology of nanomaterials. General description of nanomaterials, presentation of their use. Toxicological risks. Presentation of eventual nervous system effects.
- Poison targets within the nervous system. Presentation of sensitive targets of the nervous system, characterization of membrane components, receptors as targets. Alterations on the cellular and tissue level.
- Research methods – anatomy and molecular biology techniques. Presentation of experimental methods suitable for studying nervous system toxicity with anatomical and molecular biological tools. Evaluation of nervous system toxicity.
- Research methods – electrophysiology and behavioral testing. Presentation of experimental methods suitable for studying nervous system toxicity with electrophysiological and behavioral tools. Evaluation of nervous system toxicity.
- Alternative toxicological testing methods. Environmental toxicology, use of non-mammalian species for toxicological testing.
- Written test

### Requirements

Written exam

Grade is determined by the exam result.

### Literature

Power point slides, circa 350 slides