

9-4-2014

# Measuring Activity of Endothelial Nitric Oxide Synthase and Nanodisc Complex through Nitrate Production

Christopher Verdi  
*Cleveland State University*

Ghaith Altawallbeh  
*Cleveland State University*

Mekki Bayachou  
*Cleveland State University, M.BAYACHOU@csuohio.edu*

Follow this and additional works at: [https://engagedscholarship.csuohio.edu/u\\_poster\\_2014](https://engagedscholarship.csuohio.edu/u_poster_2014)

 Part of the [Chemistry Commons](#)

**How does access to this work benefit you? Let us know!**

---

## Recommended Citation

Verdi, Christopher; Altawallbeh, Ghaith; and Bayachou, Mekki, "Measuring Activity of Endothelial Nitric Oxide Synthase and Nanodisc Complex through Nitrate Production" (2014). *Undergraduate Research Posters 2014*. 37.  
[https://engagedscholarship.csuohio.edu/u\\_poster\\_2014/37](https://engagedscholarship.csuohio.edu/u_poster_2014/37)

This Article is brought to you for free and open access by the Undergraduate Research Posters at EngagedScholarship@CSU. It has been accepted for inclusion in Undergraduate Research Posters 2014 by an authorized administrator of EngagedScholarship@CSU. For more information, please contact [library.es@csuohio.edu](mailto:library.es@csuohio.edu).



This digital edition was prepared by MSL Academic Endeavors, the imprint of the Michael Schwartz Library at Cleveland State University.

# ***Measuring Activity of Endothelial Nitric Oxide Synthase and Nanodisc Complex through Nitrate Production***

College of Sciences and Health Professions

**Student Researchers:** Christopher Verdi and Ghaith Altawallbeh

**Faculty Advisor:** Mekki Bayachou

## **Abstract**

Nitric oxide is an important bioregulator generated in various regions throughout the body by a family of isozymes referred to as Nitric Oxide Synthases (NOS). Within vascular endothelial cells, nitric oxide is generated from oxygen and arginine (amino acid) by endothelial nitric oxide synthases (eNOS). Within this environment nitric oxide plays a critical paracrine role, mainly antithrombotic and anti-atherosclerotic. This is accomplished by vessel dilation and prevention of platelet and leukocyte aggregation and adherence to the vessel wall. The activity of the eNOS enzyme has been studied within solution and is well understood. However, the impact that the lipid bilayer of endothelial cells has on the activity is not known. To better understand this interaction, we have formed “nanodiscs” to bind to the eNOS. Nanodiscs have two components that combine and self-assemble when added to solution, POPC (a lipid) and MSP1E3D1 (Membrane Scaffold Protein). The nanodiscs help provide a better microenvironment to study the enzyme and its activity. Through reaction with an indicator dye in the Griess reagent system, activity levels, as calculated by nitrate production, reduced dramatically. Over a 50% reduction was seen when calculating specific activity of the eNOS enzyme when bound to nanodiscs. A possible indication that a lipid bilayer restricts activity of the eNOS enzyme.