

# Ozempic™ (semaglutide) Miracle drug?

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# Objectives

1. List the benefits of the Glucagon-like peptide (GLP-1) Agonist drug class.
2. Describe what is meant by off-label use of a prescription drug.
3. Demonstrate the anecdotal use, efficacy and safety of GLP-1 Agonist drug class.

# What is Diabetes?

- A disease that results in elevated glucose (blood sugar) levels
- Glucose is the main source of the body's energy (the brain's only source)
- Elevated glucose levels are toxic and cause organ damage
- Glucose comes from the food we eat (carbohydrates)
- Insulin is a hormone made by the pancreas that processes glucose for energy

# Type 1 vs Type 2 Diabetes

- Type 1 (juvenile onset) diabetes - the pancreas no longer makes insulin
- Type 2 diabetes – there is insulin but the body doesn't use it properly (insulin resistant)
- The end result of both conditions is elevated glucose levels

# Treatment

- Diabetic diet, exercise, weight loss
- Type 1 diabetes – INSULIN
- Type 2 diabetes – oral medications, injectables, insulin

# Diabetes Drug Classes

- Biguanides- Metformin (Glucophage™ )
- Sulfonureas – Glimepiride (Amaryl™ ), Glipizide (Glucotrol™ )
- Thiazolidinediones – Rosiglitazone (Avandia™ ), Pioglitazone (Actos™ )
  
- Dipeptidyl peptidase-4 (DPP-4) Inhibitors – Sitagliptin (Januvia™ ), Saxagliptin (Onglyza™ )
- Sodium-glucose transport protein 2 (SGLT-2) Inhibitors – Canagliflozin (Invokana™ ), Dapagliflozin (Farxiga™ ), Empagliflozin (Jardiance™ )
  
- GLP-1 Receptor Agonists

# Glucagon Like Peptide-1 Receptor Agonist

- Dulaglutide (Trulicity™) weekly
- Exenatide (Byetta™) twice daily
- Liraglutide (Victoza™, Saxenda™) daily
- Tirzepatide (Mounjaro™) weekly
- Semaglutide (Ozempic™, Wegovy™) weekly, (Rybelsus™) oral daily
- All injections except Rybelsus™



# GLP-1 Receptor Agonist Mechanism of Action

- Stimulates glucose-dependent insulin release in the pancreas
- Slows gastric emptying
  - Normal rate is about 1.5 - 2hrs
- Inhibits post-meal glucagon release
- Decreases satiety (Mounjaro™) - feel full faster



# How Do These Medications Work

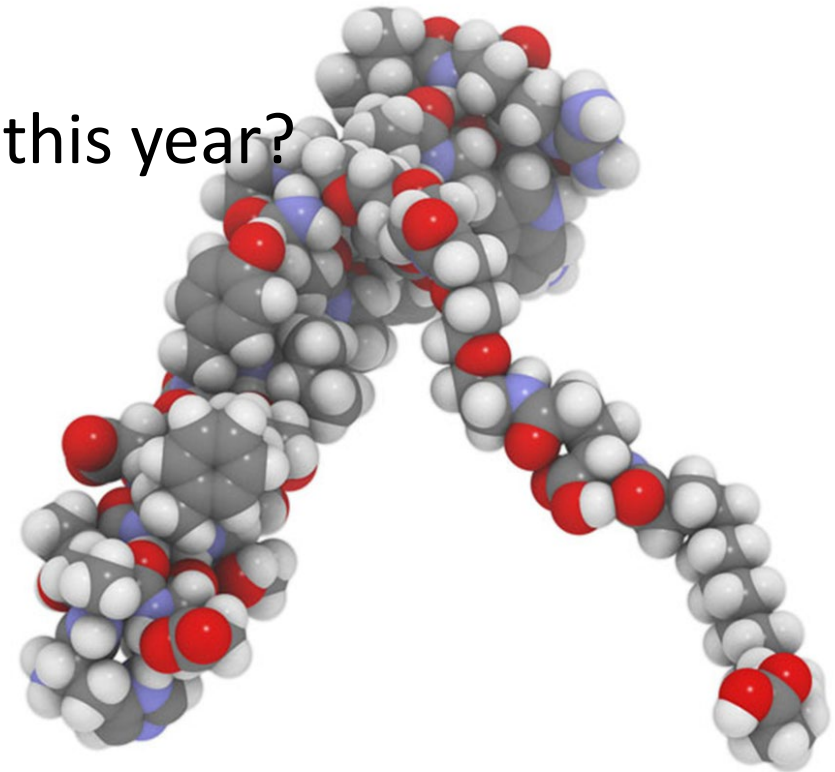
- Slows gastric emptying
  - Food stays in stomach longer
  - Feel full longer, decreases appetite
  - Overeating causes nausea and vomiting
  
- Decreases satiety (satisfied)
  - Humans eat until they feel full
  - A satiety center has been discovered in the brain that controls this feeling
  - Feel full faster and with less food

# Benefits of GLP-1s

- Less eating!
- Weight loss
- Excellent blood sugar control
- Reduce risk of heart disease and stroke
- Looking at addictions
  - May reduce cravings for alcohol, opioids, nicotine

# FDA Approved for Weight Loss

- Wegovy™ (Semaglutide), same as Ozempic
- Saxenda™ (Liraglutide)
- Mounjaro™ (Tirzepatide) approval at the end of this year?
- Reports of losing 12-15% of body weight



# Off Label Prescribing

- When a medication is prescribed for a condition other than for what it is FDA-approved
  - Aspirin (pain, fever) – Cardiovascular disease prevention
  - Gabapentin (seizure) – restless legs, anxiety, neuropathy, hot flashes
  - Viagra™ (ED) - female sexual arousal disorder, pulmonary hypertension
  - SSRIs (depression, anxiety) - migraines, chronic pain, hot flashes
  
- Ozempic™ , Mounjaro™ – obesity, weight loss, addictions?

# Shortages

- Because of extremely high demand for Wegovy™, Novo Nordisk has limited its availability to keep up with world-wide demand
- Patients then use alternatives such as Ozempic™ or Mounjaro™ for weight loss, which has created shortages for diabetic patients

# Compound Pharmacies

- If a drug falls on the "FDA Drug Shortage List" then a Compound Pharmacy may compound the drug
- Semaglutide is currently on the list
- These pharmacies must obtain the base form of Semaglutide from Novo Nordisk as they have the patent
- With very limited availability Compound Pharmacies are using the salt form of Semaglutide (semaglutide sodium or semaglutide acetate)

# Semaglutide Sodium/Acetate

- "For research use only"
- "Not intended for use in humans"
- FDA Statement  
and "Salt forms of semaglutide have not been shown to be safe and effective."

# Anecdotal Data

- Ozempic™ and Mounjaro™ are very effective in controlling glucose levels
  - HgbA1C drops of up to 1.5-3%
    - HgbA1C: Hemoglobin A1C > blood test to measure average blood sugar over past 2-3 months
  - This can facilitate decreases in insulin use
- Ozempic™ and Mounjaro™ are very effective for weight loss
  - Average loss 10-15lbs in 3 months, up to 30lbs
- Toleration is variable
  - Nausea and vomiting
  - Directly related to overeating

# Offer Pharmacist Counseling

- It is critical to counsel patients when starting on these medications
- Expect to feel sick if overeating
- Need to closely monitor other conditions while losing weight
  - Decreased insulin needs
  - Blood pressures can drop, need to alter treatment
- NUTRITION
  - Eating less and not as often makes eating the right things critical
  - Monitor for hypoglycemia

# Safety of GLP-1 Receptor Agonists

- Limited data as they are new (Byetta™ 2005, Ozempic™ 2017, Mounjaro™ 2022)
- Low risk for hypoglycemia (act in a glucose dependent manner)
- Avoid use if personal or family history of medullary thyroid cancer
  - Black box warning
- Pancreatitis/pancreatic cancer???? No evidence to date
- Stomach paralysis (gastroparesis)
- Small bowel obstruction

# Case Study

- 63yo WF with type 2 diabetes, HTN, obesity, hyperlipidemia presents for routine follow-up
- Meds: Lantus™ 40U am and 40U pm, Metformin 1000mg BID, Jardiance™ 25mg daily, Irbesartan HCT 150/12.5mg daily, Amlodipine 10mg daily, Atorvastatin 40mg daily
- Weight 226lbs, BP 138/88, HgbA1C 8.9%

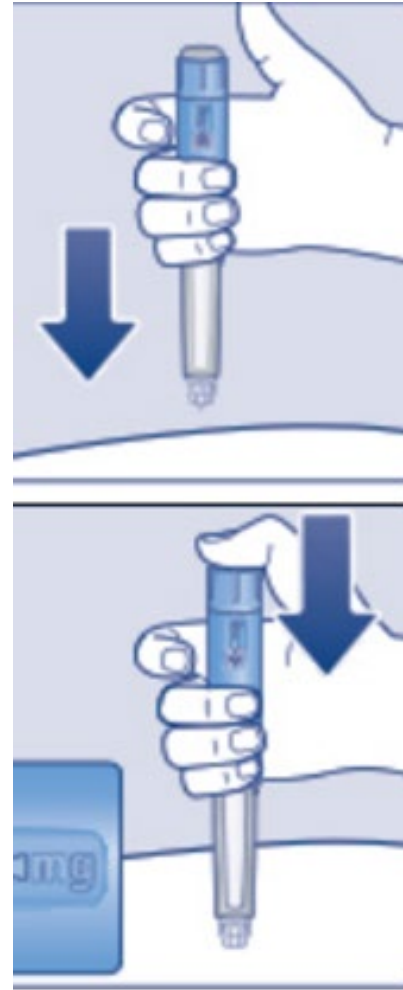
# Case Study

- Treatment goals
  - Weight down to <180lbs? (50lbs)
  - HgbA1C <7%
  - BP 120s/70s
- Treatment options
  - Better diet, exercise, lose weight
  - Increase long-acting insulin
  - Add short-acting insulin to cover meals
  - Add a DPP-4, Sulfonurea, TZD

OR.....

# Add a GLP-1

- Started on Mounjaro™ 2.5mg SC weekly for 4 weeks
- Left everything else the same
  
- 4 weeks later increased Mounjaro™ to 5mg SC weekly as she was tolerating the med well



# 3 Month Follow-Up

- Weight 198lbs (226lbs)
- HgbA1C 5.9% (8.9%)
- BP 106/58 (138/88)
  
- Hypoglycemia, dizzy, fatigued
- Decreased insulin from Lantus 40U BID to 20U daily
- Discontinued Amlodipine

# GLP-1 Receptor Agonists

- Very promising class of medication
- Extremely effective at glucose control and weight loss
  
- Huge demand as weight loss indication is coming
  - Shortages
  - Beware of different formulations
  - Market estimates at \$100 billion by 2035
  
- Long-term safety seems promising but is an unknown at this time