Blood samples used to investigate adaptive repair mechanisms of transplanted kidneys

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Researchers at Wake Forest Baptist Medical Center have shown that gene expression analysis of blood samples taken from the recipients of transplanted kidneys can be used to better understand the mechanisms that promote repair and regeneration of the transplanted organs.

The pilot study, published ahead of print by the journal *Annals of Surgery*, marks the first demonstration that blood can be used for this purpose."We want to know exactly what happens in the body during the first 30 days following kidney transplantation," said the study's lead author, Giuseppe Orlando, M.D., Ph.D., assistant professor of transplant surgery at Wake Forest Baptist. "Kidney biopsies have traditionally been used to gain insights into post-transplant physiology, but the invasive nature of acquiring biopsy tissue prevents multi-time point investigation of the molecular events that occur in the initial post-transplant period. This study shows that profiling gene expression in blood samples offers a viable alternative."

The researchers used blood taken over 30 days in routine draws from 15 kidney transplant recipients, five of whom received an organ from a living donor and 10 with organs from deceased donors. Gene expression analysis—which examines the amounts of RNA available to be transcribed into proteins—revealed that in all 15 subjects the most robust gene expression changes occurred in the first day following transplantation and subsided by the end of the 30-day period.

However, while the over expression of most genes fell off markedly

after the first day in the living-donor group, the expression of a large number of genes remained elevated among recipients of deceased donor kidneys. Comparison between living donors and non-living donors groups helped to identify 11 genes that may be key players in kidney repair and regeneration after damage.

"Transplanted kidneys from deceased donors don't always work right away, which means that recipients may still need dialysis or other treatment after the transplant," Orlando said. "If we will be able to identify the 'magic stick' that orchestrates the repair and regeneration process in the kidney, perhaps we can find a way to boost it or speed it up.

"In the future, we hope this information will help us treat other conditions characterized by impairment of the renal function, as well as help transplanted kidneys function as soon as possible."

Further studies that involve a larger number of subjects, more blood-collection points and additional data analysis will be needed to validate the findings of the pilot study, Orlando said.

Provided by Wake Forest University Baptist Medical Center