

Evolution of the *Foxo* Gene in the *Drosophila* Genus

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Abstract: The *FOXO* gene is responsible for mediating the inhibitory action of insulin or insulin like growth factors of specific key functions such as cell metabolism, growth, and aging. In the insulin signaling pathway of a *Drosophila* the insulin receptor (InR) occurs earlier on and interacts with several genes before it eventually indirectly interacts with the *FOXO* gene. This study investigated the evolution of the *FOXO* gene on different species within the *Drosophila* genus and whether or not the evolution would occur at a faster rate than that of the gene *PTEEN* which occurs earlier on within the insulin signaling pathway. The two species chosen for this research were *Drosophila suzukii* and *Drosophila navajoa* because they were more distantly related within the genus; *Drosophila melanogaster* was used as a reference species. The *FOXO* gene was then annotated on both species in order to obtain their protein sequences for comparison. *Drosophila navajoa* was successfully annotated while *Drosophila suzukii* is still in progress. A sequence comparison was then ran between *D.navajoa* and *D. melanogaster* using the Molecular Evolutionary Genetic Analysis (MEGA) software resulting in a 0.189 genetic distance of amino acids between these two species. Due to the annotation of *Drosophila suzukii* being still in progress, we are still in the process of gathering data and will hopefully fully complete this study in the near future.