

## 2007 Ohio Student Research Forum

Wright State University  
Dayton, OH

## RESEARCH ABSTRACT FORM

**TITLE:** Characterization of the Interaction of PTEN's N-terminus with PI(4,5)P<sub>2</sub>**AUTHOR:** Alexandra Hill**MENTOR(S):** Roberta Redfern and Arne Gericke**INSTITUTION:** Kent State University

Phosphatase and tensin homologue deleted on chromosome 10 (PTEN) is a lipid phosphatase and acts as a tumor suppressor.<sup>1</sup> It is often inactivated in human cancers and is linked to autism and heart-related diseases including cardiac hypertrophy and heart failure.<sup>2</sup> Previously, it has been shown that PTEN and PTEN<sub>1-21</sub> bind to PI(4,5)P<sub>2</sub> specifically. The N-terminus contains the PI(4,5)P<sub>2</sub> binding domain and this study will examine the effects of cancer relevant mutations such as K13E on binding of PTEN<sub>1-21</sub> to phosphoinositides. Fluorescence quenching, FRET, zeta potential, and ITC measurements were used to study this binding. These methods allow the study of mechanisms that lead to the formation of phosphoinositide enriched domains as well as characterization of such structures in the presence of phosphoinositide binding proteins. It was found that the mutation of the lysine in position 13, both in position and charge, regulates the specificity of phosphoinositide binding. The phosphate substitution pattern of bisphosphate phosphoinositides has no effect on the zeta potential of mixed phosphoinositide/phosphatidylcholine vesicles. Cholesterol presence in mixed phosphoinositide/phosphatidylcholine vesicles enhances phosphoinositide domain formation, while the presence of salt did not alter the formation of these domains.

**References:**

1. Gericke, A., M. Munson and A.H. Ross, Regulation of the PTEN phosphatase. *Gene* **2006**, 374, 1-9.
2. Oudit, G.Y., H. Sun, B.G. Kerfant, M.A. Crackower, J.M. Penninger, P.H. Backx, The role of phosphoinositide-3 kinase and PTEN in cardiovascular physiology and disease. *J. Mol. Cell* **2004**, 37, 449-471.