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November 09-10, 2018 | Atlanta, USA

Lymphotoxin-beta receptor angiogenic signaling is crucial for bio-engineering a kidney in lymphoid organs

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The need for alternative therapies to replace dialysis and transplantation for renal failure is imperative. However, despite some promising research developments, rebuilding a kidney is still a long way from clinical application. Vascularization is one of the greatest challenges that tissue engineering faces in order to achieve functional kidney substitutes. In our lab, we have pioneered an in vivo vascularized tissue-engineering model, in which target cells/tissues are implanted into a mouse lymph node (LN). Upon transplantation into the LN, fragments of mouse and human embryonic kidneys acquire markers of mature renal structures, have excretory, homeostatic, and endocrine functions. The LN also acts as an innovative bioreactor to organize kidney organoids into vascularized kidney elements. Here, we identified the lymphotoxin-beta receptor (LT β R) as a new pathway that the lymphoid stromal microenvironment utilizes to enhance angiogenesis of the transplanted tissues. These findings will guide our future translational efforts to engineer renal functions.

Biography

Maria Giovanna Francipane has completed her PhD from the University of Palermo, Palermo, Italy, and postdoctoral studies from the University of Pittsburgh School of Medicine, Pittsburgh, PA, USA. She is a Research Assistant Professor in the Department of Pathology, University of Pittsburgh School of Medicine, and an affiliated faculty member of the McGowan Institute for Regenerative Medicine in Pittsburgh. She also holds a position as Principal Investigator at Fondazione Ri.MED in Palermo. She has broad expertise in the fields of cancer and regenerative medicine, and extensive technical skills, as evidenced by more than a dozen first author publications in reputed journals.

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