BASIC DEPARTMENTS OF PHARMACOLOGY. WHAT RULES ARE FOLLOWED FOR THE CLASSIFICATION OF DRUGS!

[1]Hikmatulla Toraev, [2]Begnayeva Mukhiba
[1,2] Samarkand State Medical University
https://doi.org/10.5281/zenodo.7682710

Abstract. *Pharmacology is one of the main sciences of medicine, it is considered the most important weapon in the hands of doctors in the fight against diseases. Pharmacology is a Latin word, parmacon means medicine, logos-science, the science of medicine. Pharmacology studies the changes that occur in the body of humans and animals after drugs are administered. Pharmacological substances can change the activity of various organs, tissues, and even cells of the body. Pharmacology consists of several major departments: general pharmacology, clinical pharmacology, biochemical pharmacology, chemotherapy, toxicology, etc. Pharmacology is a pharmaceutical science - pharmaceutical chemistry, pharmacognosy is closely related to pharmaceutical technology, through which it is connected with the sciences of chemistry, botany, and technology. In the world of medicine, pharmacology has a special place: on one side are the main theoretical sciences of medicine - physiology, pathological physiology, biochemistry, and on the other - applied sciences - therapy, pediatrics, surgery, etc.*

Keywords: *basic departments of pharmacology. Classification of medicinal substances - rules, absorption, distribution and accumulation of medicinal substances in the body.*

Through pharmacology, theoretical knowledge replaces practical medicine. The history of pharmacology was founded at the time when mankind was created, because at that time people were sick, encountered wild animals, fires, were bitten by snakes, scorpions, and sought healing and medicine from the surrounding plants and animals. The book, written on papyrus before 3600 BC, is called "On Medicines for Various Organs". Ancient Asian countries made a great contribution to the development of the science of pharmacology. In India, Tibet, China and Arab countries, treatment with plants has become widespread. Shen-Nung, the founder of Chinese medicine, 3000 years ago, in his works, synonymous names of plants, botanical definition, periods of preparation of products from plants and methods, range of effects of medicines, their use. "Ayur-Veda", an ancient Indian book about medicinal plants written by doctor Sushruta, describes 700 different medicinal plants. The famous book "Jud-Shi" ("Essence of Healing Medicines") forms the basis of Tibetan medicine. 1500 years before our era, it was known that pomegranate peel against worms, sesame oil, and sea onion are good for the heart. These products are still used in these diseases today. Ancient Greek doctors Bucrot (460-377 BC), Dioscorides (1st century), especially the Roman judge Jolinus (Galen, 2nd century) worked on medicines. Jolinus was the first to create different forms of medicine, to use prescriptions for medicinal substances. Uzbek scientists made a great contribution to the development of pharmacology. The great physician of the East, Ibn Abbas (died in 997), emphasized in his works that new medicinal substances appear every year, and that it is necessary to test them first on animals. The encyclopedic scientist, physician, thinker of the East, Abu Bakr Muhammed ibn Zakariya al-Razi (865-925), has reached us 36 works on medicine: in his works, he enriched the sciences of therapy, surgery, pharmacognosy, pharmacology, psychology with new ideas and inventions. The works of this scientist devoted to medicine and chemistry had a great influence on the development of these

fields in the Middle Ages in the East and West. In the development of the science of pharmacology, the great judge of Central Asia, Abu Ali Ibn Sina, made a great contribution in his works such as "The Laws of Medicine", "Kitab ush shifa", "Kitabi al kalbiya" and the medicinal substances used in the medicine of that time are presented. The first book of "Medicine Laws" lists 811 common medicinal substances, 612 of which belong to plants. The fifth book describes the methods of preparation of complex medicinal substances and their use. Ibn Sina emphasized the need to use medicines according to the patient's client, divided the medicinal substances into types that are warming, cooling, drying, moisturizing according to the client: Ibn Sina wrote a poem "Urjuza fi-t-tibb" dedicated to medicinal substances. Ibn Sina treated wounds with mercury 400 years before European doctors. The great encyclopedist Abu Raykhan Beruni made a great contribution to the development of pharmacology, in his work "Saydana" there are names and explanations of medicinal substances, more than four and a half thousand plants, animals, minerals and food products obtained from them. Beruni said that everything that enters a person's body is either food or poison, and drugs are somewhere in between. He emphasized that simple drugs should be recommended first, and if they do not help, then complex drugs can be used. Beruni's book "Saydana" has been used as a great encyclopedia of oriental medicine. Sharafutdin Abu Abdullah Muhammed Yusuf Ilaki (died in 1068) was one of the students of Ibn Sina, and in his works "Muolajati Ilaki" and "Mukhtasari Ilaki" he described the origin of various diseases, their identification, symptoms and methods of treatment with drugs. These works were a guide for doctors in their time. Khorezm scientist and physician Ismail Jurjani (1080-1141) wrote more than 15 works in the field of medicine. The book on pharmacology consists of two sections. The first section contains information about simple substances, and the second section contains information about complex substances and methods of their preparation. This scientist created pharmacological terms in Persian language. Umar Chagmini (died in 1221) created the medical work "Qanuncha". This work was used as a manual not only in Khorezm, the scientist's homeland, but also in Bukhara, Samarkand, Tashkent, Kokand madrasas, as well as in countries such as India and Iran, until the beginning of the 20th century. Najibuddin Samarkandi Abu Hamid Muhammad ibn Ali ibn Umar (died in 1222), a doctor and scientist from Samarkand, is known for 8 scientific works on medicine, one of which is "Methods of preparing complex drugs". Yusufi Muhammad ibn Yusuf al-Hirawi (15th century) Shah Zahir al-Din Babur in India, later the court physician of his son Humayun, the book "Tibbi Yusufi" is an important guide for learning how to treat patients with drugs. was In the 16th century, the Western scientist Parastels filled pharmacology with chemical substances and was the founder of the field of iatrochemistry (yatros - doctor) in medicine. At the same time, according to Parastels, there is a cure for all diseases in nature, they can be identified by their appearance. Fruits and plants similar to the shape of the diseased organ were recommended to the patient. For example, the cashew plant, whose fruits resemble the shape of a heart, has a healing effect on the patient in case of heart disease, and in case of kidney disease, plants with kidney-like leaves have a healing effect on the patient. At the end of the 18th century, Hahnemann founded the direction of homeopathy in medicine. In this case, the treatment is based on the law of similarity. Hahnemann. Homeopathic pharmacies are also common nowadays. Until the 19th century, pharmacology developed empirically, in folk medicine, even doctors monitored the effects of drugs on patients. Experimental pharmacology began to develop in the 19th century. It was concluded that all used and intended medicinal substances must first be tested in animals, and since then scientific pharmacology was founded.

Scientists such as A.P. Nelyubin, O.V. Zabelin, E.V. Pelikan in Russia, Francois Majandi, Claude Bernard, Schmideberg in Europe made a great contribution to the development of scientific pharmacology. Before becoming a famous physiologist, I.P. Pavlov conducted extensive experiments in the field of pharmacology, 80 works related to this field. a scientific work has been published. From 1891 to 1895, I.P. Pavlov headed the department of pharmacology at the military medical academy in St. Petersburg. After I.P. Pavlov, academician N.P. Kravkov, the founder of modern pharmacology, headed this department for 25 years. N.P. Kravkov created a large school in the field of pharmacology, his book "Fundamentals of Pharmacology" was published 14 times. N.P. Kravkov trained many students. Academicians S.V.Anichkov, V.V.Zakusov and other students' works are considered the foundation of today's pharmacology. Nowadays, academicians M.D. Mashkovsky and D.A. Kharkevich make a great contribution to the development of pharmacology, especially "Drug substances" by M.D. Mashkovsky, "Pharmacology" program written by D.A. Kharkevich for students is of great importance in mastering this science. The development of pharmacology in Uzbekistan began with the scientific work of the Department of Pharmacology of the Tashkent Medical Institute. The science of pharmacology developed especially after the opening of the pharmacology laboratory at the Institute of Plant Chemistry of the Uzbek Academy of Sciences in 1956. This laboratory was headed by the famous Uzbek pharmacologist Professor Ishok Komilov. Domla trained about forty doctors of science, candidates of science. Currently, more than 20 doctors of science and about 100 candidates of science have graduated in the field of pharmacology in Uzbekistan. As a result of scientists' research, several new substances are used in medicine. The science of pharmacology in Uzbekistan is developing day by day thanks to the generous contribution of pharmacology departments of medical universities, employees of a number of research laboratories, scientists, employees of the chemical and pharmaceutical industry. One of the main goals of pharmacology is to discover new drugs, study their effects, and apply them to practical medicine.

Discovery of new drugs. Substances that have the properties of treatment and prevention of disease are called medicinal substances. There are many ways and sources of medicinal substances, they come from wild and cultivated plants (cardiac glycosides, narcotic analgesics), animal organs and tissues (hormonal substances, enzymes), microorganisms (antibiotics), minerals (iron, cobalt, aluminum, coal substances) and by chemical synthesis (sulfanilamides). It is of great importance to synthesize medicinal substances by targeting them in a particularly appropriate way. In this case, chemists and pharmacologists plan in advance to synthesize substances that will have therapeutic properties. Substances produced by the body itself, for example, a number of hormones, adrenaline, noradrenaline, prostaglandins are also synthesized in laboratories. The opposites of natural metabolites, i.e. antimetabolites, are obtained by synthesis. Through synthesis, chemical changes are made to substances with clear biological activity, for example, products of acid, sulfonamides. The purpose of this is to discover new substances with a significant effect and low toxicity. New substances are also discovered by studying the chemical changes of natural metabolites in the body (inhibitors of the natural mediator acetylcholine, inhibitors of the monoamine oxidase enzyme). New semi-synthetic substances are created by synthesis on the basis of substances obtained from plants, animals and microorganisms. Drug substances can also be discovered by accident. For example, the anti-arrhythmic effect of quinine was accidentally discovered in the treatment of a patient with malaria (who also had an arrhythmia). "Screening" is important in the empirical discovery of new drugs. The biological activity of all the obtained

chemicals is determined by various methods, they are screened and the most active ones are selected. After the discovery of a new medicinal substance, it is submitted to the pharmacology laboratory, department for testing (table 1). Here, the main effect of the substance, mechanism of action, place, duration of effect are defined. In addition to the main effects of medicinal substances, other effects and side effects are also determined. The pharmacokinetics of the medicinal substance (absorption, distribution, transformation, elimination from the body) are studied. Toxicity of medicinal substances - acute toxicity - when administered once and chronic toxicity - when used continuously. Their teratogenicity, carcinogenicity, and mutagenicity are studied. Then, the main effect of the substance is studied in animals with a disease.

Physiological, biochemical, biophysical, morphological and other methods are used when conducting experiments. If it is determined in the experiments that the effect of the new medicinal substance is superior to the drugs used in medicine, the substance is submitted to the Pharmacology Committee under the Ministry of Health. Experts of the committee - pharmacologists, clinicians - review the results, if the tests meet the approved laws and regulations, if this substance can be used as a medicine, it is allowed to undergo clinical trials. The substance is tested on patients in 7-8 clinics (the more patients the drug is tested on, the more reliable results are obtained), the new substance is necessarily compared with the effect of the substance that is widely used in this disease today. In order to obtain more reliable results, a "placebo" is used during clinical trials - the shape, appearance, smell, and taste of the drug are similar to the test substance, only the placebo does not contain the substance being tested. "Placebo" is administered to patients with a test drug substance, the patient does not know which drug is the "placebo" and which is the test drug, only the treating doctor knows this, and in some cases only a third party (a medical worker) knows this. In this case, neither the attending physician nor the patient know whether they are taking a "placebo" or a drug, and this situation is called double-blind control. As a result of the tests, statistical information is obtained. If the tested drug substance is reliable, the patient's condition has improved under its influence, the substance is relatively less toxic, all indicators are superior to the compared substance, and it is also useful from the point of view of economy, the results of the clinical trial are again submitted to the Pharmacological Committee, experts are taken the results are reviewed, if the new substance meets all the laws and regulations, it is allowed to be widely used in medicine. Then this substance is sent to the chemical-pharmaceutical industry for production, the new substance discovered in such a laborious way takes its place in medical practice as a medicine.

Basic departments of pharmacology. Laws and regulations on the classification of medicinal substances.

Pharmacology consists of two branches - general and specific pharmacology. General pharmacology studies the laws and regulations arising from drug substances, their pharmacokinetics and pharmacodynamics. Pharmacokinetics - administration of medicinal substances into the body, its absorption, binding to proteins, distribution, transformation (metabolism) and processes of exit from the body, pharmacodynamics - the effect of medicinal substances, potency and effect learns the mechanism. Classification of medicinal substances into separate groups is more complicated. The effect of substances classified according to their closeness to each other in chemical structure can be different. It was difficult to classify drugs according to their effect on certain organs (for example, the heart, stomach and intestines), because a number of substances affect different organs in different directions. can show. Currently,

medicinal substances are mainly classified according to their effect on systems: they are mainly divided into substances that affect the nervous system, organs and systems, metabolism, certain diseases, microorganisms and parasites. The speed of absorption of medicinal substances, strength and duration of action depend on the way in which they were administered to the body. The method of administering medicinal substances to the patient's body is chosen depending on his condition, physical and chemical properties of the medicinal substances and the speed of their action. Ways of drug delivery to the body

1. Enteral method - drugs are sent through the gastrointestinal tract.
2. Parenteral method - medicinal substances are sent through extra-gastrointestinal routes.

In the enteral administration method, drugs are administered under the tongue, mouth, colon, and rectum. Administration of drugs under the tongue is called sublingual route. This method is not used at all in the treatment of young children. When the drug is placed under the tongue, due to the slow activity of enzymes in the oral cavity, the drug substances are almost not decomposed, the drug under the tongue is not affected by gastrointestinal enzymes, it does not undergo changes in the liver, It is absorbed at the site and has a general effect. Some drugs are administered through this route, such as nitroglycerin, methyltestosterone, and pregnin, which are quickly absorbed into the blood (there are a lot of blood vessels under the tongue), and the effect begins quickly. Oral administration is the oral route. This method is common, convenient, easy and natural, and the patient can take the medicine without an assistant. Duodenal administration method: in order to create a high concentration of medicinal substances in the intestine, substances are injected into the duodenum through a probe. this method is used in the treatment of patients, when the patient is unconscious, when there are changes in the esophagus or stomach, when drugs that break down under the influence of gastrointestinal enzymes are used. Method of parenteral administration. The method of inhalation (ingalacion - breathing) through the respiratory tract. The method of administration through the skin mainly involves the reflex and partially local effect of drugs, in this way ointments, pastes, liniments, as well as alcoholic or aqueous solutions, mixtures and sprays are used for children. The method of administration through the mucous membranes is used for the effect of drugs on the mucous membranes of the nose, throat, eyes, kidney, and vagina. The method of administration through the serous layers is used to administer medicine when the organs of the abdominal cavity are injured and in some lung diseases. Serous layers (peritoneum, pleura, pericardium) have a strong absorbent property, compared to the pleura, drugs are absorbed faster from the peritoneum. Mostly aqueous solutions of medicinal substances are injected under the skin. Aqueous and oily solutions, as well as drug suspensions, are also injected into the muscles in the intramuscular injection method. In the intravenous method, the substances enter the bloodstream directly, in which a solution of medicinal substances that does not form a precipitate, does not coagulate the blood or does not cause hemolysis when mixed with the blood is used. The drug should be injected into the vein slowly, otherwise their concentration in the blood may suddenly increase and have a toxic effect on the body. The effect of the drug is very fast, often begins at the time of injection, the duration of the effect is shorter than when injected under the skin and between the muscles. The method of administration to the spinal canal, drugs that do not pass well through the hematoencephalic barrier are administered by the subarachnoid, epidural route. Medicinal substances are sent directly to the heart, joints, and bones. Substances can be delivered by electric current, iontophoresis. There are many parenteral methods, but parenteral

means that drugs are administered under the skin, between muscles, and into veins, as other routes of administration are rarely used.

Absorption, distribution and accumulation of medicinal substances in the body.

Drug substances entering the gastrointestinal system and passing through one or more layers of cells forming a complex biological membrane into the blood or lymph is called absorption. Absorption is a complex physiological process. The biological membrane is semi-permeable, allowing some substances to pass through and not others. Due to the fact that the intestinal epithelium is only one-way permeable, drugs usually cannot pass from the blood and lymph to the intestinal cavity. The process of absorption is carried out due to slow diffusion, easy diffusion, filtration, active transport and pinocytosis is d i f f u s e. In this way, lipophilic substances (soluble in fat and fatty substances), that is, non-polar substances, are absorbed. The process of slow diffusion is the main factor in the absorption of drugs from membranes, because most of them consist of weak acids and weak bases. Slow diffusion through the membrane is determined by the concentration of substances, which are directed from the side of high concentration to the side of low, that is, towards the side of the concentration gradient is e a s y d i f f u s e. In this case, the medicinal substance combines with the special composition of the cell membrane, due to which its passage into the cell is accelerated, absorption is easier compared to slow diffusion. Facilitated diffusion also does not require energy, it is related to the concentration gradient. For example, purine and pyrimidine bases of nucleic acid are absorbed into the cell by the mechanism of easy diffusion. Filtration is the absorption of drugs through the membrane. Since the membrane gap (0.4 nm) is not so large, water, some ions and small hydrophilic molecules (for example, urea) are absorbed between them. Absorption of substances in this way does not require power, their direction depends on the level of concentration. A c t i v e t r a n s p o r t - the system of transport mechanisms participates in the absorption of substances in this way. Absorption by active transport is often directed against the gradient of substance concentration, this process is associated with energy expenditure. Water-soluble (hydrophilic) polarized molecules - inorganic ions, sugar, amino acids and pyrimidine compounds are absorbed by active transport. In young children, the active transport process is slow because the activity of enzymes is not sufficiently developed. Pinotcytosis - in the absorption of drugs in this way, bubbles (invaginastia) are formed in the cell membranes. Fluids and drugs enter these vesicles and move with the vesicles to the inside of the cells, where the substance is released from the vesicles. Medicines are absorbed into the blood and are transferred to the liver, and the liver is an important physiological barrier and blood filter that protects the body from foreign substances. Medicines are neutralized and metabolized in the liver, and their chemical structure may change. Medicinal substances also bind to specific tissue receptors. Nowadays, it has been determined that there are specific receptors in the body for most substances. Dopamine affects dopamine receptors, serotonin - serotonin receptors, histamine - histamine receptors, benzdiazepine products - benzdiazepine receptors, narcotic analgesics - opiate receptors, GAMK - GAMK receptors, hormonal substances - hormonal receptors, cardiac glycosides - digitalis receptors. Medicines can be evenly and unevenly distributed in the body. The distribution of substances is affected by biological obstacles found on roads. These are capillary walls, cell membranes, hematoencephalic barriers, serous cavity membranes. Substances can accumulate in the liver, kidneys, lungs, bones and other tissues. Most medicinal substances undergo a change (biotransformation) in the body. Microsomal enzymes of the liver take part in the process of biotransformation, and fat-soluble substances can be transformed into water-soluble

metabolites. Medicinal substances change in two ways: metabolic transformation and conjugation. In metabolic transformation, substances undergo changes mainly due to reduction, hydrolysis and oxidation. In the process of conjugation, the drug substance or its metabolites are combined with other chemical groups (methyl, acetyl, sulfate, glucuronic acid). Medicinal substances, both unchanged and changed, are mainly excreted from the body with urine and bile. From the kidneys, it passes into the urine due to the processes of filtration, reabsorption, and simple diffusion. Loss of biological activity of medicinal substances in tissues and exit from the body - the result of excretion is called eliminasia. Determination of elimination three un: the half-life of the substance, i.e. the time it takes for half of the administered substance to leave the body, as well as the elimination coefficient, i.e. the quota - how many percent of the drug administered once a day is excreted.

REFERENCES

1. Мурадова Р. Р., Хайдаров М. М., Омонов Э. М. ОПТИМИЗАЦИЯ ТЕРАПИИ БОЛЬНЫХ С ОТКРЫТОУГОЛЬНОЙ ГЛАУКОМОЙ С УЧЕТОМ ПАРАМЕТРОВ СОСТОЯНИЯ МИКРОЦИРКУЛЯТОРНОГО РУСЛА ЦЕНТРАЛЬНОЙ ЗОНЫ СЕТЧАТКИ //Вопросы науки и образования. – 2021. – №. 10 (135). – С. 66-69.
2. Хайитов У., Ахмедов Ю., Бегнаева М. Клинико-рентгенологическая картина септической пневмонии у детей //Журнал гепато-гастроэнтерологических исследований. – 2021. – Т. 2. – №. 3.2. – С. 35-36.
3. Меликова Д. У., Бегнаева М. У. CLINICAL FEATURES OF CHRONIC PYELONEPHRITIS IN CHILDREN //ЖУРНАЛ РЕПРОДУКТИВНОГО ЗДОРОВЬЯ И УРО-НЕФРОЛОГИЧЕСКИХ ИССЛЕДОВАНИЙ. – 2022. – Т. 3. – №. 2.
4. Мурадова Р. Р., Хайдаров М. М., Бегнаева М. У. СОВРЕМЕННЫЕ КЛИНИКО-ФАРМАКОЛОГИЧЕСКИЕ АСПЕКТЫ ПРИМЕНЕНИЯ НЕФРОТОКСИЧНЫХ АНТИБИОТИКОВ //Достижения науки и образования. – 2021. – №. 3. – С. 98-100.
5. Нуралиева Р. М., Мурадова Р. Р. ЭФФЕКТИВНОСТЬ ПРЕПАРАТА ГАЛСТЕНА ДЛЯ ЛЕЧЕНИЯ ДЕТЕЙ С ЗАБОЛЕВАНИЯМИ ПЕЧЕНИ //Academic research in educational sciences. – 2021. – Т. 2. – №. 11. – С. 1435-1439.
6. Мурадова Р. Р., Хайдаров М. М. КЛИНИКО-ФАРМАКОЛОГИЧЕСКИЕ АСПЕКТЫ ПРИМЕНЕНИЯ ГОРМОНАЛЬНЫХ ПРЕПАРАТОВ В ОФТАЛЬМОЛОГИИ //Достижения науки и образования. – 2021. – №. 3 (75). – С. 100-102.
7. Kurbonalievich A. S. et al. Experience of the Combination of Tiflox and Immunomax in the Treatment of Trichomoniasis Combined with a Bacterial Process //Annals of the Romanian Society for Cell Biology. – 2021. – С. 2376-2380.
8. Farrukh S. TREATMENT OF MYOCARDIAL INFARCTION AND FIRST AID." science and Innovation" International Scientific Journal. ISSN: 2181-3337, 1 (3), 317–320. – 2022.
9. Shernazarov F. TYPES OF HEMORRHAGIC DISEASES //CHANGES IN NEWBOENS, THEIR EARLY DIAGNOSIS.–2022.
10. Shernazarov F. F. CONGENITAL HEART DISEASE-CAUSES, CLASSIFICATION, DIAGNOSIS, TREATMENT, COMPLICATIONS, CONSEQUENCES //Eurasian Journal of Medical and Natural Sciences. – 2022. – Т. 2. – №. 3. – С. 84-89.
11. Shernazarov F. Microcirculation disorders in the vascular system of the bulbar conjunctiva in the initial manifestations of cerebral blood supply deficiency. – 2022.

12. F. Shernazarov THE PROBLEM OF INSOMNIA CAUSES OF SLEEP DISORDER, REMEDIES AT HOME // SAI. 2023. №D1. URL: https://cyberleninka.ru/article/n/the-problem-of-insomnia-causes-of-sleep-disorder-remedies-at-home (дата обращения: 11.02.2023).
13. F. Shernazarov HYMORITIS SYMPTOMS, TREATMENT, METHODS OF FOLK MEDICINE, PREVENTION // SAI. 2023. №D1. URL: https://cyberleninka.ru/article/n/hymoritis-symptoms-treatment-methods-of-folk-medicine-prevention (дата обращения: 11.02.2023).
14. I. Shernazarov, F. Shernazarov NATIONAL-CULTURAL FEATURES IN THE TRANSLATION PROCESS // SAI. 2023. №B1. URL: https://cyberleninka.ru/article/n/national-cultural-features-in-the-translation-process (дата обращения: 11.02.2023).
15. I. Shernazarov, F. Shernazarov PROBLEMS OF TRANSLATION OF FEATURES RELATED TO THE WAY OF LIFE OF PEOPLES // SAI. 2023. №B1. URL: https://cyberleninka.ru/article/n/problems-of-translation-of-features-related-to-the-way-of-life-of-peoples (дата обращения: 11.02.2023).
16. Shernazarov F. GENETIC MARKERS FOR THE DEVELOPMENT OF DIABETIC RETINOPATHY //Science and Innovation. – 2022. – T. 1. – №. 8. – C. 919-923.
17. Shernazarov F. Madaminov M. et al. CAUSES, SYMPTOMS, DIAGNOSIS AND TREATMENT OF KIDNEY STONES (UROLITHIASIS) //Science and Innovation. – 2022. – T. 1. – №. 8. – C. 760-765.
18. Shernazarov F. SIGNIFICANCE OF ENDOTHELIAL DYSFUNCTION IN THE DEVELOPMENT OF RETINOPATHY IN PATIENTS WITH AH AND WAYS OF ITS CORRECTION //Science and Innovation. – 2022. – T. 1. – №. 8. – C. 101-113.
19. Shernazarov F. THE ROLE OF C-REACTIVE PROTEIN IN THE PATHOGENESIS OF VISUAL VASCULAR DISEASES IN PATIENTS WITH ARTERIAL HYPERTENSION //Science and Innovation. – 2022. – T. 1. – №. 8. – C. 114-121.
20. et al. COMBINED DENTAL AND EYE PATHOLOGY //Science and Innovation. – 2022. – T. 1. – №. 8. – C. 91-100.
21. Farhod o'g'li S. F. GASTRIT—SABABLARI, ALOMATLARI, TASHXISLASH, DAVOLASH, DORILAR, ASORATLARI, OLDINI OLISH //Лучший инноватор в области науки. – 2022. – T. 1. – №. 1. – C. 103-107.
22. F. Shernazarov SYMPTOMS OF HYMORITIS, TREATMENT, METHODS OF FOLK MEDICINE, PREVENTION // SAI. 2022. №D8. URL: https://cyberleninka.ru/article/n/symptoms-of-hymoritis-treatment-methods-of-folk-medicine-prevention (дата обращения: 11.02.2023).
23. Shernazarov F. WHITE TONGUE OR FORMATION OF WHITE EYES CAUSES, METHODS OF TREATMENT //Science and innovation. – 2022. – T. 1. – №. D8. – C. 766-770.
24. F. Shernazarov SORE THROAT IN ADULTS AND CHILDREN, SYMPTOMS, CAUSES, TREATMENT, TIPS // SAI. 2022. №D8. URL: https://cyberleninka.ru/article/n/sore-throat-in-adults-and-children-symptoms-causes-treatment-tips (дата обращения: 11.02.2023).

25. F. Shernazarov FLU SYMPTOMS, FORM, CAUSES, DIAGNOSIS, TREATMENT AND PREVENTION // SAI. 2022. №D8. URL: https://cyberleninka.ru/article/n/flu-symptoms-form-causes-diagnosis-treatment-and-prevention (дата обращения: 11.02.2023).
26. , F. Shernazarov ACUTE TONSILLITIS (ANGINA) CAUSES, COMPLICATIONS, DIAGNOSIS, TREATMENT, PREVENTION // SAI. 2022. №D8. URL: https://cyberleninka.ru/article/n/acute-tonsillitis-angina-causes-complications-diagnosis-treatment-prevention (дата обращения: 11.02.2023).
27. F. Shernazarov BREAST CANCER DETECTION METHODS, SYMPTOMS, CAUSES, TREATMENT // SAI. 2022. №D8. URL: https://cyberleninka.ru/article/n/breast-cancer-detection-methods-symptoms-causes-treatment (дата обращения: 11.02.2023).
28. F. Shernazarov TINTING IN THE EAR CAUSES, DEVELOPMENT, TREATMENT AND PREVENTION OF NOISE IN THE EAR // SAI. 2022. №D8. URL: https://cyberleninka.ru/article/n/tinting-in-the-ear-causes-development-treatment-and-prevention-of-noise-in-the-ear (дата обращения: 11.02.2023).
29. Kurbonalievich A. S. et al. Experience of the Combination of Tiflox and Immunomax in the Treatment of Trichomoniasis Combined with a Bacterial Process //Annals of the Romanian Society for Cell Biology. – 2021. – С. 2376-2380.
30. Тураев Х. Н. Абдурахмонов Илхом Рустамович Влияние будесонида на качество жизни пациентов с бронхиальным обструктивным синдромом //Вопросы науки и образования. – 2021. – Т. 7. – С. 132.
31. Нуралиева Рано Матьякубовна, Тураев Хикматулло Негматович, Сиддиков Олим Абдуллаевич ЭФФЕКТИВНОСТЬ ПРИМЕНЕНИЯ ЛАНТОРОЛА В ТРЕХКОМПОНЕНТНОЙ АНТИХЕЛИКОБАКТЕРНОЙ ТЕРАПИИ С ИСПОЛЬЗОВАНИЕМ ПРОПОЛИСА // Вопросы науки и образования. 2020. №37 (121). URL: https://cyberleninka.ru/article/n/effektivnost-primeneniya-lantorola-v-trehkomponentnoy-antihelikobakternoy-terapii-s-ispolzovaniem-propolisa (дата обращения: 13.02.2023).
32. ИСМАИЛОВ Ж. А. и др. O‘tkir miokard infarkti dolzarb ijtimoiy ahamiyatga ega bo‘lgan muammo sifatida //журнал биомедицины и практики. – 2022. – Т. 7. – №. 2.
33. АГАБАБЯН И. Р. и др. O‘tkir miokard infarkti aniqlangan bemorlarni o‘z vaqtida gospitalizatsiya qilishning samaradorligi //Журнал биомедицины и практики. – 2022. – Т. 7. – №. 2.
34. Орипов Р. А. и др. ОСОБЕННОСТИ ПРИМЕНЕНИЕ АНТИОКСИДАНТНЫХ ПРЕПАРАТОВ В ЛЕЧЕНИИ НЕЙРОДЕРМИТА. – 2021.
35. Тураев Хикматилла Негматович, Абдурахмонов Илхом Рустамович ВЛИЯНИЕ БУДЕСОНИДА НА КАЧЕСТВО ЖИЗНИ ПАЦИЕНТОВ С БРОНХИАЛЬНЫМ ОБСТРУКТИВНЫМ СИНДРОМОМ // Вопросы науки и образования. 2021. №7 (132). URL: https://cyberleninka.ru/article/n/vliyanie-budesonida-na-kachestvo-zhizni-patsientov-s-bronhialnym-obstruktivnym-sindromom (дата обращения: 13.02.2023).
36. Сиддиков Олим Абдуллаевич, Тураев Хикматилло Негматович, Нуралиева Рано Матьякубовна Эффективность применения препаратов железа у детей с признаками железодефицитной анемии // Достижения науки и образования. 2020. №5 (59). URL: https://cyberleninka.ru/article/n/effektivnost-primeneniya-preparatov-zheleza-u-detey-s-priznakami-zhelezodefitsitnoy-anemii (дата обращения: 13.02.2023).

37. Турсунов Б. С. и др. Исследование пепсинообразующей функции желудка при ожоговой болезни //Скорая медицинская помощь. – 2006. – Т. 7. – №. 3. – С. 92-93.
38. Ахмедов Ш. К. и др. НЕКОТОРЫЕ ОСОБЕННОСТИ ТАКТИКИ ПРОДУКТИВНОГО ЛЕЧЕНИЯ ХРОНИЧЕСКОЙ КРАПИВНИЦЫ. – 2021.
39. Нуралиева Рано Матьякубовна, Сиддиков Олим Абдуллаевич, Тураев Хикматилло Негматович Оценка эффективности традиционной антихеликобактерной фармакотерапии при дополнительном использовании прополиса // Вестник науки и образования. 2020. №10-3 (88). URL: https://cyberleninka.ru/article/n/otsenka-effektivnosti-traditsionnoy-antihelikobakternoy-farmakoterapii-pri-dopolnitelnom-ispolzovanii-propolisa (дата обращения: 13.02.2023).
40. Абдурахмонов Илхом Рустамович, Тураев Хикматулло Негматович ОПЫТ ПРИМЕНЕНИЯ СИНУПРЕТА С АНТИБАКТЕРИАЛЬНЫМИ ПРЕПАРАТАМИ В КОМПЛЕКСНОЙ ТЕРАПИИ РИНОСИНУСИТОВ У БОЛЬНЫХ ДЕТСКИМ ЦЕРЕБРАЛЬНЫМ ПАРАЛИЧОМ // Достижения науки и образования. 2022. №2 (82). URL: https://cyberleninka.ru/article/n/opyt-primeneniya-sinupreta-s-antibakterialnymi-preparatami-v-kompleksnoy-terapii-rinosinusitov-u-bolnyh-detskim-tserebralnym (дата обращения: 13.02.2023).
41. Исмаилов Ж. А. и др. ПОСЛЕДСТВИЯ ВОЗНИКНОВЕНИЯ ХРОНИЧЕСКОЙ СЕРДЕЧНОЙ НЕДОСТАТОЧНОСТИ В ДИАГНОСТИКЕ ХРОНИЧЕСКОЙ ОБСТРУКТИВНОЙ БОЛЕЗНИ ЛЕГКИХ //Журнал кардиореспираторных исследований. – 2022. – Т. 3. – №. 4.
42. Агабабян И. Р. и др. ВАЖНОСТЬ РАННЕГО ВЫЯВЛЕНИЯ ОСЛОЖНЕНИЙ ПРИ ХРОНИЧЕСКОЙ ОБСТРУКТИВНОЙ БОЛЕЗНИ ЛЕГКИХ //Журнал кардиореспираторных исследований. – 2022. – Т. 3. – №. 4.
43. Меликова Д. У. и др. СОВРЕМЕННЫЕ ВЗГЛЯДЫ ФАРМАКОТЕРАПИИ ПРИ НАРУШЕНИИ СНА //ББК 30.16 Б 63. – 2022. – Т. 3. – С. 107.
44. АБДУРАХМАНОВ И. Р., ТУРАЕВ Х. Н., Шамсиев Д. Ф. БОЛАЛИКДАН БОШ МИЯ ФАЛАЖИ ФОНИДА РИНОСИНУСИТИ БОР БЕМОРЛАРДА БУРУН БЎШЛИҒИ МУКОЦИЛИАР ТРАНСПОРТИ НАЗОРАТИ ТЎҒРИСИДАГИ ЗАМОНАВИЙ ҚАРАШЛАР (адабиётлар шарҳи) //ЖУРНАЛ БИОМЕДИЦИНЫ И ПРАКТИКИ. – 2022. – Т. 7. – №. 2.
45. Зиганшина Н. и др. Оптимизация лечения кишечной недостаточности у больных с ожоговой травмой //Журнал проблемы биологии и медицины. – 2017. – №. 4 (97). – С. 33-35.
46. Хакимов Э. и др. Значение нутритивной поддержки для ускорения выздоровления и восстановления тяжелообожженных //Журнал вестник врача. – 2013. – Т. 1. – №. 03. – С. 194-195.
47. Нуралиева Р. и др. Распространение рака может осуществляться путем непрерывного роста по сосудам и межтканевым щелям и путем переноса отторгающихся опухолевых клеток током лимфы и крови, то есть метастазирования. Отток лимфы от молочной железы и лимфогенное метастазирование рака может происходить в различных направлениях //Журнал вестник врача. – 2013. – Т. 1. – №. 02. – С. 150-153.