Advancement of medical microbiology in Turkey and the Turkish Society for Microbiology

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The history of Bacteriology in Turkey is also regarded as the history of Microbiology. As in many countries, advances in microbiology and its acceptance as a proper scientific field started in the second half of the 19th Century. The earliest work in the field of microbiology in Turkey was related to branches of medical, clinical and veterinary microbiology as expertise was cross-disciplinary. This article will provide an overview of the history of microbiology starting from the Ottoman Empire era (1299–1923) and advancing into today’s Republic of Turkey (established in 29 October 1923).

Although infectious diseases were known, their causative agents were not identified until the early 20th Century. Prior to this era, the course of infectious diseases was observed and recorded; however, the therapies that followed were without any sound scientific basis. During the Ottoman Empire, the earliest studies in the field of microbiology came through vaccination. After 1840, scientific studies related to smallpox and vaccine preparation advanced rapidly and the smallpox vaccine in use was hailed a success. Investigations related to smallpox, rubella, cholera and plague were conducted from as early as the 12th Century, with syphilis, tuberculosis and leprosy also receiving attention. However, these studies were still limited to the description and recording of the cases. The first medical school and hospital date back to 1206 and 1399, in Kayseri and Bursa, respectively, and those of İstanbul (Fatih) and Edirne followed. In the 16th Century, again in İstanbul (Süleymaniye district), an independent medical school was established. The Greek (Balıklı) Hospital in İstanbul treated plague victims in 1753.

Ottoman Sultan Selim III (1784–1839) closely followed the advancements in Europe and started modernization of the practices in the Empire to combat infectious diseases. In the 18th Century when Europe was hit by a devastating smallpox epidemic, vaccination practices kept the numbers low in Turkey. This was due to the homely practice of Turkish women taking samples from lesions and drying them out in nut shells before reintroducing them into uninfected members of the community. Lady Montagu, who was a survivor of the disease and had lost her brother to it, observed this practice during her stay in Turkey in 1717. Lady Montagu who was instrumental in the adaptation of the practice in Europe (see Yenen article of this issue) vaccinated her son in March 1718. A modern smallpox vaccine laboratory was established in 1892 by Dr Hüseyin Remzi.

Upon advice from the Chief Surgeon Mustafa Behçet Efendi at the Ottoman Court, the first Medical Faculty was opened (Şehzadebaşı, İstanbul) in 1827. This was followed by the opening of another Medical Faculty in the district of Galatasaray in İstanbul (1839), to train military medical personnel, with French as the language of instruction. The first bacteriology laboratory was established in 1887 by Dr Zoeros Pasha in the district of Sirkeci in İstanbul and investigations under his direction were conducted from 1887 to 1899. Still operating today, the Foundation Hospital Gureba was established by the son of Sultan Mahmut II in 1843, followed by the opening of the St. George Hospital (Galata, İstanbul) in 1865 to treat cholera victims.

The first parasitology lectures were given by Dr Hüseyin Remzi upon his return from France where he received further training and together with his colleague Hüseyin Hüsni published the first book in microbiology (1888). Both doctors also published later on rashes and its treatment. Bacteriology lectures were first given by Zoeros Pasha and Rifat Muhtar Ahmet in the medical faculties as well as by Hamdi Aziz at the military medical academy. From 1847 onwards all Turkish medical microbiologists began actively working on medicine and public health after their return from overseas. In 1890, Dr Cemil (in the Republican era Dr Cemil Topuzlu), following his return from France, applied the antiseptic techniques of Lister-Alfonse in operations he conducted and Dr Celal Muhtar following his stay in Paris (1889–1892) applied quarantine restrictions during cholera epidemics. He also discovered the causative agent of Trichophyton, which was causing eczema-like infections on the feet, defining the tinea pedis et mannum published in 1892. His discovery resulted in the effective antifungal treatment of the disease on German and French soldiers of WWI.
In Focus

In 1893, during the cholera outbreak in Istanbul Dr Zühtü Nazif and Dr Rafat Hüsammettin who had also returned from France, were able to isolate the causative bacterium from human faecal samples. During the epidemic, upon the request of the Sultan, Pasteur sent Dr Chantemesse to Istanbul, and a second visit by Dr Maurice Nicolle followed. Dr Nicolle then became the director of the Bakteriyoloji-i Osmani, which was the first bacteriology laboratory in Istanbul and conducted investigations with the support of a Turkish colleague, Zühtü Zaim. He provided bacteriology training, both theory and practice for young Turkish Military doctors, and became an important foundational scientist in Turkey for the further advancement of bacteriology by applying modern methods similar to those developed and used at the Pasteur Institute in those days. Military Doctor Refik (in the Republican era Dr Refik Güran) who worked with Dr Maurice Nicolle and colleagues Dr Ziya Seyfullah, Calligrapher Mustafa Rakum and Dr Süleyman Nuri also conducted microbiology courses which were also frequented by veterinary microbiologists. Veterinary microbiologists Adil Mustafa, Osman Nuri, Dr Kimyager Nurettin, Dr Hayim Naim, Dr Rafat Muhtar, Dr Ferit Ibrahim and Dr Ethem worked closely with Dr Nicolle. In particular, Adil Mustafa Şehzadebaşı who worked with Nocard in France at Alfort Veterinary School conducted investigations of importance after 1897 and was involved in the preparation of diphtheria serum. Adil Mustafa Şehzadebaşı and Dr Refik together with Dr Nicolle produced significant research work on cattle plague. Dr Nicolle’s efforts resulted in growth and development of both bacteriology and veterinary microbiology in the then Ottoman Empire including the development of therapeutic sera against diphtheria and plague. After Dr Nicolle’s return to France in 1901 he was replaced by other Pasteurians: Dr Remlinger and Dr Simond.

Again from 1899 onwards, Turkish doctors Dr Rafat (in the Republican era Dr Rafat Muhtar), Dr Refik (in the Republican era Emeritus Professor Dr Refik Güran) and others, following their return from France continued to work in the fields of bacteriology, veterinary microbiology, pharmacology and dentistry (1908–1909). From 1913 onwards, in the laboratory, vaccines against typhoid, dysentery, plague, cholera and meningitis as well as serum development against diphtheria and dysentery were developed and were later used both for soldiers and the public during WWI and the Turkish War of Independence (1919–1923) (see articles by Karakuş and Başıstaoglu and Başıstaoglu and Karakuş in this issue).

Dr Refik (Güran) became the director of the Bacteriology Laboratory following the departure of Dr Simond in 1914. He also became the director of the Faculty of Medicine which had been in existence since 1908. Dr İhsan Sami (in the Republican era Dr İhsan Garan) ve Dr Ziya (in the Republican era Dr Ziya Öktem) were his co-workers who all played significant roles in the advancement of Microbiology in Turkey. Emeritus Professor Dr Refik (Güran), who himself had survived typhus, was instrumental in the development and advancement of bacteriology and its related educational institutions in Turkey that trained significant numbers of Turkish microbiologists. He was also the author of the first book on Bacteriology in 1919, reprinted in 1928. The foundation of today’s Republic of Turkey in 1923 led to higher education reform in 1933 and the Faculty of Medicine moved to its current premises in Istanbul. Many distinguished European scientists were invited to contribute to the Faculty’s teaching and research programmes. Emeritus Professor Dr Hugo Brown became the director of the Institute of Microbiology and Infectious Diseases in the Faculty. His Associate Professors were Dr Zühtü Berke, Dr Vefik Vassaf Aken and Dr Ziya Öktem.

Advancements in the field of microbiology (Golden Age of Microbiology) led by Robert Koch and Louis Pasteur were closely followed in Turkey (then the Ottoman Empire). Tuberculosis studies by Koch led to immediate replication of the studies for disease prevention in Turkey. During Pasteur’s studies on rabies, Ottoman Sultan Abdülhamit II sent 10,000 gold coins to the Pasteur Institute to support their research activities. Pasteur’s talk on rabies and its prevention at the Paris Academy of Medicine was even translated into Turkish and published in 1885. With the request of the Ottoman Government, doctors Huseyin Remzi and Huseyin Husnu, under the leadership of Zoeros Pasha, were sent to Paris to observe the preparation and administration of the rabies vaccine. After a 6 month stay in Paris, they returned in 1887 with two infected rabbits to be used for vaccine development in the first established rabies hospital of Istanbul.

In the Republican era, following Atatürk’s reforms, infectious disease control became part of the holistic public health approach. This approach has been very successful in the eradication and control of many infectious diseases including malaria, smallpox, trachoma and tuberculosis (see Cavuşoğlu article in this issue). Refik Saydam, who was a military doctor during the Balkan wars and WWI and later joined Atatürk’s army in 1919, became the Minister of Public Health in 1920. The distinguished Institute Hizşuşha was established by him in Ankara (1920) to prevent infectious diseases and since then has been one of the key microbiology institutes in Turkey. In 1933, rabies vaccine was produced at Refik Saydam Merkez Hizşuşha Institute in Ankara (now known as the Public Health Institution of Turkey).

One of the prominent scientists in the early years of the Republic was Osman Nuri Eralp (1884–1940) who worked in the fields of bacteriology and virology. His research on tuberculosis, tuberculin, cattle plague, cholera, syphilis, and milk derived infectious diseases were
among many of significance. Rza Ismail Sezginar (1884–1963) was another important bacteriologist with significant contributions in the field of veterinary microbiology, infectious diseases and foodborne disease control. He was instrumental in the establishment of hygienic practices within the Istanbul Abattoir. Ahmet Şefik Kalaylı (1886–1976) was another scientist who reassured the public about the lack of human-cattle cross-infection and prepared a serum against the infectious agent of cattle plague.

The Republican era produced significant numbers of eminent Turkish microbiologists and since 1929 Bacteriology specialization is offered in Turkish academic institutions. Turkish Microbiology Institutions are now capable and equipped to produce world class training and research. Since the 1980s, molecular advancements have been adapted in Turkey for diagnostic purposes including reference laboratories. Every novel approach is immediately adapted and applied in Turkey in all areas of microbiology. Currently, there is an influx of overseas scientists who pursue training in Turkey in the field of microbiology.

**Turkish Society for Microbiology (Türk Mikrobiyoloji Cemiyeti (TMC))**
(http://www.tmc-online.org/)

Control of infectious diseases dating back to the early years of the 20th Century has been an important field of research in Turkey and gaining further momentum in the early years of the Republic of Turkey founded in 1923. The Turkish Society for Microbiology (TMC), established in 1931, is one of the oldest societies of Turkey. It has over 2000 members today and since its establishment has played a significant role in the advancement of microbiology in Turkey. TMC is an active member of many other international organizations (listed below) since 1980s and is a frequent host for international conferences, symposia and workshops including the IUMS-2008.


**Biography**

**Prof. Dr Nezahat Gürler** graduated from the İstanbul University in 1972 majoring in Biological Sciences. She received further training in Clinical Microbiology becoming a resident specialist at the İstanbul University, Medical Faculty, Department of Clinical Microbiology. From 1980 to 1982 she was in Germany (Deutsche Akademischer Austauschdienst Fellowship) and conducted research at Göttingen, George August University, Microbiologie Institut, and Würzburg Medical Faculty, Department of Hygiene and Microbiology. After her return to Turkey, she received her PhD (1986) and became a full professor in 1995 in the same medical faculty. Her main research interests are Clinical bacteriology, anaerobic infections, paediatric infections, paediatric febrile neutropenia, antibiotic resistance, serotyping of Streptococcus pneumonia. She is member of the Society of Antimicrobial and Chemotherapy, Clinical Microbiology and Infectious Disease Society, AIDS Society, Paediatric Infections Society, Clinical Microbiological Society. She is currently the President of the Turkish Infectious Diseases Foundation as well as the President of the Turkish Society for Microbiology. She is also a member of the European Society of Clinical Microbiology and Infectious Diseases (ESCMID).