

James & Esther King Biomedical Research Program

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Research
Miami VA Healthcare System

2010 Program
Technology Transfer Feasibility
(1-year project)

Project Title: Activation of Precursor Cells for Cell Therapy

Project Summary: Cell-based therapies have been used for treatment of different smoking-related diseases. Age and other cardiovascular risk factors including smoking reduce the availability of progenitor cells and impair their function and activity, thus limiting their therapeutic usefulness. Bone marrow-derived cells (BMCs) are the most used source of progenitor cells for different therapies. The goal of this study is to create a simple method of preconditioning to activate progenitor cells and therefore improve their therapeutic efficacy. Cell surface receptor CXCR4 is an important element that regulates cell engraftment into injured tissues for repair. We discovered that CXCR4 on surface of BMCs can be increased by a brief treatment with our invented solution, which resulted in a significantly improved cell capacity of migration and homing. In this project, we will optimize the solution components that will efficiently increase the surface CXCR4 on BMCs, and then determine BMC homing capacity and therapeutic efficiency after the preconditioned BMCs are intravenously injected into mice. This study relates to a new method for activation of precursor cells to achieve a better homing capability and higher viability. A significant commercial opportunity exists for the preconditioning technology that can be used in cell therapy for different diseases.