Laboratory of low-molecular weight biologically active compounds

Laboratory head
Doctor of Chemical Sciences
A.D. Matchanov
Tel: +998 93-579-79-19
e-mail: olim_0172@mail.ru

The laboratory was founded in 2018 as a result of merge of two laboratories, “Polyphenols” and “Fine organic synthesis of physiologically active agents”.
The “Polyphenols” laboratory was founded in 1953 under supervision of Academician A.S. Sadykov. From 1956 to 1997 the laboratory was headed by his apprentice, Professor Amindjan Ismailovich Ismailov. Comprehensive studies on agents contained in the cotton and other medicinal plants and those used in the industry arethe main areas of expertise. The achievements in studies on polyphenols, such as flavonoids, antocyanidines and phytoalexins, as well as on gossypol from the cotton and the related plants are of exceptional significance. The laboratory workers studied more than 140 wild and domestic forms and species of the cotton, belonging to 10 genomic groups, and some other types of plants, to name the hibiscus and its hybrid forms, hemp mellow, mellow, hollyhock, spurred anoda, sumac, camel thorn and others. The study on structure of gossypol and its satellites, multiple derivatives and analogues demonstrated presence of atropoisomers for all these compounds, dynamic aldehyde-lactol tautomer transformations.
Information on electronic structure and conformational peculiarities of some fragments of the gossypol molecule facilitated comprehension of facts determining behavior and physiological effects of the agents under study in an organism.
Utilizing gossypol and its derivatives A.I. Ismailov produced 3% gossypol liniment, an antiviral agent used for therapy of herpes simplex, herpes zoster and psoriasis; batriden, the first domestic immune suppressor used in the tablet form in the kidney allotransplantation, chronic glomerulonephritis and allergodermatoses; mogosin, used as an ointment in herpetic disorders of the skin and mucous membranes in adults; gozalidon, an anti-chlamydial drug; ragosin, used for treatment of acute and chronic viral hepatides B,C and D. Upon production of the red food colorant from the hollyhock flowers, food pectin, food colorant and polysaccharides were consequently derived. For development and production of the food colorant from the hollyhock flowers a group of workers from the laboratory of polyphenols earned the Abu Raikhan Beruni State Prize. Ismailov greatly contributed to education and qualification of specialists in the sphere of bioorganic chemistry and chemistry of natural physiologically active agents. His apprentices, 4 Doctors of Sciences and 14 Candidates of Sciences are working in many Scientific and Development Institutes and Higher Educational Establishments of Uzbekistan, CIS countries and far-abroad countries.

Professor Baram N.I. and Professor Dalimov D.N. (both Doctors of Chemical Sciences), Kharimdjanov A.K., Doctor of Chemical Sciences, Rakhimkhanov R.Z., Bitimirov L., Shukurov Z.Sh., Abdullaev Z.S., Islambekov Sh.Yu., Paizieva R.Z., Pirnazarova F.N., Atkhamova S.K., Mardanov R.G. (all Candidates of Chemical Sciences), Ziaev Kh.L., and Mavlyanov S.M. (both Doctors of Chemical Sciences) as well as Sumin V.I., Candidate of Biological Sciences, significantly contributed to the activity of the laboratory.

The technology for production of pharmacopiel gossypol used as a basis for production of multiple effective drugs introduced into healthcare practice was developed at the A.S. Sadykov Institute of Bioorganic Chemistry, Uzbekistan Academy of Sciences. Identification of interferon inducing activity of gossypol makes expedient the synthesis and study on its derivatives aiming at production of novel effective inductors of interferon to solve an urgent problem of infectious disease control.

Dalimov D.N. took the charge of the laboratory in 1997, supervising the studies on isolation, modification and determination of structures of natural terpenoids and polyphenol compounds greatly contributed to progress of supramolecular chemistry studying the structure-activity relation. It was the first to perform a comprehensive study on glycyrrhizic acid, some of its derivatives and supramolecular complexes in the aqueous solution. Potential mechanism for gel formation and solubilization of glycyrrhizic acid and some of its salts, until now remaining mostly unclear and scarcely described in the literature, was proposed. The solubilization, the dissolving of insoluble organic agents in aqueous environments, is probably associated with effective inclusion of the insoluble components into micelles by formation of supramolecular complexes with molecules of glycyrrhizic acid and its derivatives. The relationships established by Dalimov D.N jointly with Gafurov M.B., Matchanov O.D., Yuldashev Kh.A. and Isaev Yu., served as good ground for production of drugsbased on molecular encapsulation, development of chemistry of supramolecular complexes of glycyrrhizic acid and its derivatives; making possible development of many effective drugs (GLAS, a non-steroid anti-inflammation drug; Megaferon and Tauferon, interferon inductors, Glylagin, Lagovin and Inebrin, hemostatics, as well as Bektit-M, a antidiarrhetic).

Laboratory of “Fine organic synthesis of physiologically active agents” was found in 1973 by Academician A.A. Abduvakhabov (1941-2014). UndersupervisionofA.A. Abduvakhabov, the first studies in the Central Asian region on isolation, determination of structure, synthesis, development of a drug form and application of pheromones of insect pests in the field conditions. As the result, sex pheromones of the cotton budworm, codling moth, domestic fly, turnip moth, exclamatory moth and other insect pests were developed; optimal proportions of components were determined, and drug forms were produced. Today, the pheromones of cotton budworm and turnip moth are widely used for protection of the cotton against insect pests in Uzbekistan.

Following the merge of two above laboratories, “Laboratory of low-molecular weight biologically active compounds” was founded to be headed by Ziyaev Khairulla Lutfullaevich, Doctor of Chemical Sciences.