US surgeon who pioneered several important neurosurgical techniques, made famous studies of the pituitary gland, and first described the chronic wasting disease now known as Cushing's syndrome (or disease).

Cushing was born on 8 April 1869 in Cleveland, Ohio, the fourth child in a family of physicians. He studied medicine at Yale and at the Harvard Medical School, graduating from the latter in 1895. He then spent about four years in practical training at the Massachusetts General Hospital, Boston, and Johns Hopkins Hospital, Baltimore, where he worked under William Halsted (1852-1922), a great innovator of surgical techniques. At about the turn of the century Cushing studied in Europe - under Emil Kocher (1841-1917) at Berne University and, briefly, under the famous neurophysiologist Charles Sherrington in England - after which he returned to the department of surgery at the Johns Hopkins University. From 1912-32 Cushing was professor of surgery at the Harvard Medical School and surgeon-in-chief at the Peter Bent Brigham Hospital in Boston. During this period he served in the Army Medical Corps in World War I and in 1918 was appointed senior consultant in neurological surgery to the American Expeditionary Force. In 1933 he became Sterling Professor of Neurology at Yale University, a post he held until his retirement in 1937. Cushing died on 7 October 1939 in New Haven, Connecticut. He bequeathed his large collection of books on the history of medicine and science to the Yale Medical Library.

Although Cushing is probably best known for his work on Cushing's syndrome, his major contribution was in the field of neurosurgery, which, until he introduced his pioneering techniques, was seldom successful. As a result of experimenting on the effect of artificially increasing intracranial pressure in animals, Cushing developed new methods of controlling blood pressure and bleeding during surgery on human beings. Moreover, his whole approach to medicine was characterized by painstaking carefulness: before operating he gave each of his patients an extremely thorough physical examination and took a detailed medical history. The operations themselves, which usually lasted for many hours, were performed with meticulous care and, over the years, were increasingly successful.

In addition to developing neurosurgical techniques, Cushing wrote a description - still valid today - of the stages in the development of different types of intracranial tumours, classified such tumours, and published (in 1917) a definitive account of acoustic nerve tumours.

In 1908 Cushing began studying the pituitary gland and, after experimenting on animals, discovered a way of gaining access to this gland, which, being situated at the base of the brain and behind the nasal sinuses, is extremely difficult to approach surgically. As a result of this discovery it became possible to treat cases of blindness caused by tumours pressing on the optic nerve in the region of the pituitary gland. Cushing also investigated the effects of abnormal activity of the pituitary gland, establishing that hypopituitarism (undersecretion of pituitary hormones) in a growing person can cause a type of dwarfism and that hyperpituitarism ( oversecretion of pituitary hormones) in fully grown adults can cause acromegaly (a form of gigantism characterized by excessive growth of the bones of the hands, feet, and face). As a result of his extensive studies of the pituitary gland, Cushing discovered the condition now

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called Cushing's syndrome, a rare chronic wasting disease with symptoms that include obesity of the face and trunk, combined with thin arms and legs; wasting of the muscles; atrophy of the skin, with the appearance of red lines on the skin; weakness; and accumulation of body fluids. Cushing attributed this disorder to a tumour of the basophilic cells of the anterior pituitary gland, but although this is one of the causes, the disorder is now known to be caused by any of several conditions that increase the secretion of glucocorticoids (particularly cortisol) by the adrenal glands, such as a tumour of the adrenal cortex itself.

Cushing was also interested in the history of medicine and in 1925 wrote a biography of William Osler (1849-1920) - one of the leading physicians of the time - which won him a Pulitzer Prize.