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On the history of the creation of the Department of Pathophysiology at the Sechenov University

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The main stages of the creation of the oldest Russian department of pathophysiology at the Sechenov University are presented in this article. The authors provide information on the origin of pathophysiology as an independent educational discipline and scientific specialization, and on the prerequisites for the creation of a separate pathophysiology department (at that time, general pathology) at Imperial Moscow University (IMU) in the second half of the 18th century. The connection between the work of the first Russian professor of the medical faculty, S.G. Zybelin, and the initial elements of pathophysiology as a science and teaching subject at IMU are elucidated. A review is provided of the preconditions for the creation, in 1804, of the Department of Pathology, Therapy and Clinical Practice at IMU, in which medical students mastered human pathology within clinical discipline courses; arguments are given for the need to direct research of the processes underlying the emergence and development of human diseases, including animal studies. The authors provide historical information on the creation of the Department of Physiology and General Pathology, which was headed by the authoritative physiologist and experimenter Professor A.M. Filomafitsky, who used data from experimental and comparative physiology to explain possible causes, mechanisms of development and the essence of a number of forms of human pathology. The development stages of the independent department of pathological physiology are characterized in accordance with the activities of the first two heads of the department in its various periods. During the department's management by Professor A.I. Polunin (1849–1880), the structure of the subject was formed: a general doctrine of disease and the theory of typical pathological processes. The curriculum and a number of works on individual forms of human pathology were also published. Following this period, a new clinical and experimental direction for the department, which has been retained to the present, was created by Professor A.B. Fokht (1880–1911).

Keywords: *history of medicine, pathophysiology, scientific schools, department of pathophysiology, Sechenov University*

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The emergence of pathophysiology as an independent academic discipline and a scientific speciality at Imperial Moscow University (1765–1804)

In the second half of the 18th century, at Imperial Moscow University (IMU) prerequisites were established for the creation of the Department of Pathophysiology. The activity of the Department of Pathophysiology of the Medical Faculty of IMU, in turn, determined the conditions for the opening of similar academic departments in other medical schools in Russia. Pathophysiology developed substantially in the second half of the 19th century, when a clinically oriented direction of this discipline was established [1].[1]

The development of pathophysiology and scientific and practical medicine are closely interrelated processes [1]. This is what determined the origin and further development of pathophysiology.

In the second half of the 18th century, shortly after the foundation of the Medical Faculty of IMU in 1758, the term "pathology" began to be used. The origin of the original elements of pathophysiology as a science and as an academic discipline is thought to have occurred at the same time. This was mainly due to the activities of the first Russian professor of the Medical Faculty, Semyon Gerasimovich Zybelin (1735–1802), who delivered the course of theoretical medicine in 1765–1768 [2]. The three-year cycle of this course consisted of physiology, hygiene, pathology, semiology and general therapy, and its methodological and contextual unity was ensured and regulated by the system body of textbooks and scientific works on physiology, pathology, therapy and practical medicine written by the Leipzig professor H.G. Ludwig. In 1768, S.G. Zybelin was awarded the title of ordinary professor and began to teach anatomy and surgery (1769–1775). In 1770–1777, the course of theoretical medicine was delivered by his student, Ivan Andreevich Sibirsky (who died in 1783). Then, from 1777 to 1779, the reading of the course was entrusted to Ignatiy Iosifovich Vech (1737–1779), student of the famous French anatomist and physiologist T. Bordes. It was I.I. Vech who substantiated the need to complement the method of observation in medicine by experiment and philosophical generalisation. In the Pavlovsk hospital, he was the first to organise training in pathology for students at the patient's bedside and, accordingly, introduced the concept of 'pathology' into clinical medicine, which further facilitated pathophysiology becoming an independent discipline.

I.I. Vech's successors – M.I. Skiadan and F.I. Barsuk-Moiseev – also adhered to the concept of A. Haller's experimental physiology. They utilised the knowledge of physiology to explain pathological phenomena (i.e., they transformed normal physiology into the physiology of the diseased organism, i.e. pathophysiology) [1, 3].

The Creation of the Academic Department of Pathology, Therapy and Clinical Practice (1804–1836)

In 1804, in accordance with the statute of IMU, six independent academic departments were established at the Medical Faculty, one of which was the Department of Pathology, Therapy and Clinical Practice. The first teacher of that department was S.A. Nemirov, a student of Professors S.G. Zybelin, F.G. Politkovsky, M.I. Skiadan, F.I. Barsuk-Moiseev and others. In 1804, S.A. Nemirov defended his doctoral dissertation, in which he made an assumption about fermentative processes (and not just chemical ones, as was previously thought) occurring in the gastrointestinal tract during digestion. Soon afterwards S.A. Nemirov was appointed an extraordinary professor of the Department of Pathology and Therapy. He wrote a textbook on general pathology, Primae Lineae Pathologiae Generalis (1806), which he used in teaching up to 1810. Apart from Nemirov, Professor M.Y. Mudrov worked at the Department of Pathology and Therapy as well. He considered it necessary to convey to students the importance of not only identifying the symptoms of the disease, but also finding out their causes. Thus, the students of the Medical Faculty acquired the elements of pathology knowledge, although of a mainly speculative nature, within the framework of lectures of clinical disciplines [3, 4].

[1] Even now pathophysiology is the basis of clinical medicine. Students of medical universities begin to study pathophysiology before clinical disciplines: therapy, surgery, neurology, infectious diseases, etc.

At the same time, lecturers of the Medical Faculty of the IMU began to realise the need for a special study of the processes underlying the emergence and development of diseases. This was pointed out in 1825 by M.Y. Mudrov in the proposals on the new statute of IMU, sent to the Secretary of State for Education. The opinion of M.Y. Mudrov, as well as other professors who supported him (Y.K. Loder, F.K. Erdman, I.F. Bush), was taken into account in the new university statute of 1835. In accordance with it, a new department was created – the Department of Physiology and General Pathology. The naming of the department wasn't accidental: general pathology (pathological physiology) was considered as the physiology of a sick organism, and demonstrative experiments on animals, revealing the essence and mechanisms of the development of pathological processes, were mainly carried out by physiologists. It was deemed necessary to merge physiology and pathology into one department [3, 4].

The statute of IMU of 1835 unambiguously reflected the separation of pathology, which took place in the universities of Russia and Western Europe, into pathological anatomy and general and specific pathology in accordance with the pathological, experimental, physiological and clinical methods of research inherent in these disciplines. This made it possible, by the 1830s, to achieve very significant results in the study of the physiological and pathological phenomena occurring in the human body. During the existence of the Department of Pathology, Therapy and Clinic in IMU (1804–1836), individual elements of pathophysiology turned into a system of ideas about the nature and causes of diseases, the patterns of occurrence and mechanisms of development of various forms of human pathology. The close interrelation between pathophysiology and clinical practice was determined by anthropathology, orientated around a sick person, and the formation of scientific bases for the clinical thinking of a physician. The course of lectures delivered at the Department (particularly by Professor K.V. Lebedev) already contained some elements related to the clinical pathophysiology that was being formulated at the time [3–5].

The Department of Physiology and General Pathology (1836–1849)

The academic Department of Physiology and General Pathology was headed by the famous physiologist and experimenter, Professor Alexei Matveyevich Filomafitsky. He actively used the information gained through experimental and comparative physiology to explain possible causes, mechanisms of development and the essence of a number of diseases and pathological processes in the human body. Professor A.M. Filomafitsky wrote: "Most of all I will pay attention to the application of physiological knowledge to medicine, for only physiology can purge medicine from crude empiricism and make it rational" [4]. Alexei Matveyevich widely used the experimental method of investigation; his students followed that course too. So, V.A. Basov invented an artificial gastric fistula ("Basov's fistula"), which played an important role in the development of physiology and pathology of digestion, as well as gastric surgery. In actuality, the works and tractates of V.A. Basov became a precondition for extensive research in the field of the physiology of digestion by the Academician I.P. Pavlov.

At the Department of Physiology and General Pathology, animal experiments dedicated to studies on the effects of drugs (ether, chloroform) on the body, the effects of blood transfusions, the removal of kidneys, urinary disorders, etc., were conducted. The training course of the Department of Physiology and General Pathology imparted knowledge on the pathophysiology of certain human diseases, and its staff conducted experiments to model pathological processes.

In the 1840s the preparations for the next reform of the system of medical education in Russia began. The creation of one more medical faculty (at St. Vladimir Royal University in Kiev, (besides the one in Moscow) to meet the needs of the southwestern part of Russia and the reorganisation of the medical faculty of IMU (to provide the northern and central regions of the Russian Empire with physicians) were planned.

In 1845, the government adopted the Additional Decree on the Medical Faculty of Imperial Moscow University (07.12.1845), in accordance with which the creation of the Department of Pathological Anatomy and

Pathological Physiology at the University of Moscow was planned [4].

The importance of having a department of pathological physiology was to a great degree appreciated by physicians, amongst whom was the great surgeon N.I. Pirogov. He repeatedly made a proposal to open the department with a course of pathological physiology. The name of the discipline "pathological physiology" was first used by N.I. Pirogov himself, who was brilliantly acquainted with the experimental method of research [4]. Pathological physiology was necessary for physicians to be able to give a scientific explanation for the causes of diseases and especially the mechanisms of their development, in order for medicine to gradually come out of the "conjectural sciences" and become "closer to the precise sciences", as M.Y. Mudrov thought [5].

Experimental physiological courses, which Professor A.M. Filomafitsky advocated, played an important role in the formation of pathophysiology as an independent science and academic discipline. However, on the 22nd of January, 1849, Professor A.M. Filomafitsky died at the age of forty-two. On the 26th of January, 1849 the decision of the Ministry of National Enlightenment of the Russian Empire, was to entrust the delivering of lectures on the physiology of an sick person (general pathology) "after the death of its worthy member, Sir Ordinary Professor A.M. Filomafitsky" was entrusted to "Polunin, the gentleman occupying the post of adjunct of the Therapeutic Department of the Hospital Clinic".[2] A new stage in the formation of pathophysiology began.

The Department of Pathological Anatomy and Pathological Physiology (1849–1869)

Since 1849, the independent Department of Pathological Anatomy and Pathological Physiology, headed by Professor A.I. Polunin, who had studied pathological anatomy, comparative physiology, "microscopic anatomy" and organic and pathological chemistry at various European universities, began to function in IMU [6].

Professor A.I. Polunin delivered a course of lectures, consisting of four parts: the general doctrine of the disease, the doctrine of the methodology of its means of transmission, the doctrine of the general mechanisms of the development of the disease and the doctrine of certain morbid processes. It was he who developed the general structure of pathophysiology as an academic discipline [7]. Shortly thereafter A.I. Polunin published a number of fundamental scientific works on pathophysiology, amongst which were *On Man and His Relations to Nature* (1847), *Reasoning on Cholera* (1848), *Introduction to Pathology* (1852). He translated R. Virchow's book, *Cellular Pathology*, into Russian. Through the years, his students included A.S. Shklyarevsky, G.A. Zakharyin, S.P. Botkin, V.F. Snegirev, I.M. Sechenov, I.F. Ognev, I.F. Klein, A.B. Focht and many others. From 1863 to 1878, A.I. Polunin was also the dean of the Medical Faculty. For many years he remained the publisher and editor of the *Moscow Medical Journal*, as well as the head of the Moscow Physico-Medical Society [4].

In one of the issues of the *Moscow Medical Journal* A.I. Polunin wrote: "I must say a few words about the appendix to this issue of the Journal. As yet, there is no complete course on Pathology and Therapy in Russian which would meet the contemporary requirements of science. I believe that, if I were to issue such a course, I would do the Russian medical public a favour and acquire the means for publishing the Pathology and Therapy journal. General Pathology and Therapy will be the subjects of my own, independent work. I will translate Specific Pathology and Therapy from the works of Canstatt, Wunderlich and others, with the necessary alterations and addenda in accordance with the contemporary state of science and my views on it. So, in the course, Pathological Anatomy will be given in accordance with the works of Rokitansky, Engel and other exemplary researchers. Some articles in Specific Pathology and Therapy will be my own, original works, and generally I will provide in this course the fruit of my own experience. Clinical Medicine with the sciences that make up its foundation was the main subject of my studies abroad for four and a half years. Upon arrival in Russia, I was a teacher of Clinical Medicine in the rank of occupying

[2] Central Historical Archive of Moscow (Tsentral'nyi Istoricheskii Arkhiv Moskvy, hereinafter TsIAM). F. 418. I. 18. 1849. P. 24.

the post of with the rank of Adjunct in the Therapeutic Department of the Hospital Clinic of Moscow University for two academic years, and had the opportunity to observe patients in one hundred hospital beds daily. And at present, whilst teaching the Pathological Anatomy and Pathological Physiology, I constantly ensure the application of the information learnt through these sciences to Clinical Medicine. The entire second volume of Pathology and Therapy will be attached to the 1852 issue of the *Moscow Medical Journal*. The main bulk of articles in the volume is mostly translated from Canstatt, with numerous addenda and amendments. The addenda are placed partly in Canstatt's paragraphs themselves, and partly separately. Articles about cholera and typhus are written by me. I intend to devote the most part of my idle hours to the preparation and translation of the course of Pathology and Therapy, and, if circumstances be favourable, I hope to publish the full course of Pathology and Therapy, consisting of six or seven volumes, in three years' time. The whole course of Pathology and Therapy will be attached to the *Moscow Medical Journal* issues and in such a way that it can be isolated from the Journal and bound separately. The 1853 issue of the Journal will also contain the whole volume of Pathology and Therapy, like the 1852 one does" [8].

Professor A.I. Polunin led the unified Department of Pathological Anatomy and Pathological Physiology for twenty years (from 1849 to 1869). He understood that pathological anatomy and pathological physiology should be completely independent courses studied by future physicians in parallel and in interconnection with each other. A.I. Polunin thought and spoke about it as early as in 1858, but the process of segregation of the Department was postponed until 1869. In 1868, the Ministry of National Enlightment of the Russian Empire approved the formation of two separate departments – the Department of Pathological Anatomy and the Department of General Pathology (Pathophysiology) [6].

The Department of General Pathology (Pathophysiology): 1869–1880

The Department of Pathological Anatomy was headed by I.F. Klein, one of A.I. Polunin's students who, in 1869, headed the Department of Pathological Physiology, renamed the Department of General Pathology, and became its first head. The main purpose of this department, in A.I. Polunin's opinion, was the study of general patterns and specific mechanisms of changes in the body of an ill person. By that time, the structure of the academic discipline was formed: the general doctrine of the disease (i.e., general nosology), the doctrine of common, typical pathological processes, the doctrine of the typical forms of pathology of individual organs and their physiological systems [4, 5].

The great merit of Professor A.I. Polunin was that, whilst in charge of the still unified Department of Pathological Anatomy and Pathological Physiology, he pointed out terms such as 'etiology', 'pathogenesis', gave definition and justified the area of studying the pathological anatomy, pathological physiology, pathological chemistry and general and specific pathology in his work Introduction to Pathology (1852). He defined these areas of pathology as sciences crucial to scientific and clinical medicine. A.I. Polunin believed: "...A person who's not familiar with pathological anatomy and pathological physiology, who doesn't truly appreciate these sciences, cannot give good advice. Being fully aware of the connection between pathological anatomy and pathological physiology with normal medicine, we will continue to try to give more thorough information on these subjects" [5]. He instigated the teaching of pathophysiology as an independent academic discipline, but did not promote the experimental physiological direction of his predecessor, Professor A.M. Filomafitsky (didn't show pathophysiological experiments to students). The opinion that A.I. Polunin "widely propagated the role of the experiment in pathology and achieved serious success in it" [5] is not supported by the facts: he didn't possess the method of pathophysiological experiment, nor did he have experimental assistants. In those years, this was a serious obstacle to the full formation of pathophysiology as an experimental scientific medical speciality and an academic discipline teaching students the experimental methods of research [5].

The Department of General Pathology (Pathophysiology): 1880–1911

In 1880, Professor A.I. Polunin's student, Professor Alexander Bogdanovich Focht (1848–

1930), was appointed head of the Department after his predecessor. He was approved in the rank of extraordinary professor by the decision of the University Council and the Ministry of National Enlightment of the Russian Empire [9].[3]

Unlike his teacher, Professor A.B. Focht was thoroughly developing a thorough new direction of scientific research of the Department – clinical and experimental – which was very relevant at the time [10]. At the same time, at Kazan Imperial University and Saint Petersburg Imperial Medical and Surgical Academy, this pathophysiological direction was being developed by Professor V.V. Pashutin. Taking this into account there is every reason to consider A.B. Focht and V.V. Pashutin the founders of the clinical and experimental direction in pathophysiology [11].

Under Professor A.B. Focht's guidance his students – V.V. Chirkov (later Professor at the Department of Therapy at the Saint Vladimir Royal University of Kiev), S.S. Kholmogorov (later Professor and prominent obstetrician), G.I. Rossolimo (Professor and prominent neuropathologist), A.I. Fyodorov, G.N. Durdufi and many others – performed clinical and experimental studies and wrote doctoral dissertations. The clinical-pathophysiological school of Professor A.B. Focht was being created at this time [12].

Soon after the election of A.B. Focht as the head of the department, he organised and launched the scientific students club in general and experimental pathology, amongst whose members were K.L. Adelheim, F.M. Blumenthal, G.N. Gabrichesky, S.S. Goloushev (writer Sergei Glagol), G.N. Durdufi, G.I. Rossolimo, S.M. Soloveitchik, I.K. Spizharny, A.A. Tokarsky and others. One of A.B. Focht's students – V.G. Korenchevsky – had worked at universities in Great Britain and the USA; he organised scientific gerontological laboratories in these countries. Colleagues of V.G. Korentchevsky called him the "father of gerontology"; his gerontological school became one of the largest in the world [13, 14]. Most members of the student club headed by Professor A.B. Focht became interested in experimental work, acquired the skills of scientific research and subsequently became eminent scientists in various fields of medicine.

The contribution of Professor A.B. Focht was also noted during the construction of the Clinical Town on the Devichye Pole: in 1890, Professor A.B. Focht founded and headed the Institute of General and Experimental Pathology [15]. The 12th International Congress of Physicians (1897) was held after the construction of the Clinical Town in Moscow had ended, and one of its delegates was A.B. Focht.

In 1911, Professor A.B. Focht left Imperial Moscow University as a protest against the reforms of the Ministry of National Englightment of the Russian Empire. Only seven years later did he return to the University, become the dean of the Medical Faculty (1918–1920) and read lectures at the Department of General Pathology.

Professor A.B. Focht established a school of pathophysiologists and clinicians. He combined pathophysiological and clinical practice and, naturally, saw the connection between pathophysiology and clinical medicine. Since the election of A.B. Focht as Head of the Department, for the first time since A.I. Polunin its activities acquired an experimental pathophysiological nature [9]. Thus, Professor A.B. Focht should be regarded as the founder and apologist of the clinical and experimental direction of pathophysiology, along with A.M. Filomafitsky, V.V. Pashutin and others, who made a significant contribution to the formation and development of pathophysiology as an independent clinical-oriented discipline [12, 13].

An entire era in the history of Russian medicine is associated with the activities of Professor A.B. Focht. He managed to realise many of his ideas. He organised the educational process at the Department of General Pathology (Pathophysiology) on the basis of clinical and experimental studies and data, founded a student scientific club at the Department, established a university scientific laboratory and the first institute of general pathology, and introduced his concept into medical education – the clinical and experimental direction in general pathology and pathophysiology. The development of this direction coincided with the trends of domestic and foreign clinical medicine, i.e. giving it the scientific foundations. A.B. Focht's ideas were close to the opinions of the outstanding therapist S.P. Botkin,

[3] TsIAM. F. 418. I. 49. 1880. P. 408.

which confirms the relevance of the direction developed by A.B. Focht, and the naukograd (teaching city) – a clinical town on the Devichye Pole – created with the direct participation of A.B. Focht, which became the main scientific base for improving teaching and the very essence of clinical medicine and, of course, pathophysiology [14, 15]. Interest of foreign scientists in Russian medicine was especially evident at the 12th International Congress of Physicians, in which A.B. Focht participated. Over the years, the authority of A.B. Focht and his school received recognition from the Russian medical community.

Professor A.B. Focht defined the main vectors of pathophysiology, which accelerated its development in the 20th and 21st centuries. Considering the great contribution of this widely known scientist, clinician and teacher to the development and formation of the Moscow scientific and pedagogical school of pathophysiologists, the academic student club of the Department of Pathophysiology of I.M. Sechenov First Moscow State Medical University was named after Professor A.B. Focht.

Conclusion

Pathophysiology is one of the oldest academic disciplines and academic specialities at Sechenov University. The name and role of pathophysiology in the system of training doctors and in science have changed, but the need for it, both in integral and analytical specialities, has not changed and is being preserved now.

This is because pathophysiologists are engaged in identifying, describing and explaining the causes, conditions, and specific and general mechanisms of the origin and development, as well as the outcomes of diseases and morbid states. Based upon this knowledge, the principles and strategies for their diagnosis, therapy and prevention are continually being developed and substantiated.

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