

Public Abstract
Gregory Van Vickle
M.S.
Biomedical Sciences
The Effect Of Free Fatty Acids On Endothelial Cells
Advisor: M. Harold Laughlin
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The vascular endothelium is a monolayer of cells lining all blood vessels of the body. This cell layer modulates vascular tone via a number of vasoactive molecules such as the prostaglandins and nitric oxide (NO). Investigations show that oxidation of dietary lipids e.g. low density lipoprotein (OxLDL) decreases levels of the cellular protein responsible for production of NO endothelial nitric oxide synthase (eNOS) and that this can potentiate cardiovascular disease. A key question is if specific components of OxLDL molecules such as oxidized polyunsaturated fatty acids (PUFAs), or other atherogenic lipid, such as saturated free fatty acids (FFAs), are alone sufficient to decrease eNOS protein content in endothelial cells. The purpose of this thesis was to test the hypothesis that some types of FFA, either oxidized PUFAs or saturated FFAs, alone have the ability to decrease eNOS protein content in cultured porcine aortic endothelial cells (PAECs).

Twenty hour exposure of PAECs with the oxidized PUFAs (0-100 μ M) linoleic acid (LA), eicosapentaenoic acid (EPA), and arachidonic acid (AA), does not alter eNOS protein content within the cells. However, PAEC incubation with the saturated FFAs (0-.6mM) palmitic acid (PA) and stearic acid (SA), which do not undergo oxidative modification, dose dependently decrease eNOS protein content within the cells.

The results of this study indicate that oxidized PUFAs are not sufficient alone to contribute to NO mediated endothelial dysfunction induced by OxLDL. However, saturated FFA may contribute to NO mediated endothelial dysfunction produced by OxLDL by decreased eNOS protein content within endothelial cells.