Apr 14th, 9:00 AM - 10:00 AM

Effects of Dephosphorylation in 7E Mutants of NPR-A

Bridget Wall, '08
Illinois Wesleyan University

Brian Walter, Faculty Advisor
Illinois Wesleyan University

Poster Presentation P3, P82

EFFECTS OF DEPHOSPHORYLATION IN 7E MUTANTS OF NPR-A

Bridget Wall and Brian Walter*
Biology Department, Illinois Wesleyan University

Natriuretic peptides (designated ANP, BNP, and CNP) are hormones and paracrine factors which regulate blood volume, blood pressure, ventricular hypertrophy, pulmonary hypertension, fat metabolism and long bone growth. When bound to natriuretic peptide receptors, they allow for the production of cGMP (cyclic guanosine monophosphate), a secondary messenger which allows for the production of proteins from the cell. These receptors are designated NPR-A/GC-A and NPR-B/GC-B. Both are guanylyl cyclases (enzymes that synthesize cGMP). The focus of this research is to further examine the involvement of dephosphorylation in the desensitization of natriuretic peptide receptors. Previously, phosphorylation sites on the guanylyl cylcase domain have been mutated to express glutamate, an amino acid with a charge of -1 (the charge of a phosphate is -2). Therefore, the glutamate is mimicking the charge on the phosphorylat residue present when the receptor is phosphorylated.

Ergo, these NPR-A mutants (hereafter referred to as 7E mutants) are constitutively phosphorylated and always active. Within the current model, there should be a significant difference in cGMP production when stimulated with natriuretic peptides. By continuing previous studies geared toward a better understanding of phosphorylation in these receptors, members of the field of pharmocology will be able to develop a drug that will either semi-permanently dephosphorylate or phosphorylate natriuretic peptide receptors in an effort to treat heart disease and hypertension.