

HISTORY OF PHARMACOLOGY DEVELOPMENT IN UZBEKISTAN

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Abstract. *The article states that the development of pharmacology in Central Asia began from ancient times, and the great thinker, scientist Abu Ali ibn Sino, is one of the founders of pharmacological science. His works “The Laws of Tib”, “The Book of Three Healings”, “The Book of Al-Hearts” contain medicinal substances used in medicine of that time. The first book, “The Laws of Chiba,” presents about 900 simple medicinal substances, of which 612 are plants. Currently, the pharmacological properties and characteristics of coumarins, flavonoids, alkaloids and their derivatives, extracted from local medicinal plants and drugs used in clinical practice, are given.*

Keywords: *anatomy, physiology, therapy, surgery, pharmacology and psychology.*

Introduction. The history of pharmacology begins with the period of the appearance of primitive people on Earth, since in those days people also suffered from various diseases, fought with predators, encountered fires, and received bites from snakes, scorpions and karakurt. In the structure of the primitive collective, people sought treatment and medicine from the surrounding plants, minerals, and fauna.

Traditional medicine is widespread in Central Asia; remedies made from medicinal plants were widely used in the treatment of various diseases. In ancient times, one of the pressing problems was the treatment of diseases that were most vulnerable to human life. In order to treat such malignant neoplasms, people looked for inexhaustible natural properties in plant and animal cultures. The countries of Ancient Asia made a great contribution to the development of pharmacology. In India, Tibet, China and the Arab state, plant treatment is widely developed. The great healer of the East, Ali ibn Abbas Zahrawi (died 997), noted that over the years, new medicinal substances appear in his works, which must first be tested on animals.

The founder of Chinese medicine, Shen Nung, 3 thousand years ago, in his works, cited synonymous names of plants, botanical descriptions, stages and methods of manufacturing products from plants, the range of influence and use of medicines. More than 1500 years ago they knew that pomegranate peel was useful for helminthic infestations. These products are currently used for these diseases.

For about 700 years, the Arabs made great advances in medicine and pharmacy. They regulated medical practice and opened pharmacies, hospitals and libraries. The word "alcohol" as used today comes from the Arabic word al-qul. In the ninth century, in 869, the first world-famous pharmacopoeia, Kitab al-Aqrabadin ul Kabir (Great Pharmacopoeia), was written by the Arab physician Shapur ibn Sal in Baghdad. Another relatively improved pharmacopoeia, which is the basis of modern pharmacopoeias, is the Kitab al-abyinaan-hakayikal-adwiya (The Book of the Basics of the Real Properties of Medicines), written by Abu Mansur Muwaffaq bin Ali al-Hirawi in 967-976 and it is known as the Pharmacopoeia Abu Mansura.

Abu Bakr Muhammad ibn Zakariya al-Razi (865–925), encyclopedist, physician and Eastern thinker, wrote 36 works on medicine. In his works, he enriched anatomy, physiology, therapy, surgery, pharmacology and psychology with new ideas and inventions. The works of this scientist, dedicated to medicine and chemistry, had a great influence on the development of these areas in the Middle Ages in the East and West².

The great encyclopedic scientist Abu Rayhan Beruni (973-1048) also made a significant contribution to the development of pharmacology. "As-saydana fit-tib" contains the names and descriptions of medicines known in the ninth century, more than four and a half thousand plants, animals, minerals and nutrients obtained from them. According to Beruni, "first of all, simple drugs should be recommended, and if they do not work, then complex ones can be used." Beruni's book "Saydana" has been used for centuries as a large encyclopedia of oriental medicine. Abu Ali ibn Sina (980-1037), the great ruler of Central Asia, also made significant contributions to the development of pharmacology. His works "Laws of Medicine", "Kitab ush shifo", "Kitabi al qalbiya" contain medicines used in medicine of that time⁵. The first book of the Laws of Medicine contains about 900 common medicines, 612 of which are plant-based⁶.

The fifth book describes methods for preparing and using complex medicines. Ibn Sina emphasized the need to use medicines depending on the type of patient, dividing medicinal substances into types of heating, cooling, drying and moistening depending on the type. He treated syphilis patients with mercury 400 years before European doctors.

Sharofiddin Abu Abdullah Muhammad Yusuf Ilaki (died 1068) was one of Ibn Sina's students, and in his works "Muolajati Ilaki", "Muhtasari Ilaki" he described the origin of various diseases, their diagnosis, symptoms and methods of treatment. These works served as a guide for doctors of their time.

Khorezm scientist and physician Zainiddin Abul-Fazoil Ismail al-Jurjani (1080–1141) created more than 15 works in the field of medicine¹. The book on pharmacology consists of two chapters, the first of which is devoted to simple substances, and the second - information about complex substances and methods for their preparation. This scientist created pharmacological terms in Persian.

In the 16th century, the Western scientist Paracelsus infused pharmacology with chemicals and was the founder of the field of iatrogenic chemistry (Dr. Iatros) in medicine. At the same time, according to Paracelsus, in nature there is a cure for all diseases that can be identified by their appearance. At the end of the eighteenth century, Hahnemann founded homeopathy in pharmacology. In this case, treatment is based on the law of similars; homeopathic pharmacies are still common today. Until the nineteenth century, pharmacology developed empirically, and in folk medicine, doctors observed the effects of drugs on patients. Since the 19th century, experimental pharmacology began to develop.

It was concluded that all drugs used before use must first be tested on animals, since scientific pharmacology has since been created.

At the same time, such scientists as A.P.Nelyubin, O.V.Zabelin, E.V.Pelican, François Majendi, Claude Bernard, Schmiedeberg in Europe made a great contribution to the development of scientific pharmacology.

Despite the fact that Russian academician I.P.Pavlov is a famous physiologist; he also conducted extensive experiments in the field of pharmacology and published 80 scientific papers in this field. In post

I.P.Pavlovsk period, as the founder of modern pharmacology, academician N.P.Kravkov created a large scientific school, and his book “Fundamentals of Pharmacology” was published 14 times. Scientific works of his students - S.A.Anichkova, V.V.Zakusova, M.D.Mashkovsky - form the basis of modern pharmacology.

In the development of modern pharmacology, the contribution of Academician D.A.Kharkevich is invaluable. His textbook “Pharmacology,” written for medical students, is of great importance in mastering this subject⁷.

To date, more than 40 doctors of science and more than 100 candidates of science have been trained in the field of pharmacology in Uzbekistan. As a result of research by scientists, a number of new medicinal substances have been introduced into medical practice and are being effectively used. In particular, the efforts of the following scientists to apply new drugs in medical practice are invaluable.

It is known that the first department of pharmacology in Uzbekistan was created in 1920 in Tashkent as part of the medical faculty of the newly opened Turkestan State University under the name pharmacology, pharmacy and pharmacognosy. The newly created department was headed by Professor Ivan Ivanovich Markelov (1869-1944) from St. Petersburg, Russia, from 1920 to 1930. During these years, Professor I.I. worked at the department. Markelov, assistants N.N.Kompantsev, K.I.Siverskaya and L.G.Merkulov. In 1930, the medical faculty of the university became independent and became the Central Asian State Medical Institute. Two years later, in 1932, it was renamed the Tashkent State Medical Institute. As intensive training of pharmacologists, especially in the local population, became a pressing issue, the issue was addressed through additional graduate studies. Therefore, Kamilov I.K., Sultanov M.B., Sagatov R.S. were the first graduate students of the department and at the same time were engaged in teaching activities.

In 1933, N. N. Kompantsev (1893–1984) was appointed head of the department. He introduced a new drug psoralen, psoboran, in collaboration with M.B. Sultanov. During this period, the first to defend dissertations were K.I.Siverskaya (1938), I.K.Kamilov (1940) and M.B.Sultanov (1941).

With the beginning of the Great Patriotic War, a group of teachers from the department (I.K.Kamilov, M.B.Sultanov, N.A.Kambulin) was sent to the front. In parallel with the students of the department, pharmacologists evacuated from other cities of the former Soviet Union worked - Professor V.V.Nikolaev (Moscow), associate professor M.I.Olshansky and assistant E.A.Stegailo (Rostov). In addition, Sultanov T.G., Aripov M.O. Fatkhullaev I.F. were appointed as graduate students.

Later R.S.Sagatov and M.B. Sultanov were involved in responsible work in the Ministry of Health of the Republic of Uzbekistan, and I.K.Kamilov was appointed head of the pharmacology laboratory of the Regional Medical Institute. Then this laboratory was transferred to the Institute of Chemistry of Plant Substances of the Academy of Sciences of the Republic of Uzbekistan.

Thus, at the end of the 50s, teaching at the department was headed by Professor N.N.Kompantsev, teaching activities were carried out by associate professors Kambulin N.A., Sultanov T.G., assistants Siverskaya K.I., Oripov M.O., Fatkhullaev I.F. After some time, V.Z.Mazgutov, T.Boydzhanov and N.T.Tulaganov began teaching at the department.

During these years, Doctor of Medical Sciences U.B. Zokirov and Candidates of Medical Sciences K.N.Nadzhimutdinov joined the staff of the department M.M. Azimov, K.A.Juraeva, M.A.Magrupova, N.A.Eshmukhamedov, N.V.Abdumalikova, Sh.S.Umarova, F.Sh.Tashmukhamedovs, working in the laboratory of pharmacology of the Institute of Chemistry of Plant Substances of the Academy of Sciences of the Republic of Uzbekistan. C.M.Vishnevetskaya and Sh.Kh.Khusanov entered graduate school.

In September 1969, Professor N.N.Kompantsev began working as a consulting professor. Associate Professor Kamilov I.K. was appointed head of the department. (1909-1985). U.B.Zakirov, who defended his doctoral dissertation in 1968, was elected professor of the department in 1970. In 1971 I.K.Kamilov and in 1974 K.N.Nadzhimutdinovs defended their doctoral dissertations.

In connection with the opening of the Central Asian Medical Pediatric Institute (CAMPI) in Tashkent in 1972, assistants V.Z.Mazgutov and F.Sh.Tashmukhamedovs moved to this institute to organize the department of pharmacology. Later, the department was headed by the great Uzbek female pharmacologist, Professor S.S.Azizova (1934-2015), who worked in the laboratory of pharmacology of the Institute of Chemistry of Plant Substances.

In the mid-seventies, Professor I.K.Kamilov was transferred from head of the department to the position of consulting professor. Professor U.B.Zokirov (born 1934) was elected in his place. In 1982, some of the department's employees (Professor K.N.Nadzhimutdinov, Associate Professor N.G.Babaeva, assistants N.A.Eshmukhamedov and Sh.M.Muzrabekov) moved to the newly created Department of Clinical Pharmacology and began working, Professor was appointed head of the department K.N.Nadzhimutdinov (1931-2003).

In 1980-1990 B.Sh.Kholtaev successfully defended his thesis, E.Baldandorzh (Mongolia), Z.Solikhodzhaev (TashPharmi) and M.M.Azimov successfully defended their doctoral dissertations.

In 1990-2000 employees of these departments Kh.A.Beridze, A.I.Mermerov, K.Shukurlaev, R.I.Azimov, O.A.Zaitseva, M.Yu.Chirko, M.O.Mamazhonova, N.Kh.Sinsadze, D.N.Karshiev, Kh.Kh.Pulatov, S.R.Ismoilov, Yu.I.Khakimova, K.M.Yafasov, T.B.Mustanov, S.R.Abdullaev successfully defended their candidate dissertations, A.T.Nikbaev, B.Shaislamov, D.Yu.Teshabayev doctoral dissertations⁸.

Today in Uzbekistan there are more than 20 doctors of science and more than 100 candidates of science in the field of pharmacology. As a result of research by scientists, several new substances have been introduced into medical practice and are effectively used. In particular, the efforts of the following scientists to apply new drugs in medical practice are invaluable.

Kamilov Isak Kamilovich (1909-1985) Doctor of Medical Sciences, Professor. For many years he worked as a department head at TashMI, TashPharmI. He defended his doctoral dissertation on the topic "Pharmacology of alkaloids and glycosides isolated from plants growing in Uzbekistan." Under his leadership there were doctors and candidates of science (S.F.Fakhriddinov, S.S.Azizova, Kh.U.Aliev, M.A.Magrupova, Sh.S.Umarova, N.Abdumalikova and others). Azizova Sanat Sobirovna (1934-2013). Born in 1934 into an intelligent family, Uzbek, Honored Scientist of Uzbekistan, Doctor of Medical Sciences, Professor, Pharmacologist, in 1958 she graduated from the Faculty of Medicine of the Tashkent State Medical Institute. From 1958 to 1972 she was a graduate student, junior and senior researcher at the laboratory of pharmacology and toxicology of the Institute of Chemistry of Plant Substances of the Academy of

Sciences of the Republic of Uzbekistan. From 1972 to 2005, she headed the Department of Pharmacology at TashPMI.

In 1962 she defended her PhD thesis on the topic “The action of cardiac glycosides olitorizide and corchoroside in some pathological conditions of the heart in experiment”, in 1968 she defended her doctoral dissertation on the topic “The action of cardiac glycosides of the strophanthidin series in experimental disorders of coronary circulation”. She has published more than 300 scientific papers, 6 monographs, 12 teaching aids, the textbook “Pharmacology” was published twice in the Russian, Uzbek and Latin alphabets. The electronic textbook “Pharmacology” was created in Uzbek and Russian. Under her leadership, a scientific school was created, 7 doctors of science and 22 candidates of science were trained.

In 1992, the merits of Professor S.S.Azizova were highly appreciated and she was awarded the title of Honored Scientist of Uzbekistan.

Zokirov Uzuv Bokievich. Born on September 17, 1934 in Tashkent. In 1958, having graduated with honors from the medical faculty of the Tashkent State Medical Institute, he became a graduate student at the Research Institute of Pharmacology in Moscow. In 1962 he defended his thesis on the topic “Pharmacology of the new neuroleptic drug meterazine.” In 1962-1969, he continued his scientific work in the laboratory of pharmacology of the Institute of Chemistry of Plant Substances of the Academy of Sciences of the Republic of Uzbekistan, and in 1968 he defended his doctoral dissertation on the topic “Pharmacology of alkaloids of the Ungernia plant and their derivatives.” From 1969 to 1978 he worked as an associate professor, professor of the Department of Pharmacology at the Tashkent State Medical Institute, and from 1978 to 2007 - head of the department.

U.B. Zokirov is the author of more than 300 scientific articles, 6 monographs, 46 inventions. Under his leadership, 9 new drugs were introduced into medical practice, 13 doctoral and 56 candidate dissertations were defended.

Aliyev Khabibulla Ubaydullaevich. Born on February 20, 1936 in Tashkent. In 1960 he graduated from the Tashkent State Medical Institute. He began his scientific career as a senior laboratory assistant in the laboratory of pharmacology and toxicology of the Institute of Chemistry of Plant Substances of the Academy of Sciences of the Republic of Uzbekistan. In 1965, he defended his dissertation on the topic “Study of the pharmacology of the new antihypertensive drug apochlorin” under the guidance of Professor I.K.Kamilova, in 1973 defended his doctoral dissertation on the topic “Antiarrhythmic activity of the alkaloids Fumaria, Ungernia and their derivatives.” Under the leadership of G.U.Aliyev, a diuretic from deer grass, Asian mint, buimadoron, expectorant Gulkhairi, lemon grass preparations, biostimulant "Balm of the Oriental Doctor", stimulants, sedative Fitopassit and Cobalt-30 against radiation sickness, Feramide against anemia, Ferasc and regenerating Mumiyo Asil, antidiabetic drugs Glipil, Glykorazmulin were introduced into medical practice. He is the author of about 400 scientific works, including 2 textbooks, 3 monographs, 18 patents and copyright certificates. Under his leadership, 20 candidates of science and 5 doctors of science were trained.

Akhmedkhodjaeva Khafiza Saydganievna. Born in 1930 in Tashkent. After graduating from the Tashkent State Medical Institute, Hafiza Akhmedkhodjaeva worked in the laboratory of pharmacology of the Institute of Chemistry of Plant Substances of the Academy of Sciences of the Republic of Uzbekistan in 1961 as a senior laboratory assistant, junior researcher, senior researcher, and leading researcher. H.S.Akhmedkhodjaeva defended her PhD thesis in 1968 on the topic “Study of the effect of

alkaloids isolated from the plant *Haplofillum perforatum* and their derivatives on the central nervous system,” and in 1988 her doctorate on the topic “Pharmacological properties of substances isolated from ferula plants.” H.S. Akhmedkhodzhaeva studied the hormonal and estrogenic activity of more than 50 new compounds isolated from plants common in Central Asia. One of them is tephesterol, extracted from the ferula plant, which is used in the treatment of obstetric and gynecological diseases caused by dysfunction of the reproductive glands in women. Tefesterol has been shown to speed up labor, tenuferol has been shown to speed up labor in menopausal women, and ferulene has been shown to be a new contraceptive. He has more than 100 scientific articles, 1 monograph, 9 copyright certificates.

Azimov Muzaffar Makhmudovich - one of the scientists who conducted extensive research into the pharmacology of substances derived mainly from medicinal plants and their new products, and also applied glyceric acid derivatives to practical medicine.

Minkhoj Nosirovich Makhsumov. Born on August 25, 1928 in the city of Tashkent. In 1951 he graduated from the medical faculty of the Tashkent State Medical Institute. From 1951 to 1958 he served as a doctor in the army. In the same year, he entered graduate school in pharmacology at the Regional Medical Institute of the Academy of Sciences of Uzbekistan and was sent to graduate school at the Institute of Experimental Medicine in Leningrad. In 1962 M.N.Makhsumov defended his Ph.D. thesis on the topic “The influence of methyl diazyl, methyl diphacil and their iodomethylates on the function of the gastrointestinal tract,” and in 1975, his doctoral dissertation at the Leningrad Medical Institute on the topic “The influence of synanthropic substances on the activity of the gastrointestinal tract at high temperature and insulation.” The main direction of his research is the study of complex compounds and pharmacology of medicinal plants containing trace elements. M.N.Makhsumov is the author of 4 textbooks, 3 monographs, 10 inventions, more than 150 scientific articles. Under his leadership, 1 doctoral and 3 candidate dissertations were defended.

Solikhujayev Zikrilla. Born on December 10, 1939 in Tashkent. In 1962 he graduated from the Tashkent State Medical Institute. From 1962 to 1966 he worked as a doctor in medical institutions in the Jizzakh and Tashkent regions. From 1967 to 1992 he worked at the Tashkent Pharmaceutical Institute as a junior researcher, assistant, senior researcher, and associate professor. In 1972 he defended his PhD thesis on the topic “Pharmacology of new cobalt complex compounds”, in 1989 - his doctoral dissertation on the topic “The influence of coordination compounds of some biometals on experimental atherosclerosis”. The hypolipidemic and antiatherosclerotic drug Piracin, which he studied, was introduced into production and used in medical practice. He is the author of more than 100 scientific articles, 10 scientific and methodological manuals and 10 copyright certificates. Under his leadership, 2 candidate dissertations were defended.

Kurmukov Anvar Gafurovich. Born on March 18, 1932 in the city of Astrakhan. In 1957 he graduated from the Tashkent State Medical Institute. From 1959 to 1978 he worked as a researcher at the laboratory of pharmacology of the Institute of Chemistry of Plant Substances of the Academy of Sciences of the Republic of Uzbekistan. In 1963 he defended his candidate's thesis, in 1970 - his doctoral thesis on the topic “Pharmacological studies of some indole alkaloids.” As a result, the drug vincamethrin was introduced into practice. In 1976 A.G. Kurmukov was appointed head of the laboratory of the Research Institute of Cardiology of the Ministry of Health of the Republic of Uzbekistan. During this period, under his leadership, the

drugs ecdisten, tefesterol, oligvon, and glyrofam were introduced. Kurmukov A.G. published 240 scientific articles, 3 monographs, 14 copyright certificates and patents. Under his leadership, 12 candidate and 5 doctoral dissertations were defended.

Djakhangirov Farkhad Nabievich. Born on May 6, 1944 in the Ak-Dararya district of the Samarkand region. In 1968, he graduated from the Tashkent State Medical Institute and was hired as a junior researcher in the laboratory of pharmacology and toxicology of the Institute of Chemistry of Plant Substances named after Academician S.Yu. Yunusova. In 1979 he became a senior researcher, in 1987 - head of the toxicology laboratory, and in 1992 - head of the pharmacology and toxicology laboratory. In 1974 he defended his PhD thesis on the topic "Pharmacology of Zongorin alkaloids", and in 2010 - his doctoral dissertation on the topic "Pharmacology of diterpenoid alkaloids". Under the leadership of F. N. Dzhangirov, a new direction was opened in the design and development of algorithms based on various types of diterpenoid alkaloids of antiarrhythmic drugs, which have no analogues in world practice in terms of chemical structure and mechanism of action. For the first time, the pharmacological and toxicological properties of 123 diterpenoid alkaloids were systematically studied. Based on the data obtained, their pharmacological properties, mechanism of action on the cell membrane, pharmacodynamics, degree of safety, biotransformation and structural-active dependence were determined. As a result of the work done, the drugs Allapinin and Aklesin were introduced into medical practice as a new antiarrhythmic drug. Allapinin is included in the list of vital medicines of the Republic of Uzbekistan and the Ministry of Health of the Russian Federation. Documents on the protection of Allapinin trademarks have been received in the Republic of Uzbekistan and the Russian Federation. More than 24 alkaloids are included in the catalog of the French company Latoxan and are exported as medicinal and biological bioreagents. For the development and implementation of Allapinin. F.N.Jahangirov was awarded the State Prize of the Republic of Uzbekistan in the field of science and technology, 1st degree.

Sirov Vladimir Nikolaevich. Born in 1946 in the Gorky region of Russia. In 1969 he graduated from the Tashkent Medical Institute. He began his career in 1972 at the Institute of Chemistry of Plant Substances of the Academy of Sciences of the Republic of Uzbekistan, from graduate school to the position of head of the pharmacology laboratory. In 1979 he defended his thesis and in 1997 his doctorate on the topic "Pharmacological study of phytoecdysteroids from Rhaponticum, Silene and Ajuga plants." V.N.Syrov conducts research on the effect of drugs on the metabolic process. Under his leadership, scientific research is being conducted to study agents that reduce fatigue, anabolic, actoprotective, hepatoprotective, hypoglycemic, hypoazotemic, immunomodulatory and other properties of natural compounds of various chemical classes. With his participation, ecdisten, austane, Khodzhimetov's choleric collection and heptaphyte, as well as dietary supplements: ecdisten plus, exumid and jisten, were created and used in medical practice. V.N.Syrov is the author of more than 500 articles, 17 copyright certificates, 25 patents. Under his leadership, 10 candidates of science and 2 doctors of science were trained.

Azizov Umarchon Mukhtarovich. Born on October 29, 1945 in Tashkent. In 1966 he graduated from the Tashkent Pharmaceutical Institute. From 1967 to 2020, he worked at the Uzbek Chemical and Pharmaceutical Research Institute as a graduate student, junior researcher, senior researcher, head of the laboratory, and since 1989 - deputy director for scientific work. U.M. Azizov defended his doctoral dissertation in 1991 on the topic "Obtaining biologically active substances based on the process of selective oxidation of homo- and heteroaromatic compounds."

In 1994 he became a professor. U.M.Azizov synthesized about 200 new substances based on aromatic ketocarboxylic acids and their derivatives, and established patterns of interrelation between their biological activity. As a result, the drugs Fensulkal, Benzketazone, the expectorant Alceum, glycyrrhizin based on local dried extract of local velvet root, used in the treatment of inflammatory, gynecological and rheumatic diseases, as well as balms of oriental medicine that improve the functioning of the cardiovascular system, were created and released. U. Azizov is the author of more than 220 scientific articles, 45 inventions and patents, more than 20 regulatory and technical documents. Under his leadership, 9 candidates of science and 1 doctor of science were trained⁹.

Aminov Salakhitdin Djuraevich. Born on June 9, 1956 in Tashkent. Doctor of Medical Sciences, Professor. Head of the Department of Pharmacology and Normal Physiology, Tashkent Pediatric Medical Institute. Aminov S.D. in 1980 he graduated from Tashkent State Medical Institute and, following the direction of the institute, began working as a senior laboratory assistant in the pharmacology laboratory of the Institute of Chemistry of Plant Substances of the Academy of Sciences of the Republic of Uzbekistan. In 1983, through a competition, he was elected to the position of junior research fellow, and since 1989, a research fellow.

At this institute, S.D.Aminov studied the pharmacological properties of coumarins¹⁴, flavonoids¹¹ and alkaloids isolated from various plant species. Found that the studied compounds have antispasmodic, hypotensive, antiarrhythmic and anti-inflammatory effects¹⁰. I received a copyright certificate for 4 drugs as biologically active substances.

In 1989 he defended his thesis on the topic: "Pharmacological studies of quinolinyl- β -carboline alkaloids and their derivatives." From 1990-2009 worked at the Department of Pharmacology of Tashkent PMI as an assistant, associate professor and studied the lipid-lowering and anti-atherosclerotic activity of the multicomponent drug Firutac¹³.

In 2007, reports on the drug were submitted to the Pharmacological Committee of the Ministry of Health of the Republic of Uzbekistan to obtain permission for a clinical trial. By decision of the Pharmacological Committee of the Ministry of Health of the Republic of Uzbekistan, No. 3 dated September 19, 2008, Firutas tablets 0.3 g were approved for clinical trials. Based on contract No. 4-L/01 dated April 27, 2011, drawn up between the French company "Latoxan" and the Institute of Chemistry of Plant Substances, the flavonoid pinocembrin was included in the catalog as biological bioreagents and sold to consumers¹². In 2007, he defended his doctoral dissertation on the topic: "Pharmacological studies of some coumarins and flavonoids isolated from plants growing in Uzbekistan." In 2012, reports on the drug "Glycitrinate" were submitted to the Pharmacological Committee of the Ministry of Health of the Republic of Uzbekistan to obtain permission for a clinical trial. Glycitrinate has an antiulcer effect¹⁵. By decision of the Pharmacological Committee of the Ministry of Health of the Republic of Uzbekistan, No. 5 dated October 12, 2012, "Glycitrinate" tablets 0.1 g are approved for clinical trials. In 2014, the first stage of the clinical trial was successfully completed.

S.D. Aminov published 1 textbook "Pharmacology", 2 monographs, 5 textbooks, 8 teaching aids and 130 scientific articles. Under his leadership, 2 candidates of science and 1 doctor of science were trained.

Abdusamatov Abdulaziz Abdulatipovich. Born on June 3, 1961 in Tashkent. In 1978 he entered the Central Asian Medical Pediatric Institute. After graduating from the institute in 1984, he was sent to work as an assistant at the department of pharmacology. In 1990 he defended his

thesis on the topic “The influence of bismethylmethionine sulfonium cobalt chloride, methyl methionine sulfone chloride and methionine on lipids and their peroxidation in experimental hepatitis.” In 2000, he defended his doctoral dissertation on the topic “Pharmacotherapy of toxic hepatitis with cobalt coordination compounds.” Based on his research, a cobalt coordination compound based on methyl methionine sulfonium chloride and glutamic acid was introduced into medical practice as a hepatoprotective drug - a complex combination of cobalt with cobalt and phytin - cobalt phytate.

Tulyaganov Rustam Tursunovich. Born on August 22, 1955 in the city of Tashkent. In 1978 he graduated from the biological faculty of Tashkent State University with a degree in physiology. In 1978-1988 he worked at the Research Institute of Polymer Chemistry and Physics of the Academy of Sciences, in 1988-1992 in the laboratory of pharmacology and toxicology of the Research Institute of Bioorganic Chemistry of the Academy of Sciences, studied the pharmacological properties and safety of biologically active substances. In 1988, he defended his PhD thesis on the topic “Pharmacology of complex compounds of polyvinylpyrrolidone with cobalt ions” at the Institute of Pharmacology of the Tomsk Scientific Center. Currently works as a professor at the Department of Pharmacology and Clinical Pharmacy of TashPharmI. R.T. Tulyaganov is the author of more than 120 scientific articles. He was directly involved in clinical trials of a number of drugs used in medical practice, such as Hepatin, elixir, and Bozorov’s choleric collection. In 2009, he defended his doctoral dissertation on the topic “Pharmacology of the new hepatoprotector hepatin and Bozorov’s choleric collection.” Under his leadership, 2 candidates of sciences were trained.

Allaeva Munira Djurakulovna. Mainly based on natural medicinal plants, scientific research is being carried out to create new local medicinal products and introduce them into medicine, as well as dry extracts of buimadaron, corn silk, cobalt containing drugs Cobalt-30, Feramide, Ferasc and enhancing regeneration "Mumiyo Asil", Ferasc, acting on the hematopoietic system. Mumiyo Asil introduced medicines into medical practice. Currently he is the head of the department of pharmacology at the Tashkent Medical Academy. M.Zh. Allaeva is the author of more than 130 scientific articles. In 2012, she defended her doctoral dissertation on the topic “Pharmacological effects of the drugs cohistine, ferasc, stiflos and mummy on the blood system.” Under his leadership, 5 candidates of sciences were trained.

Conclusion. Thus, the development of the science of pharmacology dates back to ancient times, and the role of the great thinkers of Europe and Asia in the development of this science was of great importance. While pharmacology developed empirically until the nineteenth century, experimental pharmacology has been established since the nineteenth century. The first department of pharmacology in Uzbekistan was created in 1920 in Tashkent as part of the medical faculty of Turkestan State University under the name pharmacology, pharmacy and pharmacognosy. In 1950-55, the opening of a laboratory of pharmacology and toxicology at the Institute of Chemistry of Plant Substances of the Academy of Sciences of the Republic of Uzbekistan made it possible to train more than 40 doctors of science and more than 100 candidates of science in the field of pharmacology. For the further development of pharmacology in the country and for the development of new drugs, it is advisable to conduct preclinical research in pharmacological laboratories, as well as the search for new drugs based on local raw materials, the introduction of drugs into medical practice, in collaboration with these laboratories.

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