
Dendritic Cell Therapy Improves Kidney Transplant Survival in Preclinical Model

A single systemic dose of special immune cells prevented rejection for almost four months in a preclinical animal model of kidney transplantation, according to experts at the University of Pittsburgh School of Medicine. Their findings, now available in the online version of the American Journal of Transplantation, could lay the foundation for eventual human trials of the technique.

Organ transplantation has saved many lives, but at the cost of sometimes lifelong requirements for powerful immunosuppressive medication that can have serious side effects, said senior investigator Angus Thomson, Ph.D., D.Sc., distinguished professor of surgery and of immunology, Pitt School of Medicine. Scientists have long sought ways to encourage the organ recipient's immune system to accept or tolerate the donor organ to reduce the need for drugs to stave off rejection.

"This study shows it is possible to prepare the patient's immune system for a donor kidney by administering specially treated immune cells from the donor in advance of the transplant surgery," Dr. Thomson said. "This could be very helpful in the context of planned kidney donations from living relatives, and could one day be adapted to transplantation from deceased donors."

For the project, the research team generated immune cells called dendritic cells (DCs) from the blood of rhesus macaques that would later provide a kidney to recipient monkeys. Dendritic cells are known to be key regulators of the immune system by showing antigens to T-cells to either activate them against the foreign protein or to suppress the T-cell response. The researchers treated the donor DCs in the lab to prevent them from fully maturing and having the capacity to trigger an immune reaction against foreign proteins.

One week before having a kidney transplant, recipient monkeys received a single infusion of treated DCs obtained from their respective donor animals. Another group of monkeys was transplanted without receiving the cells, but both groups were given the same regimen of immunosuppression drugs, a modified protocol for experimental purposes that eventually results in donor organ rejection. The researchers found that the donor kidney was rejected in about 40 days among animals that got only the drugs, but survived for about 113 days in the group that had a prior infusion of treated DCs.

The modified donor DCs sent signals to the recipient immune system to stay quiet and not launch an attack against the donor organ, explained lead author Mohamed Ezzelerab, M.D., research assistant professor, Department of Surgery, Pitt School of Medicine.

"The results indicate that we achieved immune system regulation without side effects of the DCs, but better yet, the monkeys were healthier from a clinical perspective," he said. "They maintained a better weight, had less protein in the urine and fewer signs of kidney damage than the other group. Ultimately, all these factors played a role in prolonging organ survival in the group that received DC therapy."

Co-authors of the paper include other researchers from the Thomas E. Starzl Transplantation Institute, and the departments of Surgery, Immunology, Medicine and Pathology, Pitt School of Medicine.

Source: [University of Pittsburgh School of Medicine](#)

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