

Significant Basal and Stimulated Variations in Inflammatory Gene Expression Profiles in African American and Caucasian HUVECS

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Biomarkers related to hypertensive disease onset and progression are differentially implicated in African Americans (AA) and Caucasians (Cau) and investigation of these biomarkers is needed to elucidate their significance. Racial disparity studies are carried out solely in vivo making it difficult to focus on the cause(s) of endothelial dysfunction (EnDy) leading to vascular complications. Therefore, building on data from our laboratory that reveals a mechanism of EnDy in AA human umbilical vascular endothelial cells (HUVECs) (increased ROS), we report basal differences and effects of activating HUVECs on relative gene expression ($2^{-\Delta\Delta CT}$) of important immune mediators (IL-1 β , VCAM-1, ICAM-1, eNOS, and MMP-2).

In an n=2-4 (both AA & Cau) cell lines in passage 6, we show that in control and after 4 hr stimulation with TNF- α (50ng/ml) that basal MMP-2 gene expression, a strong predictor of severe cardiovascular events in AA, is different in AA ECs compared to Cau. IL-1 β basal expression is higher in AA and significantly increases ($F_{1,12}=10.76;p=.007$) after stimulation, being higher in AA. Both AA and Cau ECs show reductions in eNOS expression after TNF- α and there is a trend in AA ECs for eNOS to be lower after stimulation ($p=0.06$). Further, basal expression of cell adhesion molecules (ICAM-1 & VCAM-1) are significantly greater ($p<.05$) in AA ECs while after stimulation VCAM-1 was significantly exaggerated in AA (race x treatment interaction: $F_{1,12}=6.05;p=.030$).

Increases in IL-1 β and CAMs in AA ECs indicate they are operating at a higher basal immunological active status. As ROS is known to be indirectly involved with expression of inflammatory genes, it is probable the effect exaggerated ROS has on MMP-2 activation, and its detrimental downstream effects, may play a role in activating immune pathways. Experiments are being performed to assess MMP-2 intracellular activities on cytosolic peptides.