

1106-92-1080

**Erica J. Graham\*** (ejgraha2@ncsu.edu) and **James F. Selgrade.** *Modeling the dynamics of insulin-mediated ovarian steroid production.*

The ovulatory cycle is a tightly regulated system of feedback that depends largely on cross-talk between brain- and ovary-derived hormones. Polycystic ovary syndrome (PCOS), a common cause of infertility, results from dysregulation of these hormones and is often characterized by increased ovarian androgen production (hyperandrogenism). Hyperandrogenemic PCOS is also associated with elevated insulin levels resulting from cellular insulin resistance (an important mediator of type 2 diabetes). Although the precise mechanisms of ovulatory dysfunction in PCOS remain to be elucidated, we can explore its pathogenesis through mathematical modeling of known endocrine processes. Here, we develop a system of nonlinear ordinary differential equations to describe follicle development and intracellular mechanisms of insulin-mediated ovarian steroid production. We estimate a typical set of parameters by optimizing the model with data obtained from the literature and present numerical results. We then explore abnormal parameter regimes and discuss implications for the role of insulin in ovulatory dysfunction. (Received September 10, 2014)