

First Successful Genetically-Modified Pig-to-Human Kidney Transplant Performed in the U.S.

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In March 2024, Richard Slayman, a 62-year-old man, made medical history by undergoing the world's first genetically modified pig-to-human kidney transplant at Massachusetts General Hospital (MGH). Through this groundbreaking procedure, Slayman shared hope not only for his personal journey but also for the countless others awaiting life-saving transplants.

Mr. Slayman, who had long-term Type 2 diabetes and hypertension, underwent dialysis for seven years before receiving a kidney transplant from a deceased donor in December 2018 at MGH. After the transplanted kidney began to fail, Slayman started dialysis again in May 2023. He experienced repeated dialysis vascular access issues after starting dialysis, which necessitated repeated hospital trips and greatly affected his quality of life.

Dr. Tatsuo Kawai, Director of the Legorreta Center for Clinical Transplant Tolerance at MGH, led the groundbreaking transplant procedure. The kidney used in the transplant was sourced from a genetically engineered pig, which had three genes associated with potential organ rejection removed. Furthermore, seven human genes were introduced to enhance compatibility with the recipient. Additionally, precautions were

taken to deactivate retroviruses carried by pigs that could potentially infect humans. Remarkably, just two weeks after the procedure, Mr. Slayman's recovery progress was significant enough for him to be discharged from the hospital.

In September 2021, medical professionals at NYU Langone Health in New York conducted a kidney transplant from a genetically modified pig into a brain-dead individual in whom the transplanted kidney showed normal functioning for an unprecedented duration of thirty-two days. Shortly after, researchers from the University of Alabama in Birmingham reported achieving similar results through a comparable process. The surgical team at the University of Maryland attempted twice to perform heart transplants using genetically engineered pig hearts.

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To cite : Suriyamoorthi S, Kumar P, Shroff S. In the news. First Successful Genetically-Modified Pig-to-Human Kidney Transplant Performed in the U.S. Indian Transplant Newsletter. 2024 Jan-Mar; 23(1):p2-3. 10.64384/ITN.2024.004

