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CONTRIBUTION OF OLGA MECHNYKOVA TO MEDICAL SCIENCE

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Abstract. When conducting historical and scientific research, the figures of women who made a significant contribution to science appear quite often. Women scientists were engaged not only in research activities. They took part in scientific expeditions, learned future specialists, carried out active organizational and popularization work. Sometimes women became authors of new progressive ideas and founded their own scientific schools. In this connection scientific activities of female investigators like M. V. Pavlova, V. Y. Bilai, O. I. Smirnova-Zamkova,

S. M. Pereyaslavtseva, O. M. Khokhol, K. G. Beltiukova are highlighted. A special attention worth married couples engaged in joint research activities. A clear examples of such cooperation (French physicists Marie and Pierre Curie, native couple Oleksandr and Natalia Yanata) are mentioned. Meanwhile women often helped their husbands by sharing scientific interests. Among them the wife of Ilya Mechnikov – Olga Mykolaivna – takes a rightful place. It should be noted that very often the role of women in performing scientific research was out from the attention of historians of science. And Olga Mechnikova is a classic example of this. Meanwhile, this woman not only helped and supported the work of her husband, but also conducted active research activities herself. Her life was completely devoted to science and people. The proposed article presents the life path of Olga Mechnikova – a wife, faithful friend and colleague, an attentive biographer of her husband. Olga Mykolaivna's contribution to the practical implementation of Ilya Mechnikov's achievements and conducting joint scientific research with him in the field of developing methods of biological control of pests in agricultural plants, ways of overcoming tuberculosis diseases, and the initiation of gnotobiology are shown. The practical activity of Olga Mykolaivna in clarifying the role of phagocytes in the destruction of bacteria during vaccination is highlighted. Particular attention is paid to the medical practice of Olga Mechnikova in providing medical care to both Ukrainian peasants and patients of the Pasteur Institute. The authors of the article did not avoid another sphere of activity of Olga Mechnikova, which is related to the field of art. The role of this extraordinary personality as a capable sculptor and artist is emphasized.

Key words: microbiology, immunity, gnotobiology, Pasteur Institute, vaccination, concept of gender.

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ВНЕСОК ОЛЬГИ МЕЧНИКОВОЇ В МЕДИЧНУ НАУКУ

Анотація. Під час проведення історико-наукових досліджень досить часто можна побачити постаті жінок, які зробили суттєвий внесок у науку. Жінки-науковці займалися не лише дослідницькою діяльністю. Вони брали участь у наукових експедиціях, готували майбутніх фахівців, проводили активну організаційну та популяризаторську роботу. Нерідко жінки ставали носіями нових прогресивних ідей та засновували власні наукові школи. На окрему увагу заслуговують сімейні подружжя, які займалися спільною дослідницькою діяльністю. При цьому, жінки часто допомагали своїм чоловікам, розділяючи їхні наукові інтереси. Серед них належне місце займає дружина Іллі Мечникова – Ольга Миколаївна. Варто зазначити, що досить часто роль жінок у проведенні наукових досліджень залишалася поза увагою істориків науки. І Ольга Мечникова – класичний приклад цього. Тим часом, ця жінка не лише допомагала й підтримувала роботу свого чоловіка, але й сама провадила активну дослідницьку діяльність. Її життя було цілком віддане науці й людям. У пропонованій статті представлено життєвий шлях Ольги Мечникової – дружини, вірного друга й соратниці, ретельного біографа її чоловіка. Показано внесок Ольги Миколаївни в практичне впровадження надбань Іллі Мечникова та проведення спільних із ним наукових досліджень у галузі розробки методів біологічної боротьби зі шкідниками сільськогосподарських рослин, засобів подолання туберкульозних захворювань, започаткування гнотобіології. Висвітлено практичну діяльність Ольги Миколаївни у з'ясуванні ролі фагоцитів для знищення бактерій під час вакцинації. Окрему увагу приділено лікарській практиці Ольги Мечникової з надання медичної допомоги як українським селянам, так і пацієнтам Інституту Пастера. Автори статті не оминули увагою ще одну галузь діяльності Ольги Мечникової, яка стосується галузі мистецтва. Підкреслено роль цієї неперечісної особистості як здібної скульпторки та художниці.

Ключові слова: мікробіологія, імунітет, гнотобіологія, Інститут Пастера, вакцинація, гендерна концепція.

Introduction. The role of women in the development of science and medicine has been known since ancient times. At the beginning, their contribution took place mainly in auxiliary roles in the field of medical practice, but later real researchers, authors of medically oriented works appeared among them. In particular, the treatise «Alimma» («Ointments»)

was the first medical work created by a woman of Kyivan Rus – Volodymyr Monomakh's granddaughter Evpraksiya (Zoya). Over the following centuries, many women achieved equality with men in scientific and teaching medical activities, but up to this day there are still significant differences between them in salary, scientific rank and management positions. The concept of gender, which has been rooted in society for a long time, prevents further progress in overcoming these differences. Its rethinking requires the expansion of the evidence base created on specific examples of women's participation in the development of scientific knowledge.

The history of science knows many examples of women scientists who devoted their lives to the scientific activity[1]: M. V. Pavlova, V. Y. Bilai, O. I. Smirnova-Zamkova[2], S. M. Pereyaslavtseva[3], O. M. Khokhol, K. G. Beltiukova, N. T. Osadcha-Yanata etc.

Thus, Maria Vasylivna Pavlova (1854–1938) became the first female academician of the All-Ukrainian Academy of Sciences and University, the first female paleozoologist in the Russian Empire, the founder of the paleozoological school[4]. Paleozoology was at that time a new direction in the development of biological science. The investigator showed her talent as a teacher by gathering young researchers around her and founding a scientific school in this discipline. M. V. Pavlova devoted her scientific research to the study of fossil mammals, in particular, to finding out the reasons for the extinction of animals in past geological epochs.

Vira Yosypivna Bilai (1908–1994) was a well-known Ukrainian scientist in the field of systematics, physiology, toxicology, ecology of microscopic fungi. From 1935 to 1994, the creative life of V. I. Bilai was associated with Zabolotny Institute of Microbiology and Virology of the National Academy of Sciences of Ukraine. In the 40s of the 20th century the department of mycology began to study properties of antibiotic with microbial origin – penicillin and streptomycin. An antibiotic called microcide was obtained from the culture selected by Ukrainian researchers. Clinical trials conducted in hospitals in Kyiv (1948) demonstrated its high efficiency[5]. The strain of the fungus producing the microcide was named Penicillium vitale Pidopl. et Bilai. Its discoverers, N. M. Pidoplichko and V. I. Bilai, were awarded the State Prize[6].

Another native researcher, Klavdia Gnativna Beltiukova (1900–1970) also devoted her life to science[7]. The doctrine of plant bacteriosis, created with her own participation on the basis of the interaction of botany, phytopathology and bacteriology, proved the perspective of this direction, remaining useful for science and practice. From 1937 to 1970, Beltiukova was the permanent head of the plant bacteriosis department at the Institute of Microbiology of the Academy of Sciences of the Ukrainian SSR[8]. Under her leadership and with her

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participation, research methods were developed and improved, which made it possible to study in depth the biological properties of a wide range of plant bacteriosis pathogens and to clarify their systematization[9].

It is also worth mentioning one of the most famous native pediatricians, corresponding member of the Academy of Medical Sciences of the USSR, Honored Scientist of the Ukrainian SSR, Professor Olena Mykolaivna Khokhol (1897–1964). Her scientific research was inextricably linked to health care practice. O. M. Khokhol was one of the first in the country to establish the clinical essence of the toxin secreted by the bacterial causative agent of dysentery[10]. A group of medical scientists led by O. M. Khokhol conducted multi-year complex studies of toxic forms of gastrointestinal diseases of dysenteric and non-dysenteric etiology. Thanks to a broad discussion with the participation of pediatricians, microbiologists, infectious disease specialists, pathophysiologists and pathomorphologists, the issues of diagnosis, clinical research and treatment of these pathologies were clarified. The performed developments have found application in clinical practice.

In the history of science, there are quite often cases of joint research by married couples. In particular, such were the physicists Marie and Pierre Curie, who together studied the phenomenon of radioactivity. An example of such cooperation in native science can be the scientific activity of Oleksandr Aloizovich Yanata and his wife, Natalia Tykhonivna Osadcha-Yanata (1891–1982). It should be noted that the Yanata's couple worked together when writing a number of important works in the field of Ukrainian nomenclature and terminology. A positive result of their work was the publication in 1928 of the "Dictionary of Botanical Nomenclature"[11], created in close collaboration with the staff of the Institute of Ukrainian Scientific Language. And the result of all scientific activity of Natalia Osadcha-Yanata was the publication in 1973 of the monograph "Ukrainian folk names of plants"[12]. It was created on the basis of rich materials collected by Natalia and her husband in Ukraine during 1927–1939. The life of this woman became a vivid example the work of a research scientist, wife and colleague, who not only continued her husband's work, but also made her undeniable contribution to science[13].

Olga Mykolaivna Mechnikova takes her rightful place among these researchers. This woman not only helped and supported the work of her husband, but also performed active research activities herself. Her life was completely devoted to science and people.

Analysis of recent research and publications. The problems of gender inequality became particularly acute within society in the 21st century. Many works of foreign and native authors are devoted to them. According to Laura Reichenbach, the goal of gender equality "is not only to ensure an equal number of men and women, but also to guarantee honesty and fairness in the structure of professional opportunities"[14]. Jane Dacre and Susan Shepherd noted that women in medicine are now rapidly gaining consultant status. This is a significant achievement in terms of gender equality, but it raises a number of questions personnel planning and policy[15]. According to Georg Thibault[16], more than ten years ago, women reached equality with men in number of applicants to medical schools, in quantity

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of professors and teaching staff of medical schools. Almost a third of them were women, including female deans and heads of departments. Such trends were promising, but now we see, unfortunately, that this process is moving too slowly. Agreeing with the opinion of Thibault, Mark Del Monte et al. believe that equity issues are far from resolved, despite progress in bringing more women into the field of medicine, and this requires a focused and systemic approach to promoting change in the medical community[17]. Among the works of native authors who noted the role of women in medicine, the textbook by Lyudmila Lutsyk and others should be mentioned. This work is destined for students of medical institutions and it describes the development of nursing in Ukraine and abroad in detail[18].

Sources and methods. The study is based on the fundamental principles of historicism, objectivity and comprehensiveness, which determine the research methods, including comparative-historical, subject-logical, system-functional methods. Special techniques, such as problem-chronological, comparative, biographical methods are also engaged. We used the origin and archival approaches for analysis of the source base. The method of generalization and systematization of facts is employed in the preparation of conclusions.

Thus, **the aim of the article** is to reproduce the image of Olga Mechnikova, a comprehensively gifted woman who made a significant contribution to medical science and left her trace in the history of medicine and art.

Basic material and results. From 1806 to 1815, Ivan Bilokopytov (1762–1825) fought against the Ottoman Porte and Napoleonic France. On December 27, 1815, having completed his military career with the rank of major general, he settled with his wife in the village of Popivka, Popivka Volost, Cherkasy County, Kyiv Province. After his death, the estate in Popivka passed to his son, Mykola, and here in 1858, in the house above the Rotten Tashlyk River, his eldest daughter Olga was born. Mykola Bilokopytov, holding the post of marshal of the Odessa nobility, rented an apartment in Odessa, and professor of Novorossiysk University Ilya Mechnikov settled in the same house. While studying at the Odesa gymnasium, Olga Bilokopytova was fascinated by natural history taught by one of Mechnikov's students, and at the first opportunity she asked Ilya Ilyich to study zoology with her. Joint classes turned into a warm friendship, and then into love, and finally on February 14, 1875, the lovers got married in Odessa. Throughout her subsequent life, Olga Mechnikova followed her husband, helping him in his multifaceted activities.

Mechnikov first came to Popivka in 1875, after which he stayed in this village for 13 consecutive years. He equipped his private laboratory in the village, where he completed work on the study of the phagocytosis phenomenon. His wife conducted a number of experiments in Popivka on the study of anthrax vaccines administered to sheep. The experiments were to show the role of phagocytes in the destruction of bacteria during vaccination. The obtained results were published by her in Paris[19]. In the years 1879–1880, while studying the biology of the bread beetle (Anisoplia austriaca), which destroyed crops in the Popivka estate, Mechnikov put forward an innovative idea of biological control on this pest by artificially infecting the beetle with the pathogenic fungus muscardina. As his wife recalled, this idea came to him when he saw a large fly on the window, which had apparently died from the mold that covered it. He also studied the origin of fish and other vertebrates, observing the life of Rotten Tashlyk. His wife's participation in these studies is confirmed by her notification, published in the "Proceedings" of the Novorossiysk Society of Nature Researchers[20]. While in Popivka, Olga treated the peasants who came to her, and felt the need to take a medical course at the Faculty of Geneva (1882).

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At the bacteriological station opened on June 11, 1886 in Odesa, I. Mechnikov was appointed head of it, Olga Mykolaivna received patients. The station fought against rabies, and during the first three years, almost 1,500 people were vaccinated against rabies. Considerable attention was also paid to the development of methods for diseases of farm animals. Unfortunately, during the mass vaccination of animals against anthrax, trouble awaited the station: 3,000 vaccinated sheep of landowner Pankeev died. This could be because they were given an insufficiently weakened vaccine. At that time Mechnikov was no longer at the station; he accepted Pasteur's invitation and moved to Paris. He rejected the offer to work at the Bacteriological Institute in St. Petersburg, received from Prince Peter of Oldenburg. Mechnikov noted that in Paris his laboratory would be open to every scientist who wanted to work, and in St. Petersburg such conditions were not foreseen.

On October 15, 1888, Ilya Ilyich and Olga Mykolaivna arrived in Paris and stayed in a small hotel in the Latin Quarter, not far from Ulm Street, where Pasteur's laboratory was located. A few months later, Mechnikov was allocated two rooms in the new building of the Pasteur Institute, and later, when the number of his students increased, he was given an entire department on the second floor. His wife worked with him as an assistant, at the same time taking part in the reception of the institute's patients, who came in large numbers. In one of his letters to the Mechnikov couple, Emil Roux wrote about this: "Mrs. Mechnikova does everything to tire herself out. I see her from here among the sick, experiencing the suffering of each patient, happy for the opportunity to cure him… All days she works as a sister of Mercy"[21]. It also follows from his correspondence that he constantly gave instructions to Olga to support her culture of the tubercle bacillus, which was necessary for him and Mechnikov to conduct experiments to test the effects of tuberculin. He always paid tribute to the quality of the translations she made from foreign languages, in particular the translation from German to French of the work of the Japanese scientist Shibasaburo Kitasato on tetanus poison, which was interesting for researchers of the Mechnikov school[22].

Olga Mykolaivna took part in I. Mechnikov's development of the foundations of gnotobiology – the science of germ-free animals, in which he was a pioneer. The idea of whether higher organisms can exist without microbes was born almost simultaneously with the very science of microbes – microbiology. Pasteur was the first, who formulated this question, submitting it for consideration to the French Academy of Sciences in 1895. He believed that the existence of higher organisms outside the surrounding world of microbes is impossible. The problem of breeding animals free from bacteria has long been of interest to Mechnikov, who considered one of the causes of old age and death to be poisoning of organisms with bacterial poisons. Solving this problem could also help in the study of the process for creating immunity. I. Mechnikov saw the main reason for the opposition of doctors against the phagocytic theory in the fact that until now, in medicine, pathological phenomena were studied exclusively on higher animals, not using lower ones. Meanwhile, it is the latter, thanks to the simplicity and primitiveness of their organism, which provide the key to the origin of pathological phenomena in the higher ones.

In 1901, Olga Mykolaivna, on the instructions of her husband, began conducting experiments on the breeding of frog tadpoles in a bacteria-free environment, presenting her results in an article in the "Annals of the Pasteur Institute"[23] that same year. Two years later, Mechnikov gave an assessment of her work. As he wrote, she managed to create a whole series of tadpoles extracted from the eggs of ordinary frogs in absolutely aseptic conditions and grown in sterilized jars filled with water and bread, also sterilized. The technique of these experiments requires great care, but it is incomparably easier than that required for aseptic rearing of guinea pigs and chickens. Tadpoles grown in the absence of microbes lived for months and even outlived controls fed unsterilized bread. But their development

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was much slower than that of the controls. Aseptic tadpoles remained small, stunted and became cachectic, while control individuals went through their normal developmental cycle[24]. O. Mechnikova continued her experiments with germ-free animals, as evidenced by her husband's letter to her from 1905: "I look at your tadpoles every day. I think that they will live until your return, then we will finish them and sum up all this experience"[25]. In the future, Mechnikov planned to repeat similar experiments on mammals.

In the middle of the 19th century, the settlement of the Kalmyk steppe by immigrants from central Russia (the so-called peasant colonization) began. The movement of large masses of people is always accompanied by an aggravation of the epidemic situation. Ilya Ilyich, who has long studied the causative agents of tuberculosis, knew that people living in the Astrakhan steppes are almost unaware of this disease, but are very easily infected by it when they come into contact with the urban population. Mechnikov assumed that there is a natural vaccination against tuberculosis in nature. In 1911, Mechnikov led an expedition organized by him to study tuberculosis and plague among the population of the Kalmyk steppes. The expedition consisted of specialists from the Pasteur Institute, members of the expedition sent at the expense of the Russian government, and scientists who voluntarily went on the expedition at their own costs. Among the participants of the expedition were: Tarasevych, who managed plague research; the Italian Solimbeni – a specialist in cholera and plague (he was in the plague in Portugal and Brazil and himself dissected plague patients); the Frenchman Burnet, who worked on tuberculosis; Bacteriologist – Japanese Yamatuga; head of the Astrakhan anti-plague laboratory Klodnytskyi and others. It was necessary to find out the level of susceptibility of nomads to tuberculosis. With the help of a special diagnostic reaction that makes it possible to recognize tuberculosis, it was possible to find confirmation of Mechnikov's hypothesis. In addition to testing this assumption, the expedition had to study the plague at the place of its constant outbreaks. It was necessary to solve the question of whether plague germs persist in the corpses of dead people. It was established that corpses, insects, earthworms, and the surrounding soil sometime after the epidemic do not contain bacteria.

Olga Mechnikova took part in a difficult and dangerous expedition to the Kalmyk steppes, motivated by both the opportunity to study epidemic diseases in natural conditions and concern for the health of her husband, who was 66 years old at the time. Two years after returning to Paris, in 1913, Ilya Ilyich suffered his first myocardial infarction, and on July 15, 1916, he died after a third attack. Following the will of the deceased, the urn with his ashes was placed in the library of the Louis Pasteur Institute. After his death, Olga Mykolaivna remained in Paris: she systematized the scientific materials of her husband and began writing a book about his life. Ilya Ilyich asked her about this during his lifetime, noting that she lived with him all the married years inseparable, knew and understood well what he created in the field of science and what he wanted to do in the future. The book was published in French in Paris in 1920[26], and a year later – in English translation in London[27]. Olga warmly recalled the years of their life together: "For many years we worked together. Working with him was the greatest blessing, because, generously sharing his thoughts … he, at the same time, created an atmosphere of close communication, and this allowed the humblest employee to feel that he was participating in the fulfilment of a high goal"[28]. She lovingly recreated the image of a man who loved her and valued her highly, once writing in one of his letters: "The fact that I worked hard all my life depended a lot on you. This contributed to the fact that I was very happy during the thirty-three years I spent with you"[29].

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Olga Mechnikova was a very gifted person. “Although I was always interested in scientific issues, the passion of my life was art,” she wrote about herself[30]. Her husband contributed to her artistic education and built an art studio for her. O. Mechnikova studied with the sculptor J.-A. Engelbert. In 1900, she exhibited her cultural works for the first time at the International Exhibition in Paris and received a bronze medal. After that, she constantly participated in exhibitions held in Paris salons. She was also engaged in painting: several picturesque portraits of I. I. Mechnikov are kept in his fund in the Archives of the Russian Academy of Sciences.

Olga Mykolaivna survived her husband for many years: she died on July 24, 1944 in the clinic of the Pasteur Institute at the age of 86. In 1926, at the request of L. A. Tarasevych, she agreed to transfer part of the family archive to Russia, and she promised to bequeath the remaining documents for the next transfer. Her will was executed in 1950, and now all these documents, united in the fund of personal origin of I. I. Mechnikov No. 584, stored in the Archives of the Russian Academy of Sciences.

Conclusions.

Summarizing the results of the study, we can state the significant contribution of Olga Mechnikova to medical science and the history of medicine. Besides a review of the materials on the selected topic allows us to note the following:

1. The development of a gender strategy as one of the directions of state policy is caused by the need to solve a number of complex socio-economic problems.

2. Activation of all the forces of society, in particular women, who make up the majority of the population of Ukraine, is especially important now, during the war on its territory.

3. Demonstration of the concrete contribution of women to the field of medicine emphasizes the importance of the selfless work of Ukrainian women doctors in the rear and on the battlefields.

The conducted research once again confirms the importance of a more detailed study of the life circumstances and environment of outstanding scientists. First of all, it concerns people who helped to provide complex experiments and important discoveries. These people often remained in the shadows, but their role in the development of science is undoubtedly significant and requires a separate study.

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ПРОВІДНА РОЛЬ ЖІНОК У РОЗВИТКУ МУЗЕЙНОЇ СПРАВИ МИКОЛАЄВА В ДРУГІЙ ПОЛОВИНІ XX СТОЛІТТЯ

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Анотація. На прикладі одного з найстаріших миколаївських музеїв – обласного художнього музею ім. В. В. Верещагіна, – проаналізовано процеси організаційних змін і трансформаційних перетворень, що стали знаковими та сформували сучасні засади його роботи. Мета статті – розкрити роль наукових співробітниць обласного художнього музею ім. В. В. Верещагіна для збереження, накопичення та популяризації музейної колекції як специфічної пам'ятки матеріальної історико-культурної спадщини України. Предметом дослідження стали форми та напрямки роботи директорок обласного музею в контексті обґрунтування пріоритетних завдань та визначення колективом шляхів їхньої практичної реалізації. Наявний акцент сприяв найбільш комплексному заглибленню в тематичну площину та дав змогу визнати відданість колежанок музейній справі. Встановлено, що комплексне збільшення експозиції музею стало результатом продуманої наукової та організаційної роботи, проводили активну експозиційно-виставкову, екскурсійну роботу, запроваджували нові, для того часу, масмедійні форми реклами. Водночас із цілеспрямованим і систематичним збиранням предметів музейного значення, колежанки вели значну культурно-просвітницьку роботу. На основі порівняння статистичних даних, доведено безперервне збільшення кількості відвідувачів музею, проведення лекцій, виставок та заходів культурно-громадського значення. Визначена проблематика, на жаль, не набула в сучасній історіографічній площині належної уваги як на загальнодержавному, так і на регіональному рівні. У вітчизняній історіографії наявна певна лакуна щодо комплексного аналізу гендерного компоненту як вагомого фактору в забезпеченні становлення та розвитку всіх форм музейної роботи в Україні. Матеріали, наведені в статті, на прикладі лише одного музею доводять перспективність обраної тематики та можливість її виокремлення як напрямку наукового дослідження.