Department of Pharmacology is one of the biggest pharmacology departments in Iran. It undertakes the education of more than 2000 students pursuing their studies in other faculties such as Medicine, Dentistry, Pharmacy, Nursing, and Midwifery. The department plays an active role in education and training of doctoral and PhD students. Graduates have been successful at obtaining positions in academia, industry, and private pharmacy.

Educational Mission

The educational mission of department is related to teaching Pharmacology and Toxicology in the doctorate, graduate and undergraduate curricula, including:

Pharmacy, Dentistry, General Medicine, PhD in Pharmacology, PhD in Toxicology, Nursing, Midwifery, Health and Nutrition, Paramedical Sciences, Rehabilitation Sciences, Medical Management and Information sciences.

Research Mission

In the field of research, good cooperation exists not only between this department and other departments of pharmacy but also with other TUOMS faculties. At present, several common research projects are running between this department and the departments of Pharmacognosy, Medicinal Chemistry, Pharmaceutics and Biochemistry.

Study of poisonings, molecular toxicology and carcinogenicity ─ This includes the comparative studies on poisonings in north-western provinces of the country, investigation about these poisonings on animal models and evaluation of their harmful effects. Mechanical aspects of poisoning and chemical carcinogenicity are studied with emphasis on the production of oxide substances, cellular and tissue injury and discovering the effects and signs of fibrosis and cirrhosis in different tissues such as the skin, lungs, liver and kidney. The study of chemotherapeutical aspects, plant products and herbal medicines are among the studies to be performed in future.

Behavioral and Biochemical studies of the pain- killing effects of medicines ─ The effects of medicines and natural products on the response of laboratory animals (rats and mice) against painful factors are the areas studied in this part. For evaluation the pain-killing effects of chemical compounds, the mechanical presser test is used as a laboratory model of acute pain, and the

formalin test is used as the model of chronic inflammatory pain. The neurochemical mechanism of pain-killing effects of these compounds is also studied by using antagonists, neural toxins and micro dialysis.

Anti-inflammatory studies ─ The anti-inflammatory effects of natural products, and formulation and pre-compound of 5-amino salicylic acid are being evaluated in these studies. Anti-inflammatory models of edema caused by carrageenan, production of licking response, formalin and colitis, are the known models being studied in rats. In order to determine the anti-inflammatory effects of the substances on the amount of the accumulation of PMNs, the measurement method of peroxidase enzyme and presence of neutrophils and macrophages has been used as the index of the activity.

Investigation of the protective effects of estrogens on cardiovascular system ─ Current epidemiologic studies have shown the useful effects of treatment with estrogenic hormones (HRT) in reducing the mortality resulting from cardiovascular diseases, which are more common in menopausal woman as compared with reproductive aged women and also with their contemporary men. By using *in vitro* and *in vivo* methods, the effects of natural and synthetic estrogens and endogen-dependent compounds on smooth muscles of the breast vessels are also studied. The mechanism of the effect of estrogen and the analysis of the relationship between their structure and their property on smooth muscles of vessels, are some research areas that are being evaluated in this part.

Pharmacology of neuro-muscular junctions ─ Research in this area includes the analysis of the function of carrier-receivers and adjustment of construction, storage and release of neural transmitters. Current research fields in this area include: 1) the effect of medicines on nicotinic cholinergic receivers including ganglion and skeletal muscles. 2) The effect of medicines on action potential of the sciatic nerve. Blockage of coronary vessels in laboratory animals and isolated hearts in order to investigate ischemic arrhythmia and the amount of injury resulting from ischemia are among the methods used in laboratory. In this case, the effects of plant extracts such as

Cratagus and Staice inflata are the Milrinon analogues being studied. Study of the mechanisms of pre-conditioning of heart by the use of hypoventilation and the probable role of pre-conditioning are being studied.

Facilities

Laboratories: Cardiovascular, Neuroscience, Immunopharmacology, Toxicology, Molecular Pharmacology and Toxicology, Cellular Pharmacology and Toxicology.

Equipment: Ultrasound Color Doppler Sonoscape E2V, Chromatography, UV spectrophotometer, different kinds of organ baths, analytical equipment to analyze blood gases, Western Blot, Plethysmometer.