

## OVERVIEW

# Tuberculosis in Genoa: the contribution of Edoardo Maragliano (1849-1940) and the Medical School of the University of Genoa

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## Keywords

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## Summary

*Between nineteenth and twentieth centuries, medicine knew the beginning of an incessant development: the birth of new medical specialties (radiology, for instance), the introduction of new devices in medical and surgical wards, and the discovery of bacteria represented important milestones in that first historical period. The Medical School of the University of Genoa, head by Edoardo Maragliano, full professor of internal medicine, took on a relevant role in the battle against tuberculosis, through the experimental demonstration of the existence of an immune response against M.*

*tuberculosis and the production of an inactivated vaccine. During his career, Maragliano surrounded himself with graduate assistants and students, who would later become full professors of internal medicine in prestigious universities and excellent physicians. In order to allow the correct diagnosis and educate his young colleagues, Maragliano endowed his clinic laboratories of haematology, biochemistry, microbiology and radiology. Under his supervision, the assistants of the Genoa University Medical Clinic issued over two thousand scientific publications.*

In the second half of the Nineteenth century, medicine knew a new era: the development of physiology, biochemistry, microbiology and cellular pathology defined diseases through the clinical observation and the scientific experimentations performed in the academic laboratories. The character of the scientist firstly appeared in the Central Europe. Another phenomenon characterized the development of a modern medicine: the integration of new medical devices was due to the intensification of scientific research in diagnosis and therapy. All things considered permitted the upgrade of specialization thanks also to other factors, such as demographic increase of population, mainly in industrial cities where the request of health enhanced enormously [1, 2].

Indeed, infectious diseases were the principal cause of morbidity and mortality within and among population. At the end of the Nineteenth century, around the world, twenty-five per cent of bodies showed signs of tuberculosis at the autoptic table, and in urban populations (in particular, industrial settlements) fourteen per cent of death were caused by *M. tuberculosis*. The mortality trend was bimodal, with peaks between the ages of one to twentyfive. The mortality percentage was higher in women than in men. Contributing factors were also cold seasons and poor hygienic conditions [3]. In this arduous scenario, the announcement of the discovery of *M. tuberculosis* on 25<sup>th</sup> March 1882 by Robert Koch (1843-1910), drove the scientific community to work on the therapies. Koch himself elaborated a combination of proteins obtained from tubercular bacteria as a therapy

for the disease [4]. Other methods of immunization were developed until 1890; nevertheless because of the inefficacy of tuberculin and the observation that not all people were affected by tubercular disease, a negativistic attitude arose towards the possibility of understanding tuberculosis pathogenesis and establishing any method of immunity activation [3, 5].

In Genoa, the Medical School of the University of Genoa, driven by Edoardo Maragliano (1849-1940; Fig. 1), played a central role in the definition of the pathophysiology and prevention of tuberculosis. Maragliano was full professor of internal medicine at the University of Genoa from 1881 until his retirement, in 1924 [6]. During this period, Maragliano and his collaborators were able to demonstrate, for the first time, the existence of innate and specific immunity against *M. tuberculosis* [7]. In 1895, Maragliano found a “tubercular antitoxin” in serum from infected animals: this discovery led Maragliano and his collaborators to use animal serum for serotherapy in humans. Then, they successfully used bacterial derivatives to induce components of innate immune response in animals and humans. Moreover, they observed that better were nutritional and environmental conditions of patients, better was the response of patients to serotherapy. Maragliano, indeed, was the first clinician who understood the importance of the influence of environmental conditions, not only from a clinical point of view, but also from a social one, in order to give a medical and a social support to patients and their families. Even if scientific community was skeptical, in particular because of the use of inacti-

Fig. 1. Edoardo Maragliano.



of Maragliano's, looked after the first use of radioscopia in the Medical Clinic for one year, because of his premature death. In 1897, Marco Sciallero, another associate of Maragliano's, became the chief of the radiologic lab, until his retirement for radiation injuries. Maragliano charged his son, Vittorio (1878-1944), with the radiologic lab: in 1913, Vittorio became full professor of radiology [3, 8, 9]. Also, his brother, Dario, began to practice medicine in the Medical Clinic directed by his father, who entrusted him a surgery service within the Clinic; he became full professor of surgery at the University of Genoa [10]. In every phase of his studies, Maragliano relied on his collaborators, who became full professors of medicine and directors of medical clinics: about them, Giovan Battista Queirolo (1856-1930) in Pisa; Livierato Panagino (1860-1936) e Spiro Livierato (1881-1962) in Genoa and Athens, respectively; Pietro Castellino (1864-1933) in Naples; Rocco Jemma (1866-1949; figure 3), pediatrician, in Naples; Luigi Devoto (1864-1936) in Milan; Luigi Lucatello (1863-1926; figure 4) in Padua; Amerigo Barlocco (1880-1926) in Modena [3, 11, 12].

Among his collaborators who became professors in medicine, Luigi Devoto had a relevant role: under the influence of Maragliano's clinical precepts and social ideas, he began to study the tuberculosis diffusion among nurses and led undergraduates in the poorest neighbourhoods of Genoa. Devoto himself recognized the role of

vated vaccine, Maragliano defended the need to prevent tuberculosis with any type of vaccine, even inactivated or attenuated one [5, 6].

Maragliano believed that: "The first duty of a physician is to lead young colleagues to a correct diagnosis, a firm prognosis and a useful therapy, applying all sciences achievements at the patient bedside" [8]. For these reasons, though he always subordinated laboratory examination to clinical observation, he provided his laboratories of equipment for serology, microbiology and, above all, radiology, in connection with the clinic in order to deal the different problems connected with medicine. Vincenzo Sciolla (Fig. 2), an associate

Fig. 2. Vincenzo Sciolla (on the left).



Fig. 3. Rocco Jemma.



his master in his interest about workers' pathology. After a brilliant academic career, with Maragliano's aid, Devoto founded in Milan the first medical clinic in the world, the so-called "Clinica del Lavoro", whose purposes were the diagnosis, the therapy and the prevention of occupational diseases [13]. Maragliano often remembered his collaborators who prematurely died. Besides Vincenzo Sciolla, Dr. Gaetano Salvioli (1852-1888) also represented a great bereavement for Maragliano. In 1883, Gaetano Salvioli discovered *S. pneumoniae*, one year before Albert Fraenkel. Gaetano Salvioli died five years later because of typhus contracted at the dissection room [14]. According to Maragliano, "affections born in school, always refreshed by working together, create relationships which are not lower than ones of blood and give to a father the tears and anguishes when he sees his children abducted by death, without the hope they were gathered around the bedside of their father" [11]. All his collaborators considered him a severe, but right and equanimous master, demonstrating himself a strong dedication to work, with renunciations and sacrifices. In public competitions, Maragliano aided his collaborators to achieve prestigious academic positions or direction of important medical clinics in Italy, such as Luigi Lucatello, who became Dean of the University of Padua [6, 7, 15].

Although Maragliano's contribution to the fight against tuberculosis was criticized and forgotten by his con-

temporaries, all his collaborators contributed to spread in the universities and in the hospitals the knowledge he created, based on clinical observation and research in laboratory. His zeal and fervour in the fight against tuberculosis also had relevant social consequences, like the institution of the first *Sanatorium* in Italy at the end of the nineteenth century [11].

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## Authors' contributions

The Authors conceived the study, drafted and revised the manuscript, read and approved the last version.

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Fig. 3. Rocco Jemma.



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