

Cryopreserved Rat Kidney Transplant Performed Successfully by University of Minnesota Researchers

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Engineers and medical researchers at the University of Minnesota have demonstrated in a ground-breaking new study how rat kidneys can be cryogenically stored for up to 100 days. They rewarmed it using innovative nanowarming technique, cleared of cryoprotective fluids and nanoparticles and subsequently transplant them into rats, resulting in the restoration of full kidney function. The transplanted kidneys in five rats regained complete renal function within 30 days without the need for additional interventions.

A significant proportion of donated kidneys for transplantation each year gets wasted, primarily because these organs cannot be preserved with ice for more than 48 hours and subsequently failing to reach recipients within the required timeframe. Methods such as vitrification, which enable long-term cryopreservation, offer the advantage of allowing more time to find the optimal match between donor organs and recipients. Nevertheless, a significant challenge has been the difficulty in rewarming these cryopreserved organs without incurring substantial damage.

The specialized nanowarming process, pioneered by the University of Minnesota team, warms the organ rapidly and uniformly and not just at its surface.

“All of our research over more than a decade and that of our colleagues in the field has shown that this process should work, then that it could work, but now we've shown that it actually does work”, said the study's co-senior author John Bischof, a Mechanical Engineering Professor and Director of the University of Minnesota Institute for Engineering in Medicine.

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