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NIH Award from the National Institute on Aging

Principal investigator: Karen A. Lapidos, biomedical engineering
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- **Project**: Endothelial Progenitor Cells in Diabetes and Renal Failure
- **Start Date**: May 1, 2009
- **Total Award Amount**: $137,250

**How the results of this project will benefit society:**
Current pharmacologic and surgical treatments have limited potential for improving the quality of life for patients in need of small diameter blood vessel replacements, repair of damaged blood vessels or heart, or the formation of new blood vessels. In contrast, the use of endothelial progenitor cells (EPCs) isolated from blood may significantly improve the clinical outcome of these patients by providing a living component of native blood vessels. In the current investigation, EPCs from patients with diabetes and kidney failure will be examined to determine their suitability for such cell-based therapies.

**How this project will work:**
To determine the suitability of autologous EPC-based therapies for diabetic, ESRD patients, the vascular functions of EPCs from patients and age-matched controls will be investigated. Peripheral blood will be obtained from human volunteers and will be cultured in vitro to obtain endothelial cells (pbECs). Flow cytometry and immunofluorescence will be used to confirm the pbEC phenotype. To assess the vascular functionality of pbECs, the anti-thrombogenic, anticoagulant, and inflammatory activities of pbECs derived from patient and control groups will be quantified and compared on a novel biomaterial. Finally, the retention of pbECs seeded onto a novel bioengineered graft will be compared between patient and control groups. These experiments are designed to provide preliminary data to determine the suitability of autologous pbECs in the development of a novel, bioengineered arteriovenous graft for hemodialysis access.

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