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## Medical microbiology at the Medical Faculty of Kazan University (1900s - 1930s)

**Maxim V. Trushin**

Kazan Federal University, Kazan, Russia.



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### ABSTRACT

Medical microbiology within the walls of the Imperial Kazan University began to develop around the middle of the XIX century. Since the beginning of the second half of the century before last, in addition to applied, theoretical issues related to the physiology of microorganisms have also been discussed. This article presents information about the work carried out by some representatives of the Medical Faculty of Kazan University in the field of medical microbiology and sanitation during 1900s-1930s. Some original guesses expressed by these authors are presented.

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### Introduction

Medical microbiology within the walls of the Imperial Kazan University began to develop around the middle of the XIX century. Initially, all studies concerned the development of methods for the control, prevention and treatment of various infectious diseases, such as cholera, influenza, plague and others (Trushin 2021). Since the beginning of the second half of the century before last, in addition to applied, theoretical issues related to the physiology of microorganisms have also been discussed, and bacteriology itself is firmly rooted in the curricula of medical students (Trushin 2020a). Medical microbiology has made special progress with the opening of the Bacteriological Institute at the Medical Faculty of Kazan University (Trushin 2020b). The purpose of this work was to present to the general attention of readers the research of employees of various departments of the Medical Faculty of Kazan University, conducted in the early — first third of the twentieth century.

### *Kazan doctors and their work on medical microbiology*

As noted above, research on bacteriology (microbiology) was carried out by the staff of the Faculty of Medicine in a fairly large volume. Their topics became especially diverse at the beginning of the twentieth century. A significant part of the results of these studies was published in the Kazan Medical Journal. The most interesting of them will be discussed below. This was the purpose of this study.

At the very beginning of the last century, hypotheses about the connection of infectious and psychiatric pathologies began to be expressed. For example, in 1901 two papers were published on the relationship between malaria and mental disorders (Sorokovikov 1901 a,b). In this regard, the article by E. I. Kurdyumova, an employee of the psychiatric clinic, on infectious psychoses is particularly interesting (Kurdyumova 1924). The author notes that numerous epidemics of 1918-1922 led to the appearance of a huge number of mentally ill people. The work of E. I. Kurdyumova is based on the analysis of



clinical cases of 125 patients of Tomsk and Kazan district psychiatric clinics and the Psychiatric Clinic of Kazan University. In addition, the author analyzed 214 cases described earlier in the literature. E.I. Kurdyumova notes that feverish delirium, infectious delirium, and mental disorders of the post-infectious period were classically distinguished. She writes that before the appearance of typhus, typhoid fever was in the first place in terms of the frequency of infectious psychoses, followed by influenza, erysipelas and rheumatism (Kurdyumova, 1924, p. 851). The statistical analysis of 125 patients revealed a number of patterns. Firstly, infectious diseases led to the development of psychoses in 3% of patients, whereas according to the literature this figure was higher (11%). Secondly, E.I. Kurdyumova found that men suffered about 3 times more often than women. More than 2/3 of the patients were from 20 to 40 years old. E.I. Kurdyumova indicates that mortality from infectious psychosis is 2%, recovery is 95%, cases of persistent dementia are 2-3% (Kurdyumova 1924, p. 856). Despite the fact that the author's main attention is focused on the analysis of mental disorders in infections, this work has opened a new direction in psychiatric research at Kazan University related to bacteriology.

V.K. Menshikov, professor of the Children's Diseases Clinic of the University continued his work in the field of scarlet fever serotherapy (Menshikov 1925). Arkady Ivanovich Dmitriev, a graduate of the Faculty of Medicine in 1925-26 academic years, a supernumerary resident of the Skin-Venereal Clinic of the University, published notes on the treatment of skin tuberculosis with antiviral (Dmitriev, 1929a) and on the bacteriology of soft chancre (Dmitriev 1929b).

In 1922, the publication of the resident of the dermatological clinic of the University N.P. Krivosheev was published. It was devoted to the development of a technique for staining gonococci (Krivosheev 1922). Using the example of 470 samples from the urethra of patients, he proposed original approaches to staining microbes, consisting in a combination of the following stages: smearing the secret with a thin layer on glass, drying it in air, fixing it in the flame of a burner, staining with gentian-violet dye, rinsing with potassium iodide, washing with absolute alcohol, washing with water and drying (Krivosheev 1922, p. 79). As the author noted (Krivosheev 1922, p. 82), his modified coloring technique makes it possible to obtain rapidly contrasting and stable gonococcal preparations.

The work of Pavel Nikolaevich Nikolaev, Professor of the Department of Medical Diagnostics, is extremely important (Nikolaev 1925). In his work, he deals with an issue that seems to be very important in the XXI century. Namely — "...are there any objective data or signs on the

basis of which it was possible in each individual case to decide on the presence or absence of immunity after a preventive vaccination" (Nikolaev 1925, p. 126). P.N. Nikolayev comes to the conclusion "that the antibodies themselves may indicate that the serum acquires certain specific properties in relation to the antigen, completely regardless of whether immunity has occurred in each given case or not" (Nikolaev 1925, p. 127). In conclusion, Pavel Nikolaevich writes: "... in assessing the effect of anti-typhoid vaccines, in the question of whether a post-vaccination reaction of one degree or another is needed or not, immunity has occurred or has not occurred, in one case or another, finally, when determining the period of revaccination, one cannot in any way be guided by the availability or absence in the serum vaccinated subjects have an antibody."

The article of the supernumerary resident of the Faculty Therapeutic Clinic Burke Litmanovich Mazur (Mazur 1932) is devoted to the dissociation of tuberculosis bacilli. At the beginning of his article, B.L. Mazur makes a very unusual note about R. Koch: "Any cultured person will always say that Koch is famous for discovering tuberculosis bacillus. And yet this is not true. p. Koch is famous for the fact that, leaving a slice of potato on the table and finding it covered with multicolored specks the next day, he made a brilliant assumption that each speck is a colony of different microbes and therefore it is necessary to use dense media to obtain pure cultures. And he introduced solid media into bacteriology. This is his main, greatest and most important act. If he had not discovered the tubercle bacillus, another one would have discovered it, but on the basis of what he did to discover the tubercle bacillus" (Mazur 1932, p. 830). B.L. Mazur, based on experiments conducted on the cultivation of tuberculosis bacilli, is inclined to conclude that cell dissociation does not occur on the medium, but in the body of patients (Mazur 1932, p. 836). Finally, in the conclusion of his work, Burke Litmanovich writes: "*If Robert Koch discovered existing pathogenic microbes, we are called upon to create new types of microbes with new properties, useful and beneficial for humans - a much broader, exciting and urgent task*" (Mazur, 1932, p. 837). In fact, this is the first statement among Kazan bacteriologists about the need to select microbes and design their new species.

Work of sanitary orientation "Materials on the issue of pollution of the street soil of the mountains. Kazan" was published by Lev Ilyich Los (Los 1929). The work is a very significant work, presented on 80 pages with a lot of experimental data. L.I. Los notes that the material for the study (137 soil samples from various districts of the city) were selected in 1927 during excavation work on laying water pipes, telephone wires, water samples

were also taken from 80 wells of the city, and in 1928, L.I. Los extracted soil samples from a depth of 50 cm specifically for microbiological analysis (Los, 1929, p. 300). Using various nutrient media (meat-peptone agar, Eikman medium), the average number of bacteria in 1 gram of soil in various districts of the city was determined: it ranged from 44 thousand to 710 thousand (Los 1929, p. 353). He gives an average value for all samples, which is 275 thousand bacteria per 1 gram of soil. For comparison, L.I. Los mentions that in 1 gram of the soil of Dnepropetrovsk, for example, 20 or more million bacterial cells can be found (Los 1929, p. 354). The number of bacteria positively correlated with the total soil contamination. Unfortunately, the diversity of the species composition of microbes was not determined – L.I. Los only took into account the presence of intestinal group microbes according to the Eikman sample, while it was found that the number of bacteria of the *E. coli* group negatively correlated with an increase in the depth of sampling.

### Conclusions

In conclusion, I would like to shed light on the previously published work on the history of medicine. In 1929, an article was published by Professor of the Obstetric and Gynecological Clinic Victorin Sergeevich Gruzdev about I.G. Savchenko (Gruzdev 1929). V.G. Gruzdev notes that Ivan Grigorievich created his own school of bacteriologists, which includes V.M. Aristovsky, V.M. Zdravosmyslov (who left for Perm), A.A. Melkikh (in Irkutsk), K.Z. Kleptsov, V.A. Barykin (in Moscow), A.I. Berdnikov (in Paris), V.K. Menshikov. The main achievements of I.G. Savchenko, his cooperation with D.K. Zabolotny are described. It is noted that Ivan Grigorievich "was reputed to be a strict, demanding teacher" (Gruzdev, 1929, p. 6). Strictness and exactingness to students, combined with short temper, did not prevent students from being proud that they were I.G. Savchenko's students. After the revolution, his life changed. He lost his two sons and all his property, he had to flee until he got to Krasnodar, where he turned the local bacteriological station into a nationally known Chemical-Bacteriological and sanitary institute. Thus, V.S. Gruzdev emphasized both the extraordinary research and teaching and organizational talent of Ivan Grigoryevich, whose main character traits, according to Victorin Sergeevich, were, in addition, "... crystal honesty, directness and sincerity" (Gruzdev 1929, p. 9).

Finally, I would like to say that the research in the field of medical microbiology has been very multifaceted and fruitful during the decades studied in this review.

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