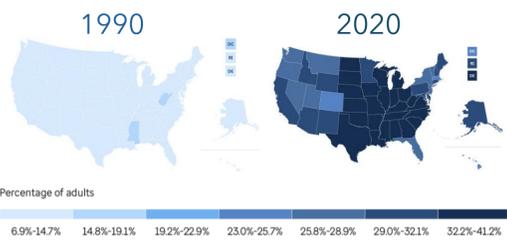


Ozempic® and Counterfeit Ozempic® in Novel Triple-Readout *Drosophila* Model With Type 2 Diabetes and Obesity

Background

U.S. Obesity Percentage



Obesity: BMI \geq 30, #1 risk for diabetes
 Type 2 Diabetes: The body resists insulin's ability to transport sugar into cells
Both are becoming more prevalent

Figure 1: Percentage of Americans with Obesity, 1990 to 2020 [Image Series]. From "Behavioral Risk Factor Surveillance System," 1990-2023, CDC. Rearranged by Finalist.

GLP-1 Receptor Agonists

Treat diabetes and obesity by suppressing hunger and causing weight loss. Often, these drugs are not covered by insurance.

Ozempic® had early success and started the GLP-1 "boom" in 2018. Semaglutide is now the most widespread GLP-1 ingredient.

Americans below 350% of the poverty line are 10% more affected by obesity. Around **1.5 million** have turned to "fake" Ozempic®, a **cheap, unstudied, and dangerous (even fatal) compound**.



Figure 2: Ozempic® pens [Photograph]. From "Ozempic Pen," 2024, Danatech.

Name	Ozempic/Wegovy	"Fake" Ozempic
Active ingredient	semaglutide (pure)	semaglutide acetate (compounded)
FDA-approved?	Yes	No
Legal?	Yes	No
Cost	\$300 - \$1,350	\$50 - \$200

Figure 3: "Fake" Ozempic pen [Photograph]. From "Pa. attorney general warns about the dangers of fake weight loss drugs," 2025, Jose Sermento Matos. Edited by Finalist using Adobe Background Remover, 2026.

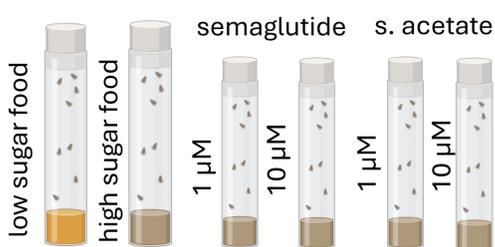
Figure 4: Ozempic®, Wegovy®, and "fake" Ozempic® cost per month. [Table]. Created by Finalist using PowerPoint, 2026.

Aim: Establish a type 2 diabetes & obesity model and contrast the effects of semaglutide (Ozempic®) and semaglutide acetate ("fake" Ozempic®)

The Triple-Readout *Drosophila* Model: Using the Wings

Why *Drosophila* (fruit fly)?

Fed high-sugar, flies get obesity & diabetes: more fat, less insulin & growth. **Insulin signaling is the same** in humans (reporter flies' fluorescence = signaling)



Induce diabetes and obesity in larvae by feeding them high sugar food, add drug
 Prior studies show that flies with diabetes & obesity have **developmental delay and larger fat stores (droplets)**

1. Insulin Signaling (NEW)

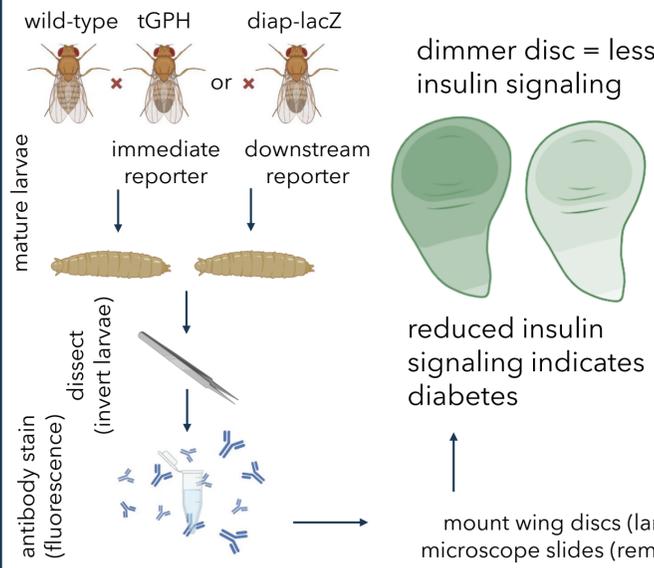
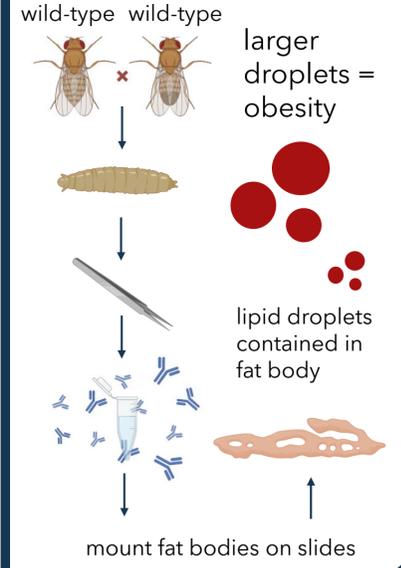


Figure 4: *Drosophila* triple-readout model procedure [Graphic]. Created by Finalist using BioRender, 2026.

2. Development



3. Fat Storage



Data

Figure 5: Wing disc insulin signaling [Graph]. Graph created by Finalist using GraphPad Prism10, 2025.

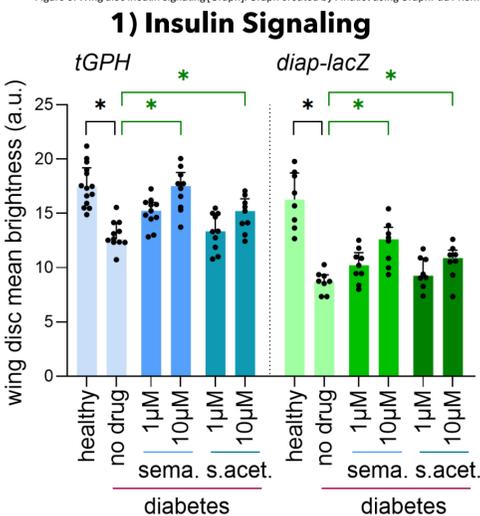
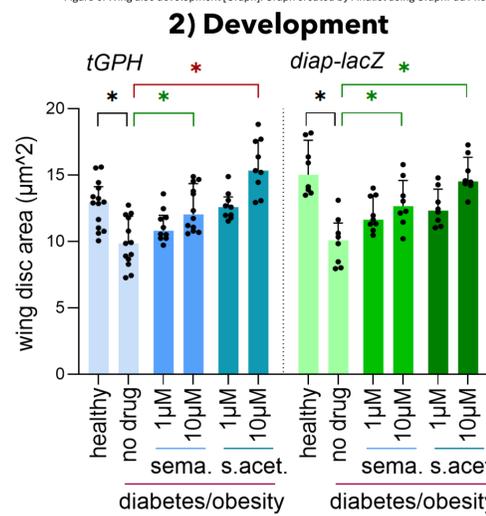


Figure 6: Wing disc development [Graph]. Graph created by Finalist using GraphPad Prism10, 2025.



1 & 2) Representative Wing Discs

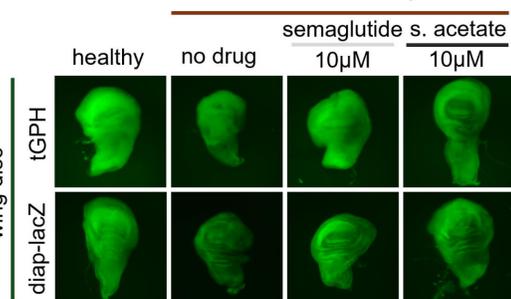


Figure 7: Wing disc signaling and development at conditions, image comparison [Visual to Graph A and Graph B]. Figure created by Finalist from photographs taken by Finalist [25x magnification], 2025.

3) Obesity (Representative Fat Bodies)

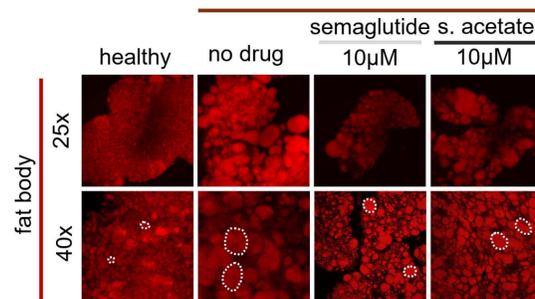


Figure 8: Fat body lipid droplets at conditions, image comparison [Visual]. Figure created by Finalist from photographs taken by Finalist [25x, 40x magnification], 2025.

Results

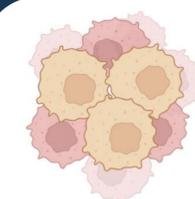
- Both semaglutide and s. acetate (less effective) restore brightness (insulin signaling)
- Both drugs restore size (development), **but s. acetate causes abnormal growth**
- Both shrink droplets (obesity). S. acetate is less effective

The unhealthy effect of "fake" Ozempic® may outweigh any success. It is not yet a safe, cheaper GLP-1 agonist.

Risks of "Fake" Ozempic®

- Unhealthy growth: tumors (**cancer**), high blood pressure, metabolic issues ← observed in patients
- Most illegal market compounds contain impurities: trace metals, co-active ingredients (serious immune harm)

Future Research



A project, already begun, showed that a certain cancer has similar effects as diabetes and obesity.

Test other GLP-1s and compounds in cancer

Do these drugs help or worsen existing cancer?

Figure 9: Cancer cells tumor growth [Graphic]. Created by Finalist using BioRender, 2026

- Machine learning to quantify fat droplet size
- Chemical analyses (homogenized flies) of blood sugar and insulin to validate the new model