



May 20th, 12:15 PM - 12:45 PM

A theoretical model of the increase in venous oxygen saturation levels in advanced glaucoma patients

Julia C. Arciero
IUPUI, jarciero@iupui.edu

Follow this and additional works at: <http://scholarscompass.vcu.edu/bamm>

 Part of the [Applied Mathematics Commons](#), and the [Systems and Integrative Physiology Commons](#)

<http://scholarscompass.vcu.edu/bamm/2016/May20/14>

This Event is brought to you for free and open access by the Dept. of Mathematics and Applied Mathematics at VCU Scholars Compass. It has been accepted for inclusion in Biology and Medicine Through Mathematics Conference by an authorized administrator of VCU Scholars Compass. For more information, please contact libcompass@vcu.edu.

Glaucoma is the second leading cause of blindness in the world and is characterized by progressive retinal ganglion cell death and irreversible visual field loss. Although elevated intraocular pressure has been identified as the primary risk factor for glaucoma and is the main target of glaucoma treatments, several vascular risk factors that lead to impaired retinal blood flow have also been correlated with the progression and incidence of glaucoma. In this study, a theoretical model of the retinal vasculature is applied to a set of oximetry data obtained from healthy individuals and glaucoma patients and is used to propose possible explanations for the clinically observed increases in venous blood oxygen saturation in advanced glaucoma patients. The model predicts that a decrease in retinal tissue oxygen demand, an impairment in blood flow autoregulation, or a decrease in Krogh cylinder tissue width can independently lead to increased venous saturation. Overall, the combined theoretical and clinical predictions suggest that the mechanisms leading to increased venous saturation differ between primary open angle glaucoma patients and normal tension glaucoma patients.