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Donor-derived Cell-free DNA in Renal Transplantation: Current challenges and Prospects for Future Development

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Abstract

Despite advances in transplant immunosuppression, long-term renal allograft outcomes remain suboptimal because of the occurrence of rejection, recurrent disease, and interstitial fibrosis with tubular atrophy following kidney transplantation. This is largely due to limitations in our understanding of allogeneic processes coupled with inadequate post-kidney transplant surveillance strategies. The concept of donor-derived cell-free DNA as a signal of allograft stress has therefore been rapidly adopted as a noninvasive monitoring tool. Refining it for effective clinical use, however, remains an ongoing effort. Furthermore, its potential to unravel new insights in alloimmunity through novel molecular techniques is yet to be realized. This presentation summarizes current knowledge and active endeavors to optimize cell-free DNA-based diagnostic techniques for clinical use in kidney transplantation. In addition, the integration of DNA methylation and microRNA may unveil new epigenetic signatures of allograft health and is also discussed. Directing research initiatives toward these aspirations will not only improve diagnostic precision but may foster new paradigms in transplant immunobiology.

Biography

Rohan S. Paul, MD is a transplant nephrologist and an Assistant Professor of Medicine in the Division of Kidney Diseases and Hypertension.Dr. Paul received his Medical Degree from the University of Western Australia. He has undertaken residencies through Sir Charles Gairdner Hospital (UWA) in Perth, Australia and Kaiser Foundation Hospital in San Francisco, CA. Upon finishing Residency, he completed a Fellowship in Patient Safety and served as Clinical Chief Resident at KFH. Subsequently, he did a General Nephrology Fellowship at University of Pittsburgh (UPMC) and a Transplant Nephrology Fellowship at University of California, San Francisco (UCSF). During the course of his training he was named Intern of the Year, and was recipient of the Ray Hively Award (KFH) and the Frank Bruns Teaching Award (UPMC). He is board certified in Internal Medicine, Nephrology and Patient Safety.