Redox in CABG: A Tale of Two Cell Types

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Coronary artery bypass grafting (CABG) is the most common type of open heart surgery performed in the United States, and the surgery most commonly involves harvesting the saphenous vein and the internal mammary artery. This project explores why the patency rate for vein grafts is only around 50% after 10 years compared to 90% for arterial grafts. High Performance Liquid Chromatography was performed on mouse aortic endothelial cells and vena cava endothelial cells to measure antioxidant levels in the two cell types after being oxidatively stressed. These two cell types may be oxidatively stressed during CABG operations. Adhesion molecule expression and macrophage adhesion, a sign of an inflammatory response that can lead to foam cell formation and atherosclerosis, were also tested after the cells were oxidatively stressed. The results showed that venous endothelial tissue expressed significantly more adhesion molecules than arterial endothelial tissue, and macrophage adhesion was significantly higher in the venous endothelial cells. The results of this project show that venous endothelial cells handle surgical stresses related to CABG much differently than arterial endothelial cells. Based on what we observed, venous endothelial cells respond poorly to stresses, characterized by enhanced inflammation and decreased biological function, when compared to arterial endothelial cells. These responses are indicative of a poor prognosis for patients? ?receiving? ?CABG in which vein grafts are used.

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