

SES07-2007-000024

Abstract for an Invited Paper  
for the SES07 Meeting of  
the American Physical Society

### **Nitric Oxide Scavenging by Hemoglobin in Health, Disease, and Therapeutics<sup>1</sup>**

DANIEL KIM-SHAPIO, Wake Forest University

Nitric oxide (NO) is the endothelium-derived relaxing factor (EDRF). It is made in endothelial cells lining blood vessels and diffuses to smooth muscle cells where it leads to muscle relaxation, vessel dilatation, and increased blood flow and also plays a large role in controlling platelet aggregation and inflammation. Hemoglobin (Hb), the oxygen carrying molecule in the blood, reacts at nearly diffusion limited rates with nitric oxide to (in some reactions) form nitrate and thereby destroy NO activity. The presence of such large amounts of such a potent NO scavenger in the blood challenges the idea that NO is indeed the EDRF. Encapsulation in red blood cells in healthy individuals limits NO scavenging by Hb. Biophysical experiments will be described exploring and evaluating these mechanisms. Other studies will be described discussing how red cells break open (lyse) in pathological situations and the cell-free Hb reduces NO bioavailability. Finally, methods to restore NO bioavailability through therapeutics will be discussed.

<sup>1</sup>This work was supported by the NIH (HL58091)