

# Otto Meyerhof Biography

## Otto Meyerhof

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# Biography

The son of a merchant, Meyerhof received his medical degree from the University of Heidelberg in 1909. Although he was originally attracted to psychology, a meeting with Otto Warburg aroused his interest in cellular physiology and, in 1913, when he joined the faculty of Kiel, he began what was to be a lifelong investigation into the biochemistry of muscle.

At the time, it was already common knowledge that muscle contained glycogen and that--as Frederick Gowland Hopkins and his coworkers had shown a decade earlier--a working muscle accumulates lactic acid. With these facts as starting points, Meyerhof conducted a series of experiments and, in 1919, demonstrated how the glycogen-lactic acid cycle works. In phase one, when the muscle begins to contract, glycogen is converted to lactic acid. Oxygen is not consumed, but an oxygen debt is built up. In phase two, when the muscle rests after work, molecular oxygen is then consumed to pay off the "debt" and to oxidize about one-fifth of the lactic acid. The energy yielded from the oxidation process makes it possible for the remaining four-fifths of lactic acid to be reconverted to glycogen.

Meyerhof's discovery elaborated the observation of Archibald Vivian Hill, in 1913, that heat was emitted and oxygen consumed only during a muscle's contraction and its recovery. Hill and Meyerhof shared the 1922 Nobel Prize in physiology or medicine for their work on the biochemistry of muscular action. Meyerhof's work also laid the groundwork for Carl and Gerty Cori's more detailed explanation, a few years later, of the steps by which glycogen is converted to lactic acid (a process thereafter often known as the Embden-Meyerhof pathway, after Meyerhof and a coworker)

Like many other Jewish scientists, Meyerhof left Germany in 1938 after the Nazis rose to power. Unfortunately, the biochemist settled in Paris, France, and was therefore forced to flee a second time when the Germans invaded France in 1940. Meyerhof then came to the United States and became a professor of physiological chemistry at the University of Pennsylvania, in Philadelphia, remaining there until his death.