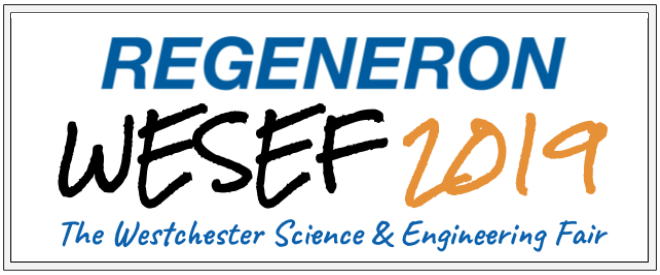

Finalist: **Emma Bilton & Hannah Bilton**

School: **Yorktown High School**

Title: **The Effect of metformin on Post Traumatic Brain Injuries and Learning Disabilities**

Abstract:

Traumatic brain injuries (TBIs) whether mild, moderate or severe, can have a direct and definite impact on a person's everyday life. The initial treatment after TBI usually consists of interventions to train individuals to learn new knowledge and skills or new ways to access previously acquired knowledge and skills. Other treatments, like Deep Brain Stimulation which works to stimulate the nerves around the lesioned (injured) area, are highly invasive. Metformin, a drug used for type 2 diabetes patients, has shown to promote neurogenesis in mice. This increase could potentially reverse the effects of a TBI by creating new nervous tissue to repair the lesion area. This study used the Drosophila melanogaster model, due to their fast-reproductive cycle and their similar nervous system to that of a human. Through the use of a T-maze the learning abilities of flies was tested as well as the effect of Metformin in different doses. Before testing flies were trained to associate a sucrose reward with an odor and no reward and another, then both were presented in the T-maze. It was found, using a One-way ANOVA test and a Tukey test, that 3.5 millimolars of Metformin significantly increased learning in flies given a TBI ($p<0.01$).