

## **Abstract: NeSA202100oral-14: The Effects of Metformin of Fecundity and Immunity in Mosquitoes**

**Time: 3:36-3:48 PM**

### **Presenter:**

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Metformin is a glucose-lowering and insulin-sensitizing agent which helps to control blood sugar level in mammals through activation of 5'AMP-activated protein kinase (AMPK). AMPK is an intracellular serine/threonine kinase and a key energy sensor that is activated under metabolic stress. AMPK governs a series of biological processes to maintain energy homeostasis in response to metabolic stresses through ATP depletion. AMPK is activated when cellular energy is low, which shuts down the anabolic pathway and concurrently turns on the catabolic pathway to produce ATP. This process continues throughout the metformin feeding which creates a nutrient-deficient environment as well as disturbs its metabolic regulation through AMPK resulting in the effect in mosquito physiology. We investigated the role of AMPK in regulating the ATP homeostasis by feeding *Aedes aegypti* with metformin and observing its effect on survival, fecundity, and immunity against bacterial challenge. Our result demonstrated that AMPK activation through metformin increased mortality rate in a dose-dependent manner where 20mM had greater mortality than 15mM, 10mM, and 5mM respectively. Similarly, AMPK also significantly reduced the fecundity rate of these mosquito in a dose-dependent manner (10mM < 5mM < 2mM < 0mM). Additionally, in response to larger bacterial load, we also saw a dose-dependent mortality rate where 10mM concentration showed higher mortality than 5mM and 2mM in comparison to the control (Mantel-Cox,  $P < 0.0001$ ).