



Image from: [Hideki Yukawa in The Cambridge Dictionary of Scientists](#)

Summary Article: **Yukawa, Hideki**

From *The Hutchinson Unabridged Encyclopedia with Atlas and Weather Guide*

Japanese physicist. He was awarded the Nobel Prize for Physics in 1949 for his discovery in 1935 of the strong nuclear force that binds protons and neutrons together in the atomic nucleus, and his prediction of the existence of the subatomic particle called the meson.

Yukawa was born and educated in Kyoto and spent his career at Kyoto University, becoming professor in 1939 and director of the university's newly created Research Institute for Fundamental Physics from 1953. Yukawa's theory of nuclear forces postulated the existence of a nuclear 'exchange force' that counteracted the mutual repulsion of the protons and therefore held the nucleus together. He predicted that this exchange force would involve the transfer of a particle (the existence of which was then unknown), and calculated the range of the force and the mass of the hypothetical particle, which would be radioactive, with an extremely short half-life. The muon, discovered in 1936, was thought to be this particle, and was at first called the mu-meson. The pion, or pi-meson, discovered in 1947, was subsequently identified with Yukawa's particle. In 1936 Yukawa predicted that a nucleus could absorb one of the innermost orbiting electrons and that this would be equivalent to emitting a positron. These innermost electrons belong to the K electron shell, and this process of electron absorption by the nucleus is known as K capture.

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