

## Richard Pfeiffer 1858–1945

Richard Pfeiffer, one of the most remarkable microbiologists at the turn of the last century, deserves to be commemorated on his 150th birthday. His work is of lasting importance to bacteriologists, immunologists, and infectious disease specialists alike.

Pfeiffer was born on 27 March, 1858 in Zduny, a small town of 3,300 inhabitants in the then Prussian province of Posen, at the border to Silesia.<sup>1</sup> His father, the pastor of the local Protestant church, soon moved with his family to Schweidnitz (now Świdnica) where Richard went to school. He then studied medicine at the *Pepinière* in Berlin (the later Kaiser Wilhelm-Akademie) and eventually became a military physician. His plans changed after he had his first encounter with bacteriology in Wiesbaden where he worked during the afternoons in the laboratory of August Pfeiffer, the discoverer of rodent pseudotuberculosis (no kin to Richard). In 1887, he was transferred to the Institute of Hygiene under Robert Koch at the University of Berlin where his colleagues included such later luminaries as Emil von Behring, Erwin von Esmarch, Carl Fraenkel, Wilhelm Kolle, Friedrich Loeffler, Bernhard Nocht, Bernhard Prausnitz, and August von Wassermann. On Koch's suggestion, he took up photography and, in 1889, published, together with Fraenkel, an atlas of bacteriology. In 1891, he moved with Koch to the Institute for Infectious Diseases where he became a subdirector for research and a Privatdozent at the University. In 1894, he was promoted to Professor and in 1899 became Director of the Institute of Hygiene at the University of Königsberg (now Kaliningrad). In 1897, he had traveled to India for the German Committee on Plague; and a year later, he had accompanied Koch on his trip to Italy to study malaria



Richard Pfeiffer (from [1]).

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Pfeiffer's earliest discovery was that of the "agent of influenza", *Haemophilus influenzae*, which he described in its morphology in 1890 and in culture in 1892. Like most of his followers, he assigned a causative role to this bacterium, a view refuted only in 1933 by Smith, Andrewes, and Laidlaw. Next came the description of the developmental cycle of "*Coccidium oviforme*" (now *Eimeria stiedae*), the agent of rabbit coccidiosis. Following an earlier interest in vibrios, he observed that there was no cross-protection between two species of this genus. The pathbreaking discovery, however, came in 1893 when he found that cholera vibrios, injected into the peritoneal cavity of guinea pigs previously immunized against cholera, were quickly destroyed, a process involving swelling, loss of motility, and finally "bacteriolysis". Nonimmunized animals were killed by the injection. This experiment still bears his name; it was the first one in which a reaction between bacteria, antibody and complement was observed. Although the theory behind the observation had to wait for an explanation, he was able to separate this phenomenon from that of nonspecific resistance against vibrios elicited by nonspecific substances. He also postulated the existence of endotoxins in vibrios as opposed to "true toxins" (i.e., exotoxins). On this basis, he recommended vaccination

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<sup>1</sup> In 1858, its population was 70% German and 30% Polish. While the number of inhabitants has remained at ca. 4,500, the entire population since 1945 has been Polish. The Protestant church is still standing but is not used for services since there are no more Protestants in Zduny. I have been assured that Pfeiffer will get an appropriate place in the local museum.

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against cholera and typhoid with killed bacterial suspensions.

Finally, in 1896 he first described and later published with Ghon the “*Micrococcus catarrhalis*”, now known as *Moraxella catarrhalis* (formerly *Branhamella catarrhalis*), and thus opened a new chapter in the pathogenesis of respiratory infections although its practical application had to wait for another 70 years. Other areas of Pfeiffer’s interest were the localization of antibody production (1898), the effect of radiation upon bacteria (1903), and the anticomplementary properties of human sera (1903–1906).

Among his disciples were his successor in Breslau, Carl Prausnitz (1876–1963) who had to emigrate to

England, Ernst Friedberger (1875–1932), later professor in Greifswald, and Georg Bessau (1884–1944), who changed specialties and became director of the pediatric departments in Leipzig and in Berlin. They, as all of us, built on Pfeiffer’s discoveries.

*Alexander von Graevenitz*

## References

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