

The Department of Biomedical Engineering

Presents:

Repair of blood vessels with umbilical cord blood-derived endothelial progenitor cells

By

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ABSTRACT:

Endothelial injury complicates many procedures used to treat hemodynamically significant atherosclerosis, including vein grafts and arterial stents. By exposing the arterial basement membrane to circulating blood, such injury can lead to thrombosis or neointimal hyperplasia. Vascular endothelial cells have limited proliferative capacity *in vivo*, and circulating endothelial cells (ECs) or endothelial progenitor cells (EPCs) are present in low numbers in blood and can cover only a small region of the damaged vessel wall. We have examined accelerating restoration of confluent vessel endothelium after injury by growing EPCs *ex vivo* to high density and injecting the resulting differentiated cells into the bloodstream. In order for this approach to be successful, the ECs first must adhere firmly and resist fluid shear stresses that can cause detachment. Subsequently, the ECs must proliferate to form a confluent monolayer. Results present establish that ECs, derived from late outgrowth umbilical cord blood-derived EPCs, adhere to fibronectin (FN) surfaces or quiescent smooth muscle cells *in vitro*. Adhesion exhibits a maximum, suggestive of catch-bond behavior. When injected into SCID mouse vein grafts, these ECs derived from human cord blood (hCB-ECs) adhere to and partially cover the intimal surface, preventing thrombus formation for at least two weeks. Results the studies to date suggest novel therapeutic possibilities to prevent vein graft failure in humans.

3:35 – 4:30 P.M.

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Room 2-101 NHH

BME n 8601 Graduate Seminar

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