Joseph E. Murray

(1919–2012)

First researcher to successfully transplant a human organ from a living donor.

Joseph E. Murray performed the first successful human organ transplant from a living donor in December 1954. This feat, along with other transplants and his research on the use of irradiation and then drugs to prevent the rejection of introduced organs, ushered in a new era in medicine and won him a share of a Nobel prize in 1990.

Murray died on 26 November at the Brigham and Women's Hospital in Boston, Massachusetts. He was born in 1919 in Milford, also in Massachusetts. After leaving high school, he went to the College of the Holy Cross in Worcester, where he received a bachelor's degree in 1940, and then on to Harvard Medical School in Boston.

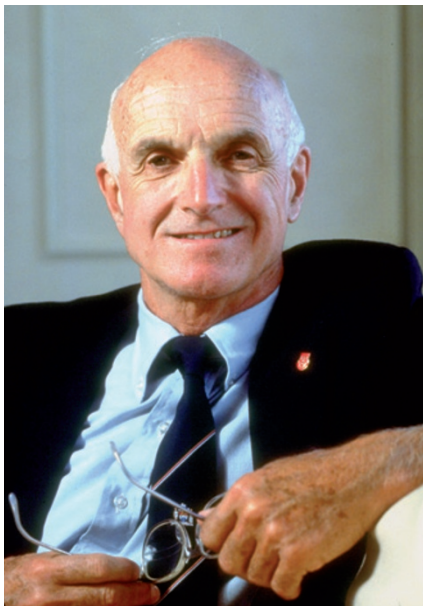
He joined the army after a brief internship at the Peter Bent Brigham hospital (later called the Brigham and Women's Hospital), and was sent to Valley Forge Hospital in Pennsylvania. At the time, Valley Forge was dedicated to the care of injured soldiers returning from the Second World War.

While at Valley Forge, Murray was involved in the treatment of burn victims. This often involved grafting skin — usually from the patients themselves, but sometimes from dead donors. Murray returned to Brigham to complete his general surgical residency after being discharged from the army in 1947. In 1954, he was appointed to the hospital staff as a general and plastic surgeon.

In the late 1940s and early 1950s, Brigham was a hive of activity in kidney transplantation. Two surgeons there, David Hume and Charles Hufnagel, had been transplanting kidneys in dogs. Hume had done several transplants using kidneys from deceased donors, and one of the introduced kidneys had survived for six months. Murray had been fascinated with transplantation since his work at Valley Forge, and when Hume was drafted during the Korean War, Murray took over the surgical laboratories at Brigham.

While Murray was exploring ways to suppress people's immune systems using treatments that involved irradiating their entire bodies, a 23-year-old patient called Richard Herrick was admitted to Brigham for dialysis, under the care of John Merrill. Richard was dying from chronic nephritis, a kidney disease. After Merrill learned that Richard had a twin, he, Murray and the hospital's chief of urology, Hartwell Harrison, discussed the possibility (and ethics) of transplanting a kidney from Richard's healthy brother, Ronald.

Birth records confirmed that the twins had once been connected to the same placenta, and a skin graft from Ronald to Richard proved successful. Meanwhile, the Boston police department confirmed that the twins' fingerprints were identical.



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On 23 December 1954, Harrison and his team removed a kidney from Ronald. Murray then implanted it into Richard. The kidney functioned immediately. After Richard left the hospital, he married his nurse, fathered two children and lived in good health for eight years before dying from a recurrence of his original renal disease in the transplanted kidney.

In the years that followed, Murray did more transplants in identical twins. He hoped to establish a way to transfer organs between non-identical individuals and also did some kidney transplants using deceased donors, irradiating the patients' bodies to suppress their immune system. With one exception, these early transplants failed, mainly because the irradiation slowed or stopped the bone marrow's production of white blood cells, which in turn led to infection.

Then in 1959, Robert Schwartz and William Dameshek, haematologists at the New England Medical Center (now Tufts Medical Center) in Boston, showed that an anticancer drug called 6-mercaptopurine (6-MP), produced by Gertrude Elion and George Hitchings at the Wellcome Research Laboratories in New York, could prevent rabbits from producing antibodies in response to a foreign protein. The drug also prolonged the survival of foreign skin grafts between rabbits. Soon after this, Roy Calne, a young surgical trainee at London's Royal Free Hospital, and Charles Zukoski and Hume, now chief of surgery at the Medical College of Virginia in Richmond, showed that 6-MP could prolong the survival of kidney transplants in dogs.

In 1960, just as Murray was planning to switch the focus of his lab work from irradiation to 6-MP, Calne was awarded a Harkness Scholarship to join Murray's laboratory at Brigham. By then, Elion and Hitchings had produced a derivative of 6-MP, called azathioprine. They gave some to Calne, who had visited their lab on his way to Boston.

Using azathioprine, Murray, Calne and other research fellows were able to dramatically improve the success of kidney transplants in dogs, and the field of organ transplantation exploded. The drug was first used in human kidney transplantation in 1963.

Murray retired from the transplant programme in 1971. He remained chief of plastic surgery at the Brigham and Women's hospital until 1986, and was also chief of plastic surgery at the Boston Children's Hospital from 1972 to 1985. He corrected various craniofacial deformities in children, with some remarkably successful outcomes.

In 1990, Murray was awarded the Nobel Prize in Physiology or Medicine (along with Donnall Thomas) for his transplantation work. Among his numerous honours and awards, he was elected a member of the US National Academy of Sciences in 1993 and was a regent of the American College of Surgeons from 1970 to 1979.

Joseph married his wife Bobby in 1945, and they had six children. He was a true gentleman, and liked all outdoor activities. He was a very good athlete and a seriously good tennis player. ■

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