Semaglutide and "Fake" Semaglutide in Drosophila Model With Type 2 Diabetes and Obesity

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Obesity has increased to 1 in 8 people globally, causing dangerous comorbidities, including type 2 diabetes, cardiovascular disease, and cancer. Many obese adults, particularly in low socio-economic areas, do not have access to effective dietary or medical treatment such as the GLP-1 receptor agonist (GLP-1) semaglutide. As a result, some pharmacies produce much cheaper, non-FDA-approved compounded semaglutide, colloquially called "fake" semaglutide—semaglutide acetate is a common compound. This treatment has caused fatalities, but its effects have not been studied. How does the success of semaglutide and "fake" semaglutide compare? For the first time, Drosophila (fruit flies) were used as a model to study GLP-1s. Prior to this study, it was unknown how similar the fruit fly GLP-1 hormone is to humans and whether GLP-1 agonists could work in flies. Drosophila were fed high-sugar food to induce three major characteristics of diabetes and obesity: impaired insulin activity, shown by larval wing disc brightness; less organ growth, shown by wing disc area; and increased fat presence, shown by fat body lipid droplet size. Larval wing discs and fat bodies were imaged and analyzed. In flies with type 2 diabetes, semaglutide raised insulin activity, caused healthy growth, and reduced obesity, mirroring GLP-1s' success in humans. Although "fake" semaglutide also raised insulin activity and reduced obesity, it caused unhealthy growth, an indicator of many issues in humans from high blood pressure to tumors and cancer. This study is the first to show that fruit flies are an effective and even beneficial model for human GLP-1s.

Awards Won:
First Award of $6,000
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