# INCRETIN MIMETIC TREATMENT: Enhancing Whole Body Health

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University of Michigan

MCT2D

# Two Steps to Receive CME/CE Credit

## STEP 1:

Scan me to open a text message!

## Text in CE Code 83336 to 833-256-8390

### by 1:00 PM on March 29th

This activates your online evaluation in the CE portal (new users follow prompts after texting to set up account).

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## Complete the required online evaluation

### by April 13, 2025

In the Cloud CME portal at https://beaumont.cloud-cme.com [Sign In > select My CME > select Evaluations & Certificates] – or – via the free CloudCME mobile app (organization code *Beaumont)*

**Refer to full CE document for additional CE information**. For assistance, email **CHEcme@corewellhealth.org**

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All other individuals involved with this activity have no relevant financial relationships with ineligible companies to disclose.

- **Lauren Oshman, M.D.** (Course Co-Director): Stocks in publicly traded companies or stock options, excluding diversified mutual funds-Abbott, AbbVie, Johnson & Johnson, Merck & Co., Organon.

# MCT2D Learning Community Series 2025
# Incretin Mimetics Nutritional Considerations and More

## CME/CE credit is available

In support of improving patient care, this activity has been planned and implemented by Corewell Health Southeast Michigan and Michigan Collaborative for Type 2 Diabetes. Corewell Health Southeast Michigan is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE), and the American Nurses Credentialing Center (ANCC), to provide continuing education for the healthcare team.

This activity was planned by and for the healthcare team, and learners will receive 1.0 Interprofessional Continuing Education (IPCE) credit for learning and change.

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**Dietetic CPEU:**

Commission on Dietetic Registration
the credentialing agency for the Academy of Nutrition and Dietetics

Completion of this RD/DTR profession-specific or IPCE activity awards CPEUs (One IPCE credit = One CPEU).

If the activity is dietetics-related but not targeted to RDs or DTRs, CPEUs may be claimed which are commensurate with participation in contact hours (One 60 minute hour = 1 CPEU).

RD's and DTRs are to select activity type 102 in their Activity Log. Sphere and Competency selection is at the learner's discretion.

# NO Disclosures

# ABOUT ME

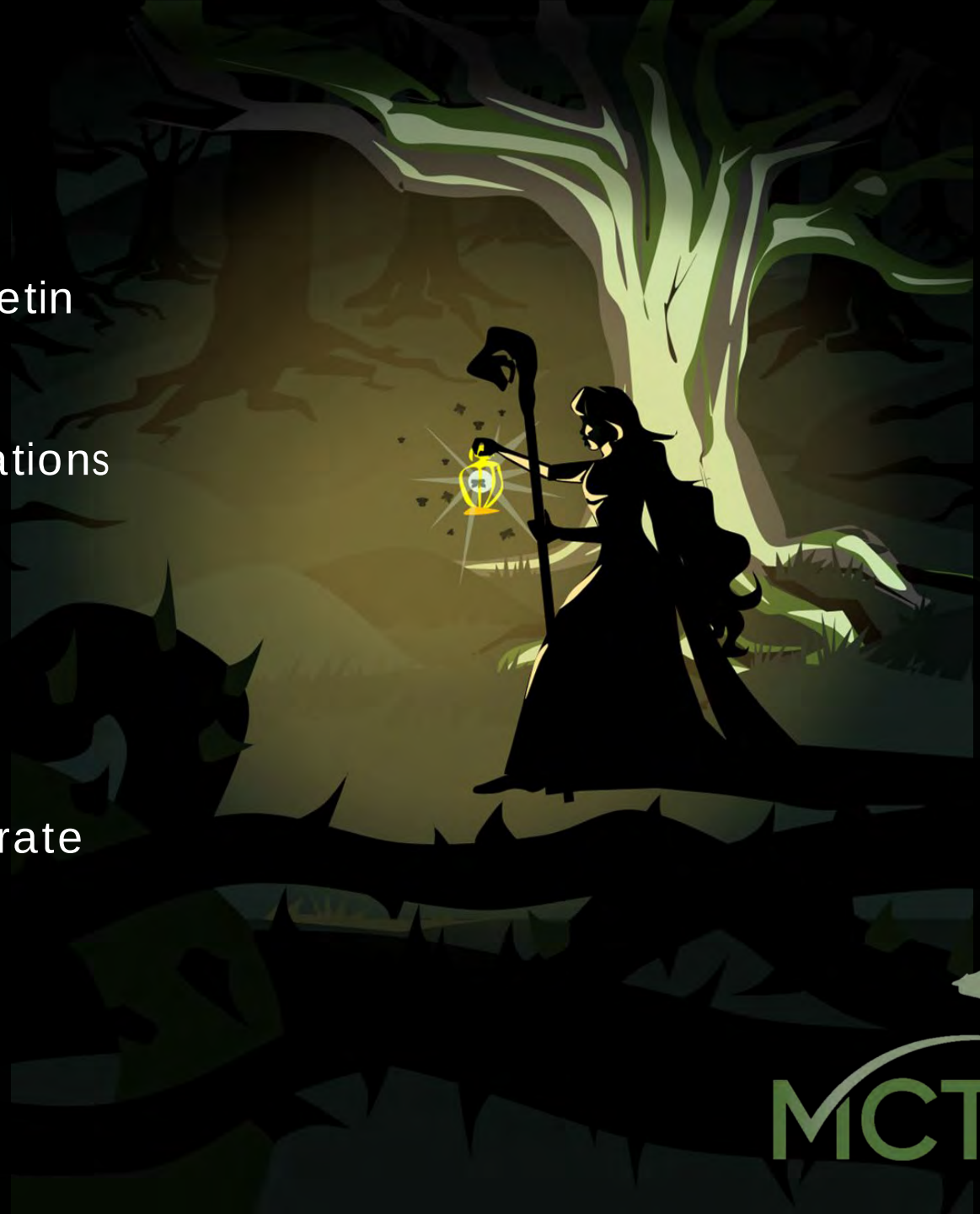
- Endocrinologist & obesity medicine specialist since 2010
- Director, Weight Navigation Program
- Director, Post-Bariatric Endocrinology Clinic
- Participating physician, Weight Management Program
- Associate Program Director, Endocrinology Fellowship

MICHIGAN MEDICINE
UNIVERSITY OF MICHIGAN

MCT2D

# Today's Goals

- Review background of incretin mimetics
- Discuss nutritional considerations
- Review sarcopenia
- Review frailty-prevention strategies
- Review case studies to illustrate points



# CASE

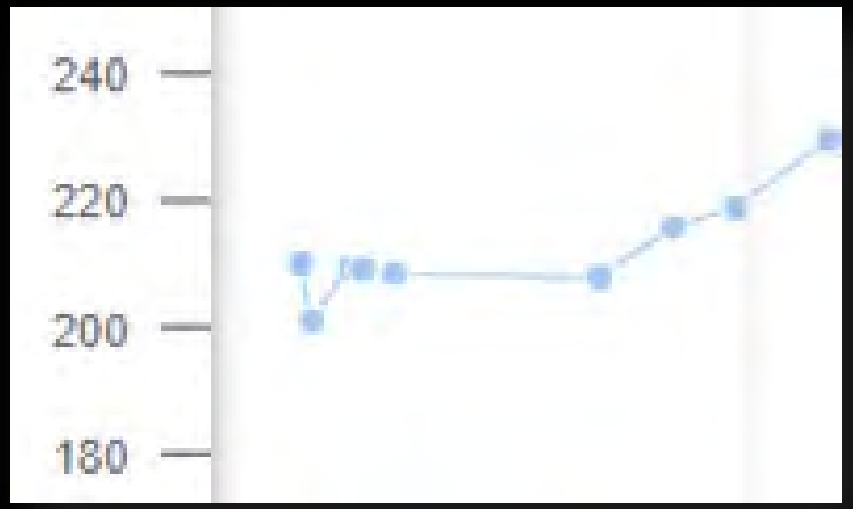
29-year-old graduate student is establishing care for management of diabetes mellitus.

- Diagnosed at the age of 21
- Started on metformin but started on premixed insulin soon afterwards due to A1c > 10%
- Had persistently poor control, was told she had T1DM, and was switched to basal bolus insulin after which she established in this clinic
- After starting CGM & titrating doses, control improved to mid 8s (on A1c)

# CASE

## 29-year-old with DM

- Though she was pleased with an A1c of 7, she was concerned about the weight gain from 200 to 230 lbs. over the course of 12 months.



**According to the American Diabetes Association Standards of Care, for non-acute, chronic care of an individual with diabetes, which health aspect has treatment priority?**

# 2004 (when I started residency)

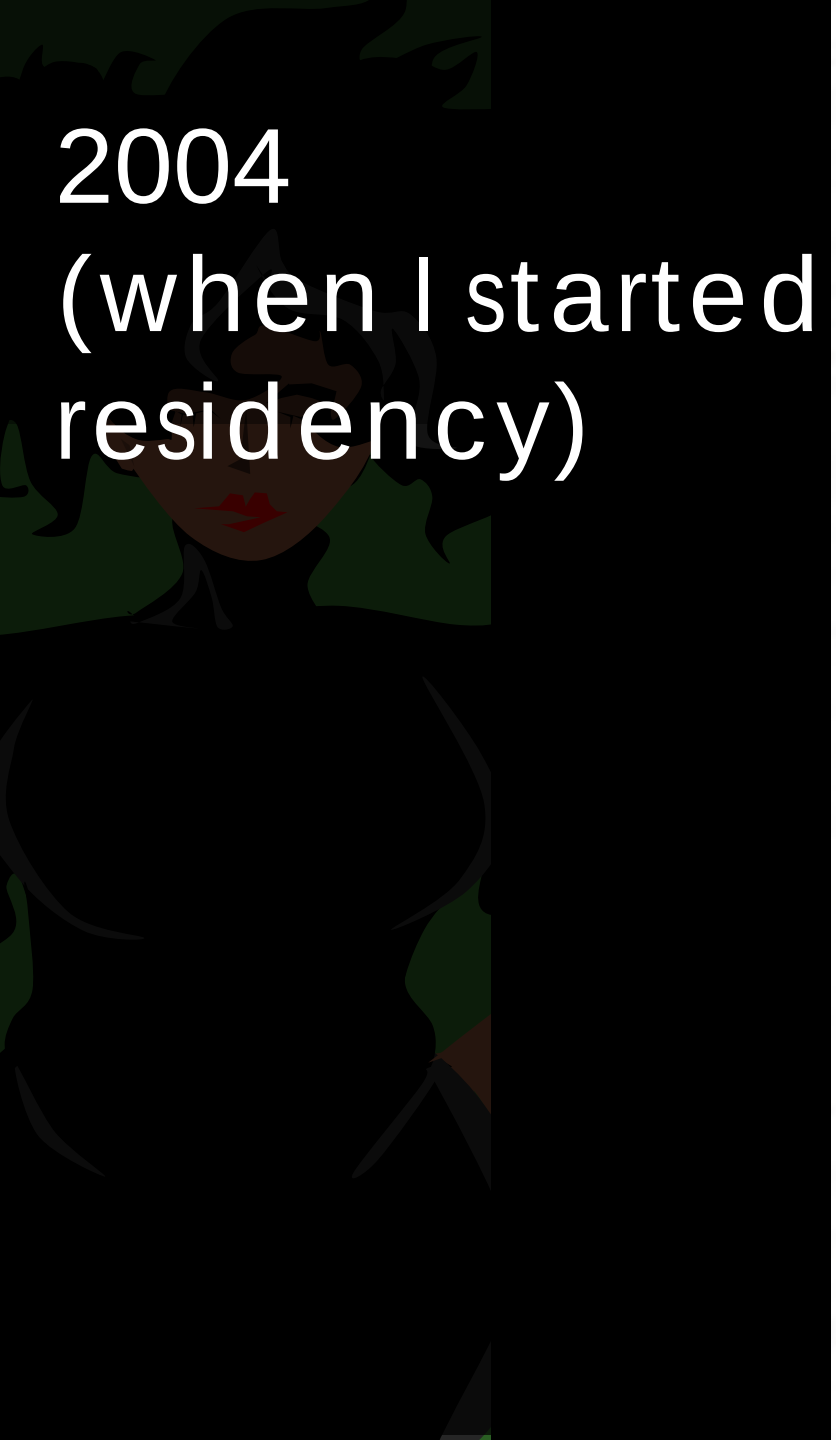


**Table 6—*Summary of recommendations for adults with diabetes***

| | |
|---|---|
| Glycemic control | |
| AIC | <7.0%* |
| Preprandial plasma glucose | 90–130 mg/dl (5.0–7.2 mmol/l) |
| Postprandial plasma glucose† | <180 mg/dl (<10.0 mmol/l) |
| Blood pressure | <130/80 mmHg |
| Lipids‡ | |
| LDL | <100 mg/dl (<2.6 mmol/l) |
| Triglycerides | <150 mg/dl (<1.7 mmol/l) |
| HDL | >40 mg/dl (>1.1 mmol/l)§ |

Key concepts in setting glycemic goals:

- Goals should be individualized
- Certain populations (children, pregnant women, and elderly) require special considerations
- Less intensive glycemic goals may be indicated in patients with severe or frequent hypoglycemia
- More stringent glycemic goals (i.e. a normal A1C, <6%) may further reduce complications at the cost of increased risk of hypoglycemia (particularly in those with type 1 diabetes)
- Postprandial glucose may be targeted if AIC goals are not met despite reaching preprandial glucose goals

NOTE: no discussion of ADM type or order – not even metformin!

*Referenced to a nondiabetic range of 4.0–6.0% using a DCCT-based assay. †Postprandial glucose measurements should be made 1-2 h after the beginning of the meal, generally peak levels in patients with diabetes. ‡Current NCEP/ATP III guidelines suggest that in patients with triglycerides 200 mg/dl, the "non-HDL cholesterol" (total cholesterol minus HDL) be utilized. The goal is 130 mg/dl (61). §For women, it has been suggested that the HDL goal be increased by 10 mg/dl.

2023

# USE OF GLUCOSE-LOWERING MEDICATIONS IN THE MANAGEMENT OF TYPE 2 DIABETES

**HEALTHY LIFESTYLE BEHAVIORS; DIABETES SELF-MANAGEMENT EDUCATION AND SUPPORT (DSMES); SOCIAL DETERMINANTS OF HEALTH (SDOH)**

TO AVOID THERAPEUTIC INERTIA REASSESS AND MODIFY TREATMENT REGULARLY (3–6 MONTHS)

## Goal: Cardiorenal Risk Reduction in High-Risk Patients with Type 2 Diabetes (in addition to comprehensive CV risk management)*

**+ASCVD†**

Defined differently across CVOTs but all included individuals with established CVD (e.g., MI, stroke, any revascularization procedure). Variably included: conditions such as transient ischemic attack, unstable angina, amputation, symptomatic or asymptomatic coronary artery disease.

**+Indicators of high risk**

While definitions vary, most comprise ≥55 years of age with two or more additional risk factors (including obesity, hypertension, smoking, dyslipidemia, or albuminuria)

**+ASCVD/Indicators of High Risk**

GLP-1 RA# with proven CVD benefit — EITHER/OR — SGLT2i§ with proven CVD benefit

**If A1C above target**

- For patients on a GLP-1 RA, consider adding SGLT2i with proven CVD benefit or vice versa
- TZD^

**+HF**

Current or prior symptoms of HF with documented HFrEF or HFpEF

**+HF**

SGLT2i§ with proven HF benefit in this population

**+CKD**

eGFR <60 mL/min per 1.73 m² OR albuminuria (ACR ≥3.0 mg/mmol [30 mg/g]). These measurements may vary over time; thus, a repeat measure is required to document CKD

**+CKD (on maximally tolerated dose of ACEI/ARB)**

**PREFERABLY**

SGLT2i§ with primary evidence of reducing CKD progression

Use SGLT2i in people with an eGFR ≥20 mL/min per 1.73 m²; once initiated should be continued until initiation of dialysis or transplantation

OR

GLP-1 RA with proven CVD benefit if SGLT2i not tolerated or contraindicated

If A1C above target, for patients on SGLT2i, consider incorporating a GLP-1 RA or vice versa

**If additional cardiorenal risk reduction or glycemic lowering needed**

## Goal: Achievement and Maintenance of Glycemic and Weight Management Goals

**Glycemic Management: Choose approaches that provide the efficacy to achieve goals:**

Metformin OR Agent(s) including COMBINATION therapy that provide adequate EFFICACY to achieve and maintain treatment goals

Consider avoidance of hypoglycemia a priority in high-risk individuals

In general, higher efficacy approaches have greater likelihood of achieving glycemic goals

Efficacy for glucose lowering

**Very High:**
Dulaglutide (high dose), Semaglutide, Tirzepatide

Insulin

Combination Oral, Combination Injectable (GLP-1 RA/Insulin)

**High:**
GLP-1 RA (not listed above), Metformin, SGLT2i, Sulfonylurea, TZD

**Intermediate:**
DPP-4i

**Achievement and Maintenance of Weight Management Goals:**

Set individualized weight management goals

General lifestyle advice: medical nutrition therapy/eating patterns/physical activity

Intensive evidence-based structured weight management program

Consider medication for weight loss

Consider metabolic surgery

**When choosing glucose-lowering therapies:**

Consider regimen with high-to-very-high dual glucose and weight efficacy

Efficacy for weight loss

**Very High:**
Semaglutide, Tirzepatide

**High:**
Dulaglutide, Liraglutide

**Intermediate:**
GLP-1 RA (not listed above), SGLT2i

**Neutral:**
DPP-4i, Metformin

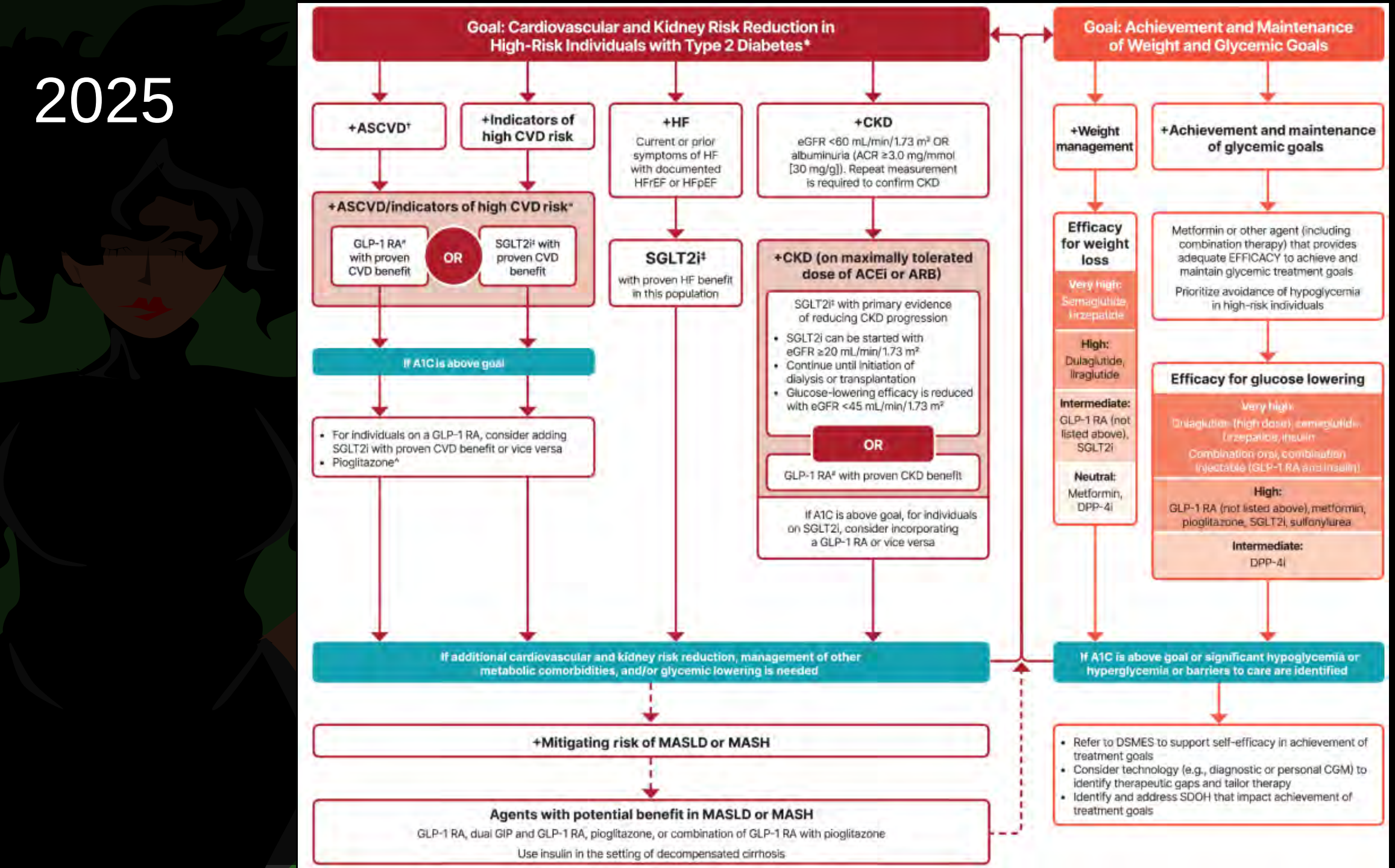
**If A1C above target**

Identify barriers to goals:

- Consider DSMES referral to support self-efficacy in achievement of goals
- Consider technology (e.g., diagnostic CGM) to identify therapeutic gaps and tailor therapy
- Identify and address SDOH that impact achievement of goals

* In people with HF, CKD, established CVD or multiple risk factors for CVD, the decision to use a GLP-1 RA or SGLT2i with proven benefit should be independent of background use of metformin; † A strong recommendation is warranted for people with CVD and a weaker recommendation for those with indicators of high CV risk. Moreover, a higher absolute risk reduction and thus lower numbers needed to treat are seen at higher levels of baseline risk and should be factored into the shared decision-making process. See text for details; ^ Low-dose TZD may be better tolerated and similarly effective; § For SGLT2i, CV/renal outcomes trials demonstrate their efficacy in reducing the risk of composite MACE, CV death, all-cause mortality, MI, HHF, and renal outcomes in individuals with T2D with established/high risk of CVD; # For GLP-1 RA, CVOTs demonstrate their efficacy in reducing composite MACE, CV death, all-cause mortality, MI, stroke, and renal endpoints in individuals with T2D with established/high risk of CVD.

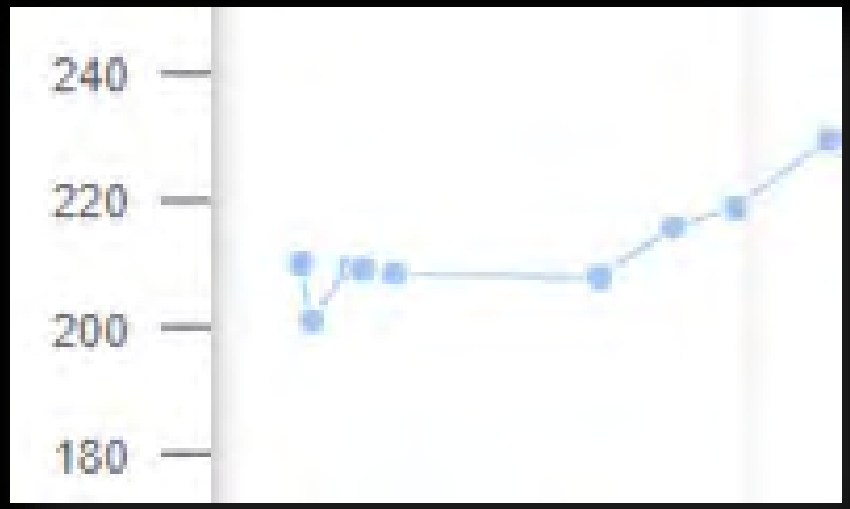
2025


Goal: Cardiovascular and Kidney Risk Reduction in High-Risk Individuals with Type 2 Diabetes*
Goal: Achievement and Maintenance of Weight and Glycemic Goals
+ASCVD†
+Indicators of high CVD risk
+HF
Current or prior symptoms of HF with documented HFrEF or HFpEF
+CKD
eGFR <60 mL/min/1.73 m² OR albuminuria (ACR ≥3.0 mg/mmol [30 mg/g]). Repeat measurement is required to confirm CKD
+Weight management
+Achievement and maintenance of glycemic goals
+ASCVD/indicators of high CVD risk*
GLP-1 RA# with proven CVD benefit
OR
SGLT2i‖ with proven CVD benefit
SGLT2i‡
with proven HF benefit in this population
+CKD (on maximally tolerated dose of ACEi or ARB)
SGLT2i‖ with primary evidence of reducing CKD progression
SGLT2i can be started with eGFR ≥20 mL/min/1.73 m²
Continue until initiation of dialysis or transplantation
Glucose-lowering efficacy is reduced with eGFR <45 mL/min/1.73 m²
OR
GLP-1 RA# with proven CKD benefit
If A1C is above goal, for individuals on SGLT2i, consider incorporating a GLP-1 RA or vice versa
Efficacy for weight loss
Very high:
Semaglutide, tirzepatide
High:
Dulaglutide, liraglutide
Intermediate:
GLP-1 RA (not listed above), SGLT2i
Neutral:
Metformin, DPP-4i
Metformin or other agent (including combination therapy) that provides adequate EFFICACY to achieve and maintain glycemic treatment goals
Prioritize avoidance of hypoglycemia in high-risk individuals
Efficacy for glucose lowering
Very high:
Dulaglutide (high dose), semaglutide, tirzepatide, insulin
Combination oral, combination injectable (GLP-1 RA and insulin)
High:
GLP-1 RA (not listed above), metformin, pioglitazone, SGLT2i, sulfonylurea
Intermediate:
DPP-4i
If A1C is above goal
For individuals on a GLP-1 RA, consider adding SGLT2i with proven CVD benefit or vice versa
Pioglitazone^
If additional cardiovascular and kidney risk reduction, management of other metabolic comorbidities, and/or glycemic lowering is needed
If A1C is above goal or significant hypoglycemia or hyperglycemia or barriers to care are identified
+Mitigating risk of MASLD or MASH
Agents with potential benefit in MASLD or MASH
GLP-1 RA, dual GIP and GLP-1 RA, pioglitazone, or combination of GLP-1 RA with pioglitazone
Use insulin in the setting of decompensated cirrhosis
Refer to DSMES to support self-efficacy in achievement of treatment goals
Consider technology (e.g., diagnostic or personal CGM) to identify therapeutic gaps and tailor therapy
Identify and address SDOH that impact achievement of treatment goals

# CASE

## 29-year-old with DM

- Though she was pleased with an A1c of 7, she was concerned about the weight gain from 200 to 230 lbs. over the course of 12 months. **She attributed this to insulin and tried to self-reduce resulting in A1c rise back to 8.5%**



# CASE

## 29-year-old with DM

- Was started on pramlintide (Symlin) 60 mcg and titrated to three times daily with meals

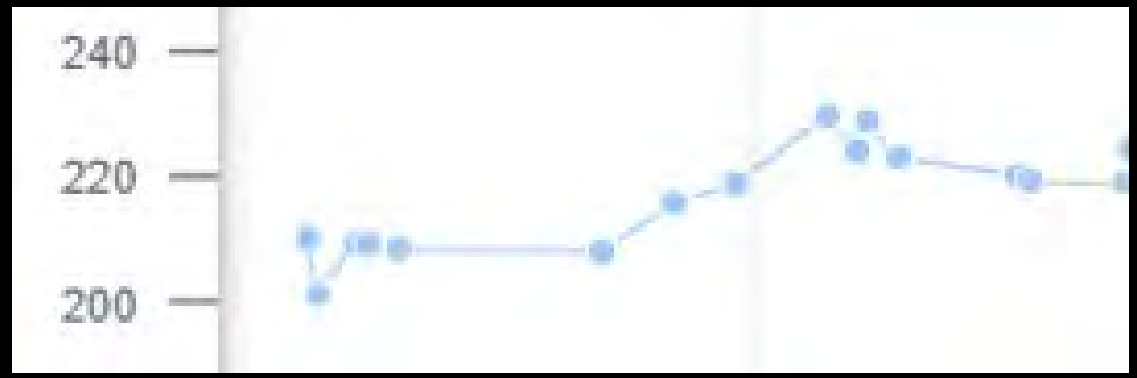
# Have you heard of pramlintide (Symlin)?

# CASE

## 29-year-old with DM

- Was started on pramlintide (Symlin) 60 mcg and titrated to three times daily with meals
- Noted some hunger reduction and modest weight reduction (230 219) but found it burdensome and expensive

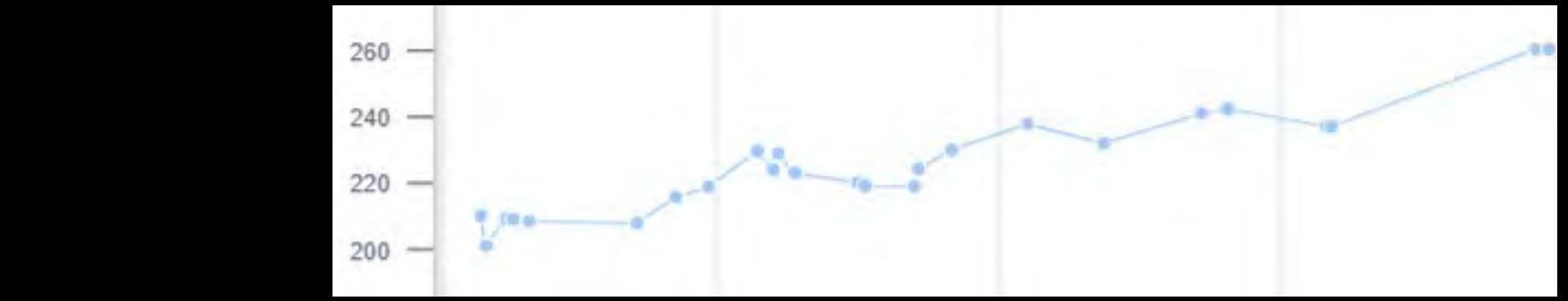
- A1c improved from 8.5% to 6.9%



# CASE

## 31-year-old with DM

- She continued with basal bolus insulin + metformin + intermittent use of symlin for another 18 months
- During this time, the pandemic started/persisted, and she had additional weight gain to a peak of 260 lbs. though glycemic control remained at target



# CASE

## 31-year-old with DM

- Decision made to retest c-peptide (previously found to be low). Found to be detectable (though low-normal). Antibody testing for T1DM also negative.
- Decision made to STOP pramlintide and START semaglutide (insurer was covering it without a prior authorization and would be less expensive than pramlintide).

**ASIDE from cost/coverage, what are the most common reasons your patients are hesitant to try incretin mimetic/NUSH therapy? (can select multiple)**

# CASE

IF your patient is hesitant to try a “new” medicine, what do you say?

IF your patient is wondering how these medicines work, what do you say?

IF your patient is skeptical about using these medicines for either diabetes or obesity, what do you say?

(brief)

# HISTORY of

~~GLP-1s~~

Incretin mimetics

a.k.a.

Nutrient-stimulated hormones

(NUSH)s

# MAIN DIRECT EFFECTS

SATIATION

SATIETY

GLUCOSE CONTROL

Anti-inflammatory

# “The Incretin Effect” → first identified in 1987

HORMONES (such as GIP and GLP-1 that…

- respond to oral nutrients
    - carb > fat > protein
- promote satiety via hypothalamus
- decrease gastric emptying
- enhance insulin secretion
- function as “meal termination” signals

# Incretin effect is BLUNTED

- In those with diabetes
- In those with obesity
- Especially in those with both

- Therefore: simple “replacement” would be inadequate

www.thelancet.com/diabetes-endocrinology Vol 4 June 2016 *Diabetes Obes Metab.* 2018;**20(Suppl. 1)**:5–21.

# INCRETIN EFFECT and weight control: Happy Accident? NO

## Lotte Knudsen

Novo Nordisk
Chief Scientific Advisor in Research and Early Development

Foto: Jeppe Bøje Nielsen / DER SPIEGEL

https://www.acquired.fm/episodes/the-scientific-journey-behind-ozempic-with-lotte-bjerre-knudsen-novo-nordisks-chief-scientific-advisor

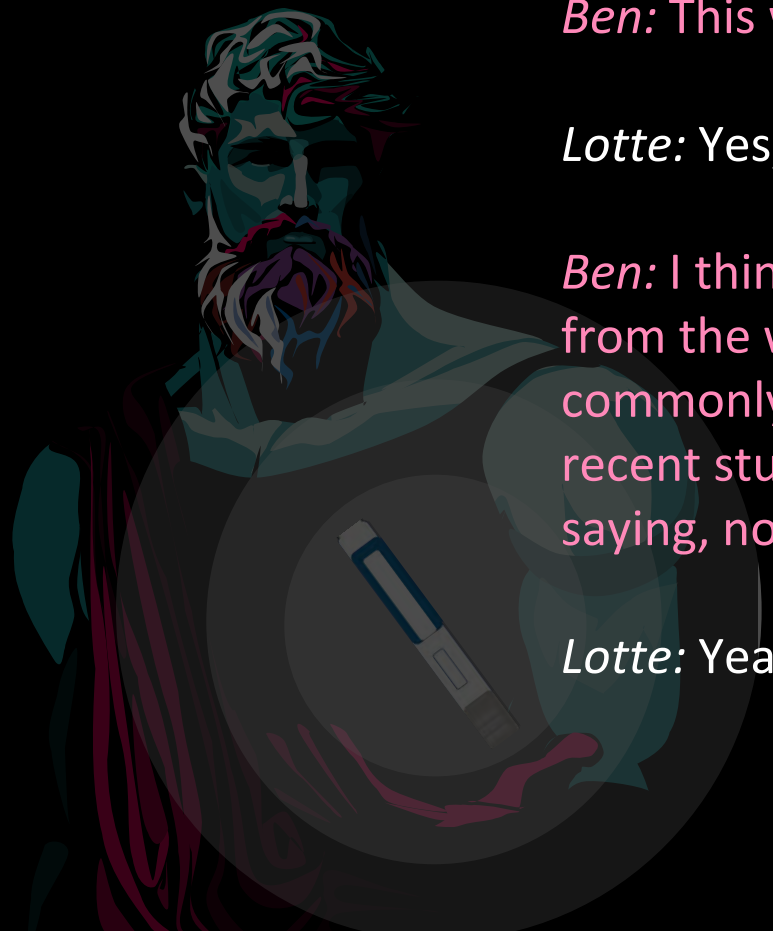
# INCRETIN EFFECT and weight control: Happy Accident? NO

*David:* Is it correct to say that during the (at least) initial development process, the target market was type 2 diabetics who were not yet insulin-dependent.

*Lotte:* That's the next level of the conversation that could be really interesting because actually for us, the target market was also obesity from the beginning. Of course, it's impossible to be on top of everything that's being written, but for us it was obesity all the way from the beginning.

https://www.acquired.fm/episodes/the-scientific-journey-behind-ozempic-with-lotte-bjerre-knudsen-novo-nordisks-chief-scientific-advisor

# INCRETIN EFFECT and weight control: Happy Accident? NO



*Ben:* This was as early as the early mid-90s, this was the thinking?

*Lotte:* Yes, it was.

*Ben:* I think this is important to underscore for listeners. This is extremely different from the widely held belief in most media right now that is about Ozempic. What you commonly read is that they were seeking a diabetes drug and oh my god, in this most recent study they stumbled upon this idea that it's amazing for weight loss. You're saying, no, from the very beginning, we thought that this could do both.

*Lotte:* Yeah, it is a common misunderstanding.

https://www.acquired.fm/episodes/the-scientific-journey-behind-ozempic-with-lotte-bjerre-knudsen-novo-nordisks-chief-scientific-advisor

# Timeline of Incretin/NUSH therapies

# Incretin mimetics / (NuSHs)


## GLP-1 RA

- 2005 Exenatide (2x/d)
- 2010 Liraglutide (1x/d)
- 2012 Exenatide-LA (1x/week)
- 2014 Dulaglutide (1x/week)
- 2014 Albiglutide (1x/week)
- 2016 Lixisenatide (1x/d)
- 2017 Semaglutide (1x/week)
- 2019 Semaglutide (oral, 1x/d)

## Amylin mimetic

- 2005 Pramlintide (3x/d)

## GLP-1/GIP Dual agonist

- 2022 Tirzepatide (1x/week)

Dahlén AD, Dashi G, Maslov I, Attwood MM, Jonsson J, Trukhan V, Schiöth HB. Trends in Antidiabetic Drug Discovery: FDA Approved Drugs, New Drugs in Clinical Trials and Global Sales. Front Pharmacol. 2022 Jan 19;12:807548. doi: 10.3389/fphar.2021.807548. PMID: 35126141; PMCID: PMC8807560.

# Incretin mimetics / (NuSHs)

## GLP-1 RA

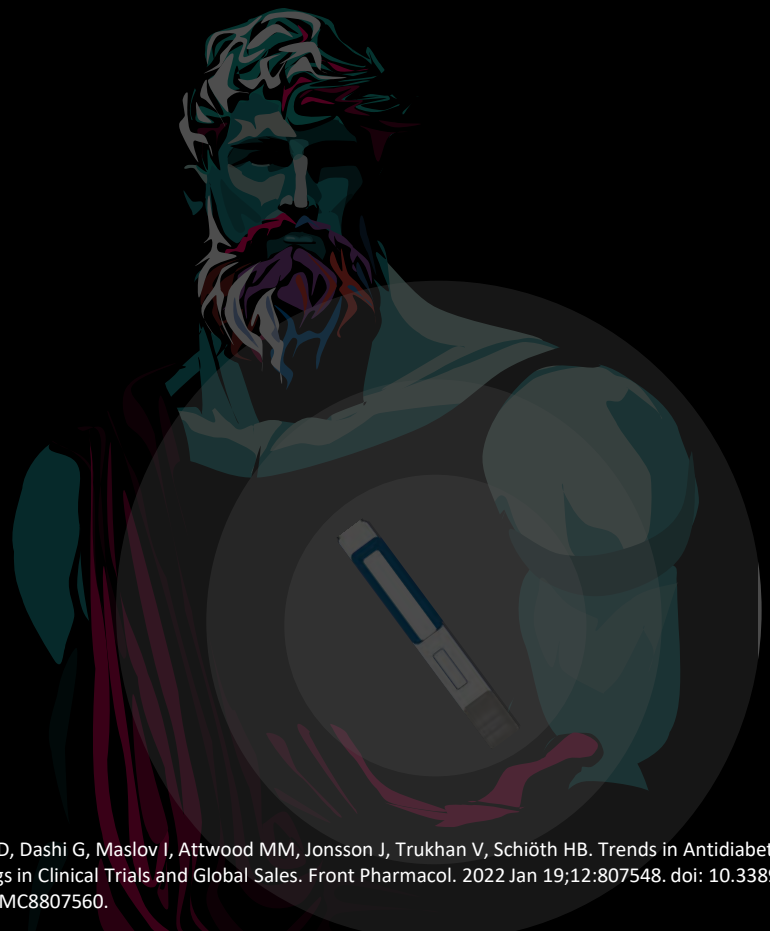
- 2005 Exenatide (2x/d)
- 2010 Liraglutide (1x/d)
- 2012 Exenatide-LA (1x/week)
- 2014 Dulaglutide (1x/week)
- ~~2014 Albiglutide (1x/week)~~
- 2016 Lixisenatide (1x/d)
- 2017 semaglutide (1x/week)
- 2019 semaglutide (oral, 1x/d)

## Amylin mimetic

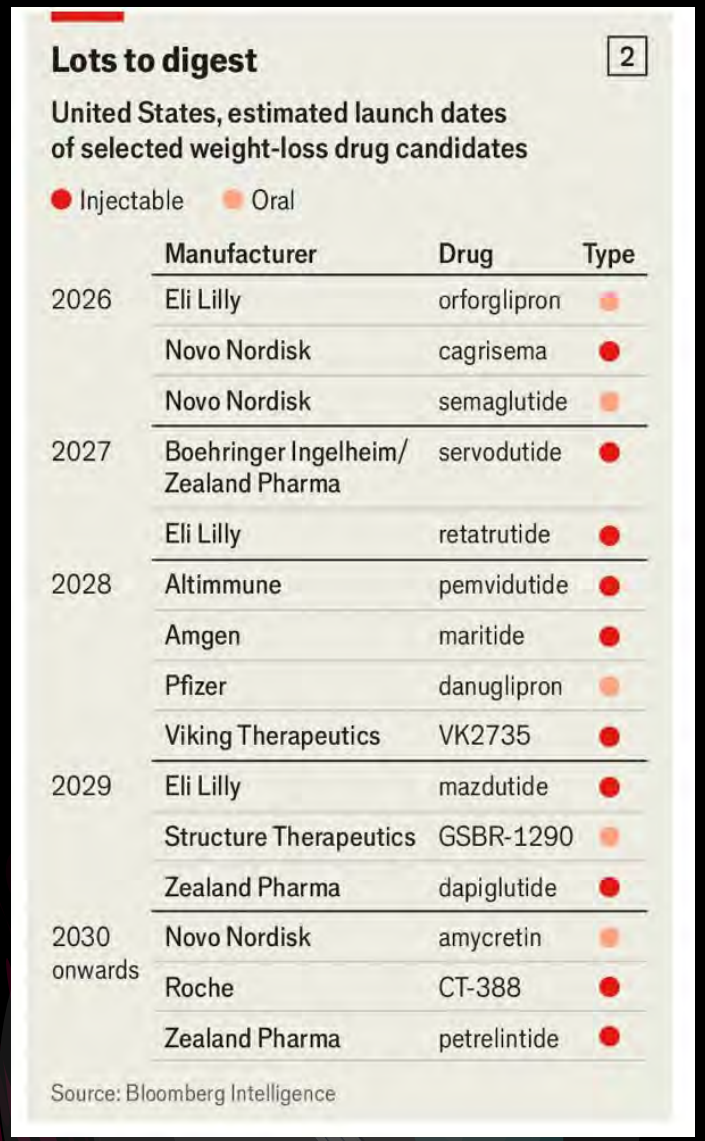
- 2005 Pramlintide (3x/d)

## GLP-1/GIP Dual agonist

- 2022 Tirzepatide (1x/week)



Dahlén AD, Dashi G, Maslov I, Attwood MM, Jonsson J, Trukhan V, Schiöth HB. Trends in Antidiabetic Drug Discovery: FDA Approved Drugs, New Drugs in Clinical Trials and Global Sales. Front Pharmacol. 2022 Jan 19;12:807548. doi: 10.3389/fphar.2021.807548. PMID: 35126141; PMCID: PMC8807560.



**Lots to digest** 2

United States, estimated launch dates of selected weight-loss drug candidates

● Injectable ● Oral

| | Manufacturer | Drug | Type |
|---|---|---|---|
| 2026 | Eli Lilly | orforglipron | ● |
| | Novo Nordisk | cagrisema | ● |
| | Novo Nordisk | semaglutide | ● |
| 2027 | Boehringer Ingelheim/ Zealand Pharma | servodutide | ● |
| | Eli Lilly | retatrutide | ● |
| 2028 | Altimmune | pemvidutide | ● |
| | Amgen | maritide | ● |
| | Pfizer | danuglipron | ● |
| | Viking Therapeutics | VK2735 | ● |
| 2029 | Eli Lilly | mazdutide | ● |
| | Structure Therapeutics | GSBR-1290 | ● |
| | Zealand Pharma | dapiglutide | ● |
| 2030 onwards | Novo Nordisk | amycretin | ● |
| | Roche | CT-388 | ● |
| | Zealand Pharma | petrelintide | ● |

Source: Bloomberg Intelligence

# Incretin mimetics / (NuSHs) FUTURE directions

- Oral GLP-1 RA
- Small molecular weight GLP-1 RA
- Dual therapy:
  - Amylin-GLP-1 RA
  - GIP R antagonist/ GLP-1 RA
  - GLP-1 RA/ glucagon (GCG)
- Triple therapy:
  - GLP-1 RA/GIP-RA/GCG

Ashwin Kanna Chetty, Ebne Rafi, Natalie J. Bellini, Natalie Buchholz, Diana Isaacs,
A Review of Incretin Therapies Approved and in Late-Stage Development for Overweight and Obesity Management,
Endocrine Practice, Volume 30, Issue 3, 2024, Pages 292-303, ISSN 1530-891X

Campbell JE. Targeting the GIPR for obesity: To agonize or antagonize? Potential mechanisms. Mol Metab. 2021 Apr;46:101139. doi: 10.1016/j.molmet.2020.101139. Epub 2020 Dec 5. PMID: 33290902; PMCID: PMC8085569.

# BACK TO CASE

## 31-year-old with diabetes:

- Ready to start semaglutide.
- Ready to start semaglutide?

Are treatment considerations different/ same when NuSH therapy is used for:

- Diabetes
- Obesity
- CAD
- PAD
- CKD
- OSA

?

**When prescribing for diabetes vs obesity vs CAD, do you think differently about how the medicine will affect weight, hunger, cravings? (may select more than one)**

Does the indication affect your nutrition plan?

More attentive?
Less attentive?

Does nutrition get “lost in the shuffle”?

?

# COMPREHENSIVE Nutrition Plan

- Baseline assessment
  - Current practices
  - Dietary/healthy literacy
  - Vitamin/mineral status
- Goal formulation
  - Calories
  - Macronutrients
  - Comorbid management
- Plan
  - RD
  - Commercial
  - Specialized program
  - Self-management

# BASELINE Assessment

## In the visit:

- The quick-and-dirty
- 24-hr. dietary recall
- Structured tool (e.g. The Rapid Eating Assessment for Participants–Shortened (REAP-S) – can be done in < 10-minute )

## Pre/post visit:

- Registered Dietitian

# BASELINE Assessment

## Vitamins/minerals:

- Consider the relative prevalence of deficiencies in the population
- May need pre-intervention screening
- May need a multivitamin +/- other supplements

Almandoz JP, Wadden TA, Tewksbury C, et al. Nutritional considerations with antiobesity 182 medications. Obesity (Silver Spring). 2024;32(9):1613-1631. doi:10.1002/oby.24067

# BASELINE Assessment

## Dietary (and health) literacy:

- Will impact treatment recommendations
- If dietary literacy is low, will need more general education, initially
- If high, then general recommendations will be seen as ineffective and a “waste of time”
- Can be discerned, to some degree, at visit

# Goal Formulation

## Options:

- Simple calorie reduction strategy
- Resting metabolic rate estimation  to guide caloric recommendation
- Macronutrient strategy (e.g. very low carbohydrate)
- Disease specific (diabetes, CHF, renal)

# Goal Formulation

For purposes of weight loss, there are numerous, evidenced based strategies:

- DASH
- Diabetes Prevention Program/ Look AHEAD
- Mediterranean
- Low-fat
- Low-carb
- Very-low-carb
- Low-calorie
- Very-low-calorie/ meal replacement
- Intermittent fasting/ time restricted feeding

In addition to patient-specific factors, think about YOUR ecosystem:

What can we do WELL?

Kheniser K, Saxon DR, Kashyap SR. Long-Term Weight Loss Strategies for Obesity. J Clin Endocrinol Metab. 2021 Jun 16;106(7):1854-1866. doi: 10.1210/clinem/dgab091. PMID: 33595666; PMCID: PMC8427732.

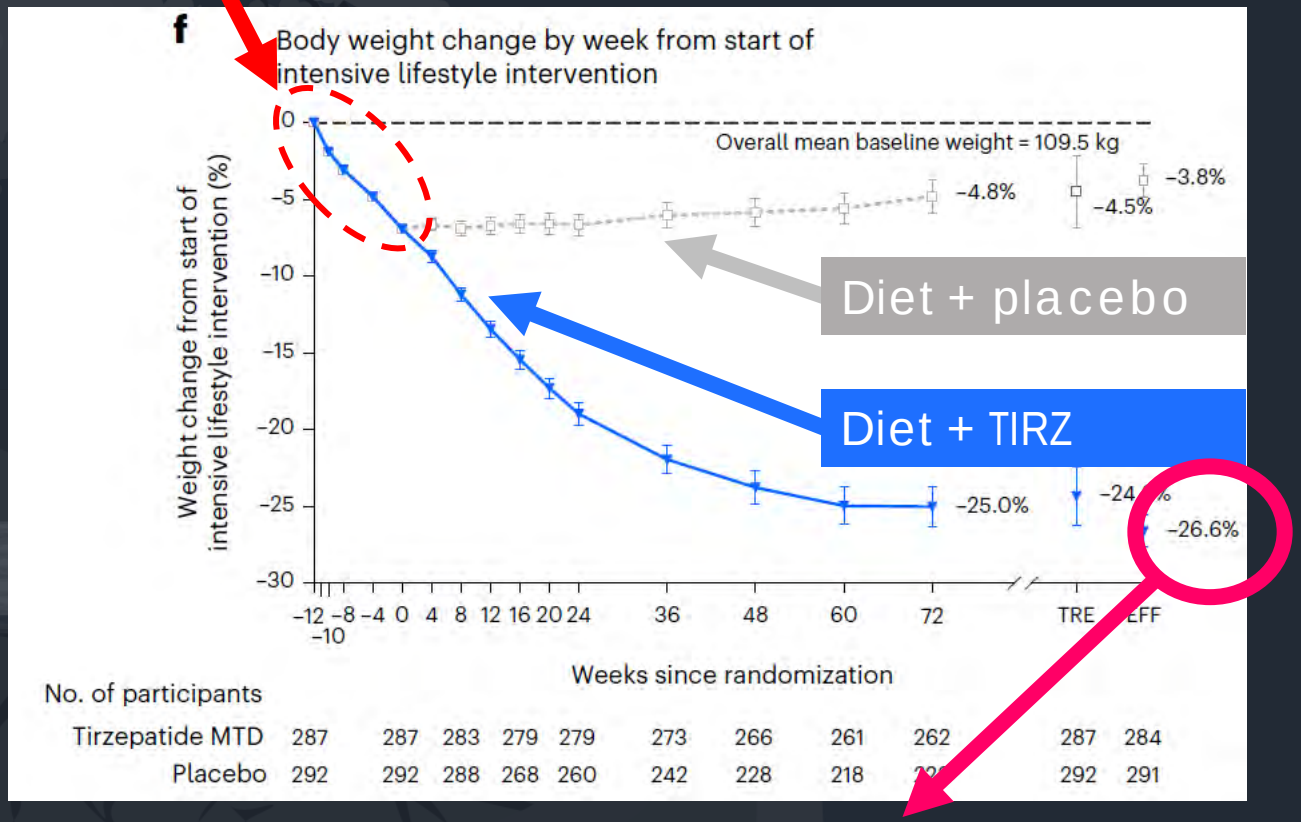
# Plan/Implementation

## Options:

- RD
- Commercial program
- Medical nutrition therapy/ comprehensive program
- Self-managed

*we will move on with the case but will talk about incretin-specific-diet considerations and exercise, later.

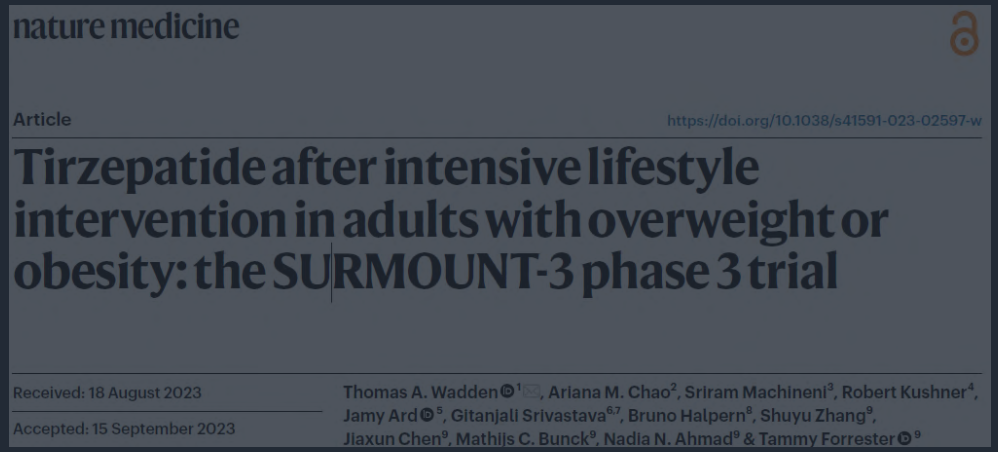
Intensive diet (could include partial meal replacement)




*Superior results to conventional dietary intervention + TIRZ

# Effect of structured lifestyle regimen

- Studies demonstrate effective enhancement of medication use when paired with more intensive dietary intervention


nature medicine

Article

https://doi.org/10.1038/s41591-023-02597-w

Tirzepatide after intensive lifestyle intervention in adults with overweight or obesity: the SURMOUNT-3 phase 3 trial

Received: 18 August 2023

Accepted: 15 September 2023

Thomas A. Wadden[1], Ariana M. Chao[2], Sriram Machineni[3], Robert Kushner[4], Jamy Ard[5], Gitanjali Srivastava[6,7], Bruno Halpern[8], Shuyu Zhang[9], Jiaxun Chen[9], Mathijs C. Bunck[9], Nadia N. Ahmad[9] & Tammy Forrester[9]

# CASE

## 31□33-year-old with DM

- She agreed to start semaglutide –and- agreed to return to see the dietitian.
- She received calorie reduction recommendations and carb moderation advice
- Over the course of two years, went from 260 □ 183 lbs. (= 30% weight loss) and A1c ranged between 6-7%. Insulin still required but at lower doses.

# CASE

## 33-year-old with DM

- Happy Ever After?
- LATER, we will revisit this case to discuss some obstacles that arose

NEXT CASE

# CASE

## 62-year-old with DM, MASLD, and OSA

- She would like help with weight control
- Diabetes is managed with metformin monotherapy and control is good
- However, A1c has been rising for the past few years and correlates with an increase in weight
- She started to gain weight in her 30s during pregnancies and had trouble losing weight post-partum
- She is at 240 lbs. with a BMI of 38 kg/m2

# CASE

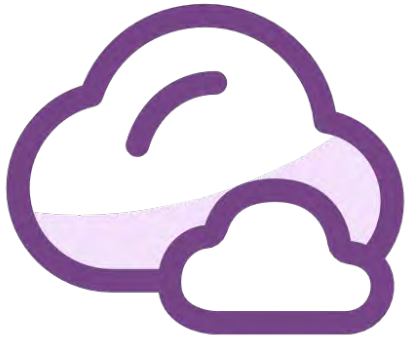
## 62-year-old

- She has tried commercial weight programs with the last effort a year ago. She was able to lose 15 lbs., but found the diet unsustainable due to hunger/cravings
- She also notes issues with impulse control and emotion-provoked eating
- She has a medical background and believes that her dietary and health literacy is high
- After initial discussion, she was referred to a therapist to discuss disordered eating.
- She also agreed to be seen in the intensive weight management program offered through the institution. This program starts with 12 weeks of total meal replacement followed by a transition to an individualized lifestyle plan.
- However, she changes her mind and returns to discuss obesity modifying medication

# CASE

## 62-year-old

- Given her history of diabetes, incretin mimetic therapy is being considered
- Baseline bone density study revealed osteopenia with T-scores of -1.2 of L1-L3 and -1.5 of the femoral neck [FRAX score did not warrant prophylactic treatment – even when accounting for diabetes]



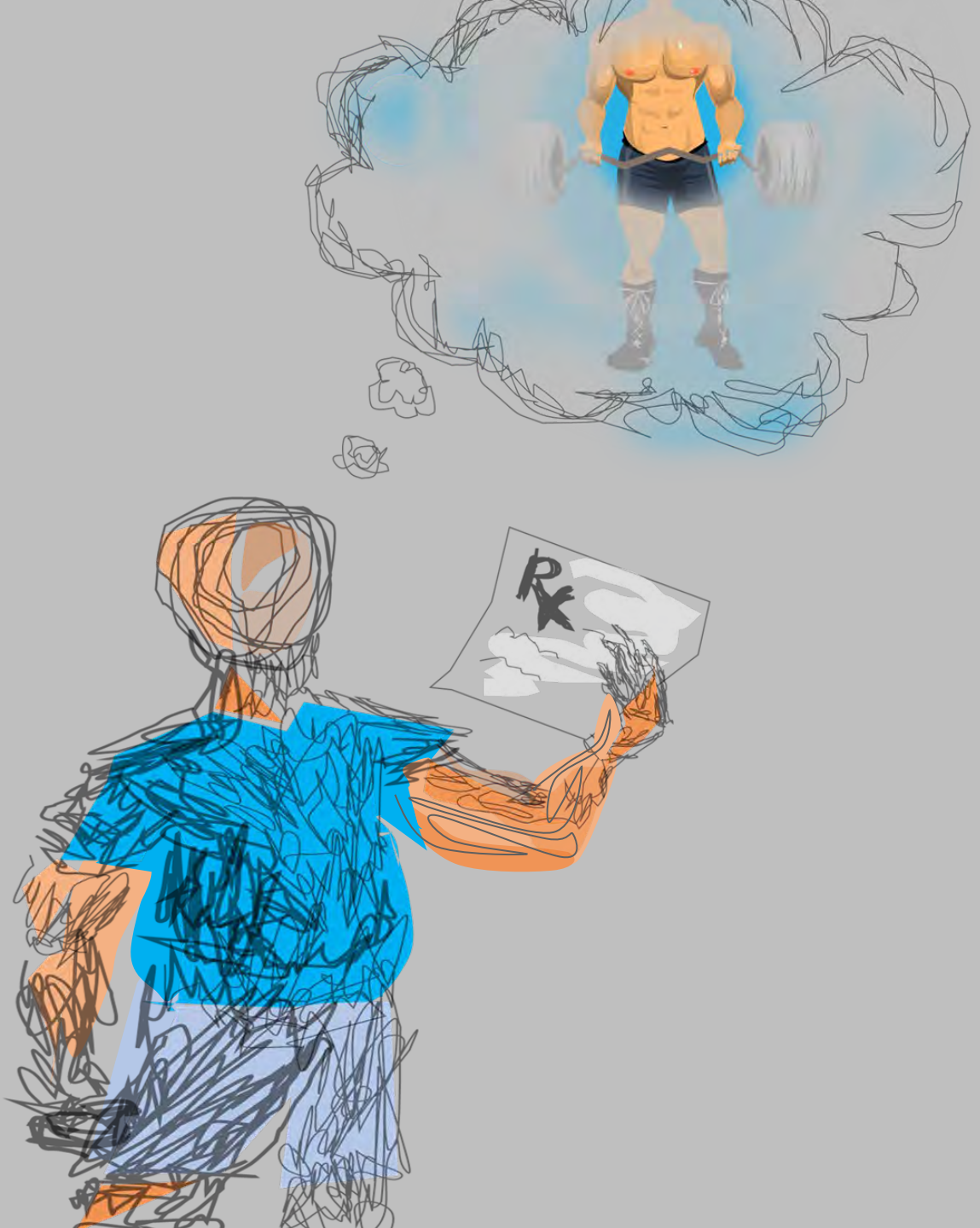
**For your older patients, are there any particular concerns you have when considering incretin mimetic therapy?**


# BODY COMPOSITION

# +

# INCRETINS

Neeland IJ, Linge J, Birkenfeld AL. Changes in lean body mass with glucagon-like peptide-1-based therapies and mitigation strategies. Diabetes Obes Metab. 2024 Sep;26 Suppl 4:16-27. doi: 10.1111/dom.15728. Epub 2024 Jun 27. PMID: 38937282.




# The concern for SARCOPENIA

Neeland IJ, Linge J, Birkenfeld AL. Changes in lean body mass with glucagon-like peptide-1-based therapies and mitigation strategies. Diabetes Obes Metab. 2024 Sep;26 Suppl 4:16-27. doi: 10.1111/dom.15728. Epub 2024 Jun 27. PMID: 38937282.

# The concern for SARCOPENIA

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# SARCOPENIA:

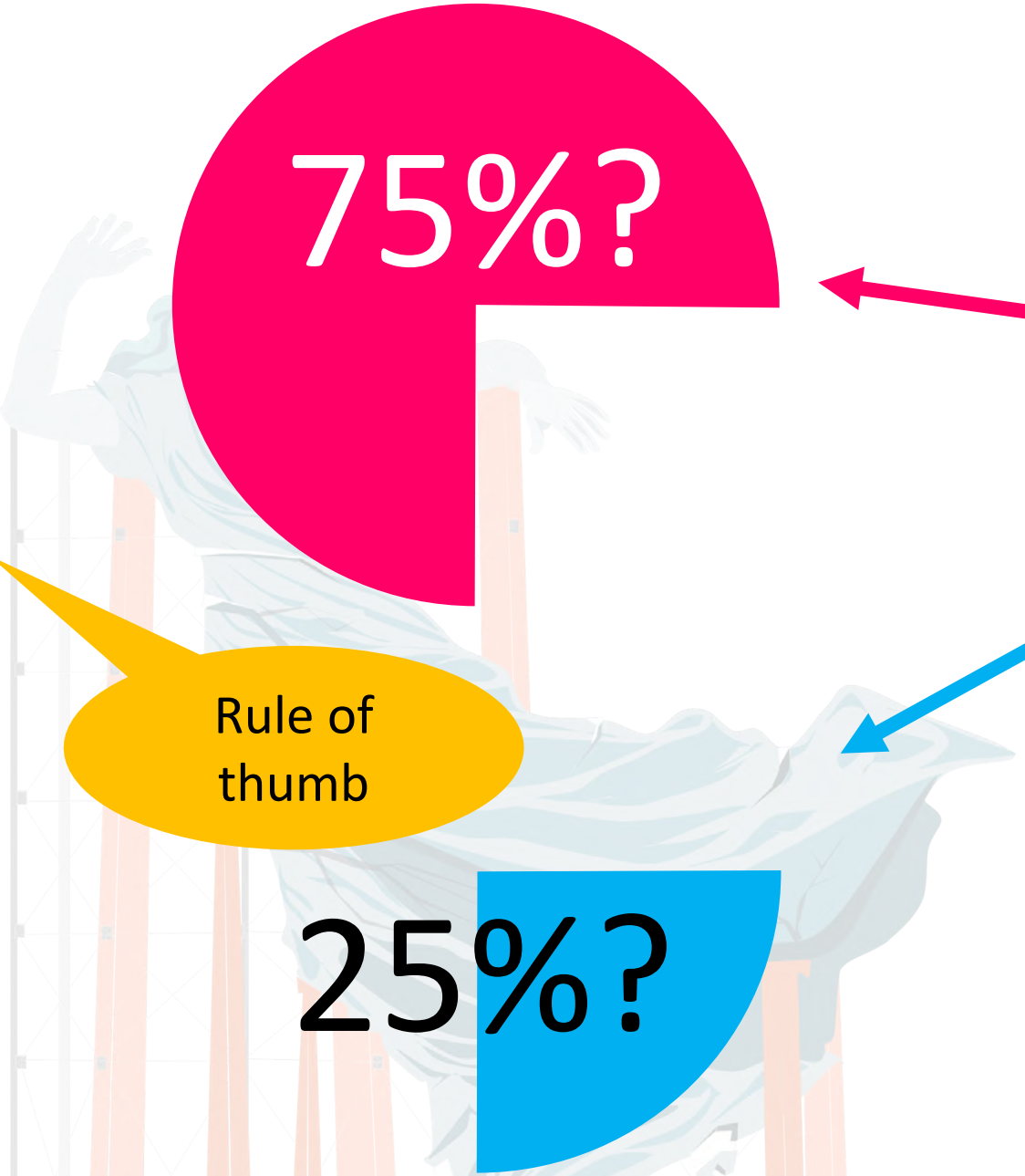
- loss of muscle mass, strength, and function due to weight loss
- Manifestations: weakness, fatigue, balance disturbance, trouble with walking/standing

Neeland IJ, Linge J, Birkenfeld AL. Changes in lean body mass with glucagon-like peptide-1-based therapies and mitigation strategies. Diabetes Obes Metab. 2024 Sep;26 Suppl 4:16-27. doi: 10.1111/dom.15728. Epub 2024 Jun 27. PMID: 38937282.

# WEIGHT LOSS-INDUCED CHANGES

- Reduction in adipose tissue mass
- Reduction in fat-free (a.k.a. lean) mass
  - Muscle
  - Organs
  - Bone
  - Fluids
  - Water

Neeland IJ, Linge J, Birkenfeld AL. Changes in lean body mass with glucagon-like peptide-1-based therapies and mitigation strategies. Diabetes Obes Metab. 2024 Sep;26 Suppl 4:16-27. doi: 10.1111/dom.15728. Epub 2024 Jun 27. PMID: 38937282.

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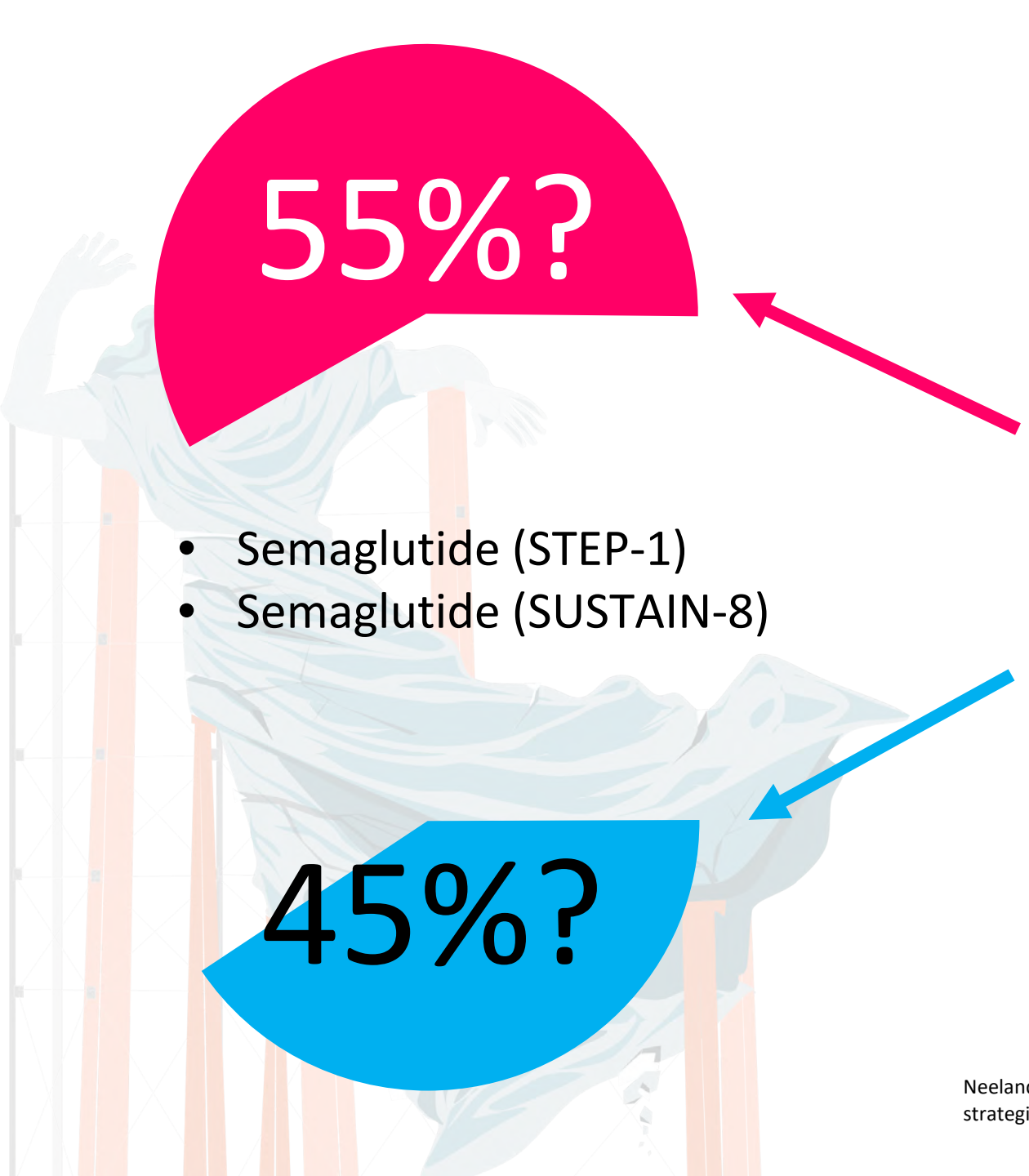
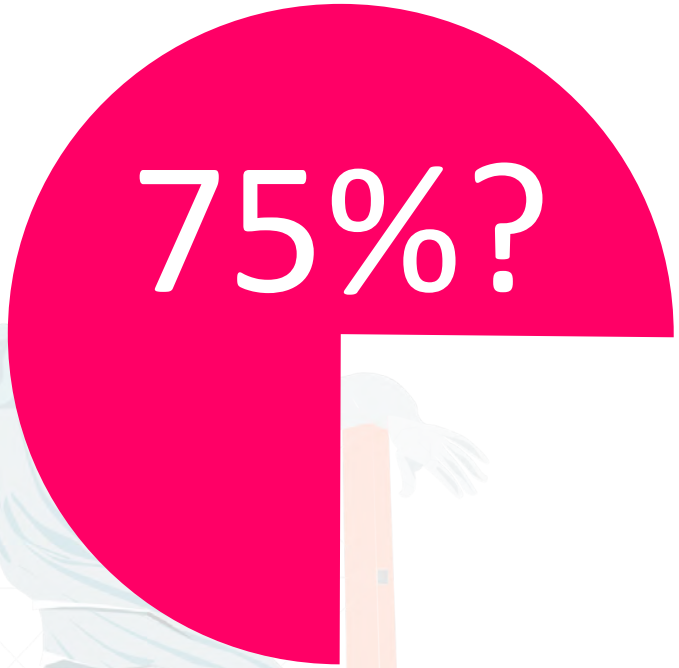



- Semaglutide (STEP-1)
- Semaglutide (SUSTAIN-8)

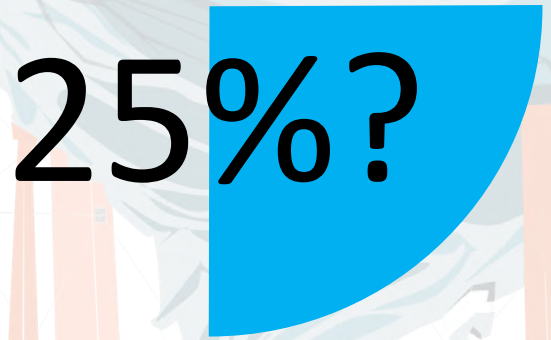
# INCRETIN-MEDIATED WEIGHT LOSS-INDUCED CHANGES: Different or not?

- Reduction in adipose tissue mass
- Reduction in fat-free (a.k.a. lean) mass

Neeland IJ, Linge J, Birkenfeld AL. Changes in lean body mass with glucagon-like peptide-1-based therapies and mitigation strategies. Diabetes Obes Metab. 2024 Sep;26 Suppl 4:16-27. doi: 10.1111/dom.15728. Epub 2024 Jun 27. PMID: 38937282.




- Tirzepatide (SURMOUNT-1)

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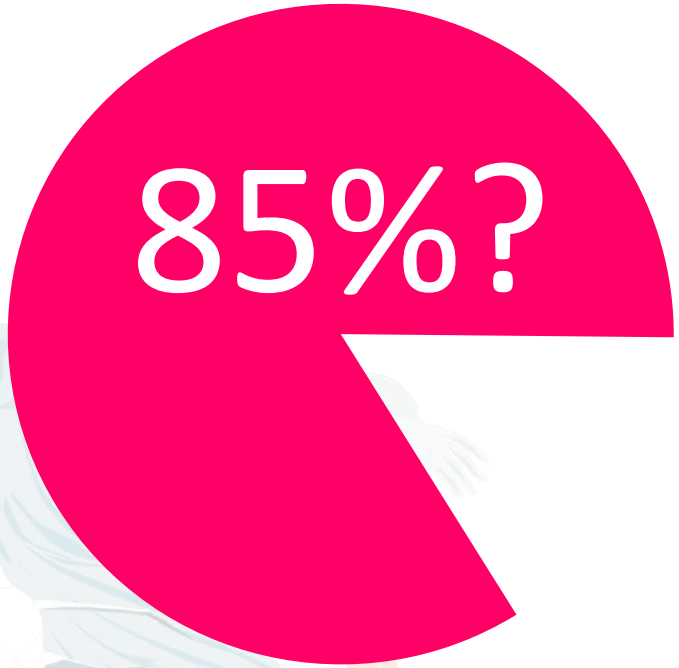
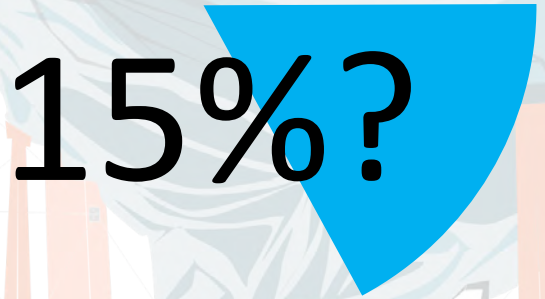



- Liraglutide + lifestyle




# INCRETIN-MEDIATED WEIGHT LOSS-INDUCED CHANGES: Different or not?

- Reduction in adipose tissue mass
- Reduction in fat-free (a.k.a. lean) mass

Neeland IJ, Linge J, Birkenfeld AL. Changes in lean body mass with glucagon-like peptide-1-based therapies and mitigation strategies. Diabetes Obes Metab. 2024 Sep;26 Suppl 4:16-27. doi: 10.1111/dom.15728. Epub 2024 Jun 27. PMID: 38937282.


- Liraglutide + exercise

+15%

# INCRETIN-MEDIATED WEIGHT LOSS-INDUCED CHANGES: Different or not?

- Reduction in adipose tissue mass
- INCREASE in fat-free (a.k.a. lean) mass

Neeland IJ, Linge J, Birkenfeld AL. Changes in lean body mass with glucagon-like peptide-1-based therapies and mitigation strategies. Diabetes Obes Metab. 2024 Sep;26 Suppl 4:16-27. doi: 10.1111/dom.15728. Epub 2024 Jun 27. PMID: 38937282.

# INCRETIN-MEDIATED WEIGHT LOSS-INDUCED CHANGES: Knowledge gaps

- Lack of routine, standardized clinical assessment/ tools
- Heterogeneity of studies
- Small % of participants get body composition
- Lean body mass is not synonymous with muscle mass
- Muscle mass is not the same as muscle function

Neeland IJ, Linge J, Birkenfeld AL. Changes in lean body mass with glucagon-like peptide-1-based therapies and mitigation strategies. Diabetes Obes Metab. 2024 Sep;26 Suppl 4:16-27. doi: 10.1111/dom.15728. Epub 2024 Jun 27. PMID: 38937282.

# INCRETIN-MEDIATED WEIGHT LOSS-INDUCED CHANGES:

- Based on the current level of evidence, we cannot definitively conclude that incretin-mediated weight loss results in a DISPROPORTIONATELY high degree of lean body mass loss and/or muscle loss

Neeland IJ, Linge J, Birkenfeld AL. Changes in lean body mass with glucagon-like peptide-1-based therapies and mitigation strategies. Diabetes Obes Metab. 2024 Sep;26 Suppl 4:16-27. doi: 10.1111/dom.15728. Epub 2024 Jun 27. PMID: 38937282.

# INCRETIN-MEDIATED WEIGHT LOSS-INDUCED CHANGES:

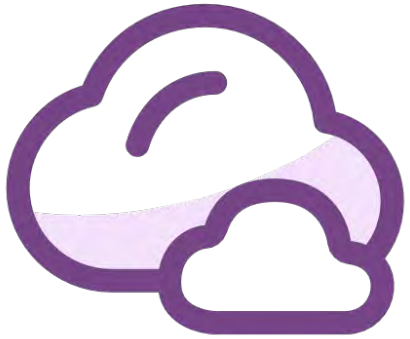
- HOWEVER, we know that some of our patients are at disproportionately high risk of sarcopenia due to:
  - Age
  - Baseline functional status
  - Comorbid conditions

- Therefore, we need to be diligent about PREVENTING FRAILTY

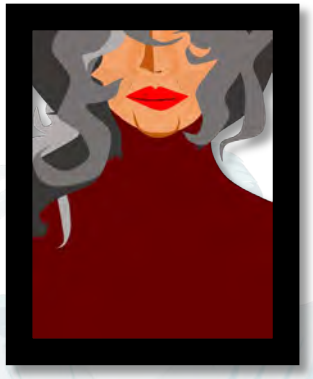
Neeland IJ, Linge J, Birkenfeld AL. Changes in lean body mass with glucagon-like peptide-1-based therapies and mitigation strategies. Diabetes Obes Metab. 2024 Sep;26 Suppl 4:16-27. doi: 10.1111/dom.15728. Epub 2024 Jun 27. PMID: 38937282.

# What about our patient?

Neeland IJ, Linge J, Birkenfeld AL. Changes in lean body mass with glucagon-like peptide-1-based therapies and mitigation strategies. Diabetes Obes Metab. 2024 Sep;26 Suppl 4:16-27. doi: 10.1111/dom.15728. Epub 2024 Jun 27. PMID: 38937282.

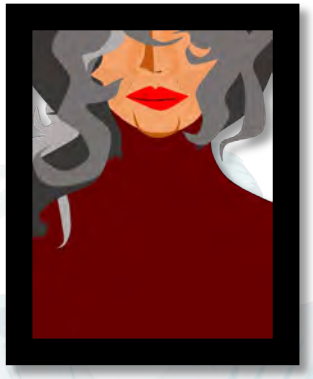


# What would you recommend to avoid sarcopenia and frailty?



# DIET:
# Nutrient Dense Foods!
# Protein prioritization!

- Common sense, right?
- What does the evidence say?
    - No consensus in the literature



# DIET: Protein prioritization

- Challenges:
    - Wide range of recommended amounts
        - Do you use a weight-based calculation? Which weight?
        - How do you select the amount from the range of from 1 – 2 grams of protein/kg/day?
        - High recommended targets can be hard to achieve
    - Easy to recommend, hard for some patients to implement  do we know what are the practical translations for our recommendations?

# 1200 - 1500 cal/day (120 gm protein)

## Day 1:

**Breakfast (400 kcal, 35g protein):**

- 3 scrambled eggs (with cooking spray)
- 1 oz shredded cheese
- 1 cup spinach, sautéed
- 2 slices of whole-grain toast

**Lunch (350 kcal, 30g protein):**

- Grilled chicken breast (4 oz)
- 1 cup quinoa
- 1 cup steamed broccoli
- 1 tbsp olive oil (for cooking or drizzling)

**Dinner (450 kcal, 40g protein):**

- 6 oz salmon, baked
- 1 cup roasted sweet potatoes
- 1 cup steamed asparagus
- Lemon and herbs for seasoning

**Snack (150 kcal, 15g protein):**

- Greek yogurt (plain, 3/4 cup)
- 1 tbsp chia seeds

## Day 2:

**Breakfast (350 kcal, 30g protein):**

- Protein oatmeal: 1/2 cup oats + 1 scoop protein powder
- 1 tbsp almond butter
- 1/2 banana, sliced

**Lunch (400 kcal, 35g protein):**

- Turkey and avocado wrap:
  - 4 oz sliced turkey breast
  - 1 whole wheat tortilla
  - Lettuce, tomato, mustard
  - 1/4 avocado

**Dinner (450 kcal, 40g protein):**

- Grilled shrimp (6 oz)
- 1 cup brown rice
- 1 cup sautéed bell peppers and onions
- Olive oil for cooking (1 tsp)

**Snack (150 kcal, 15g protein):**

- Low-fat cottage cheese (3/4 cup)
- Sliced cucumber and cherry tomatoes

## Day 6 (Vegetarian):

**Breakfast (350 kcal, 30g protein):**

- Greek yogurt bowl:
  - 1 cup plain Greek yogurt
  - 1 scoop vanilla protein powder
  - 1/2 cup mixed berries
  - 1 tbsp chia seeds

**Lunch (400 kcal, 35g protein):**

- Lentil and quinoa salad:
  - 1 cup cooked quinoa
  - 1/2 cup cooked lentils
  - Cherry tomatoes, cucumber, bell peppers
  - 2 tbsp feta cheese
  - Lemon-tahini dressing (1 tbsp tahini, lemon juice)

**Dinner (450 kcal, 40g protein):**

- Paneer stir-fry:
  - 4 oz paneer cheese
  - 1 cup mixed bell peppers, onions, spinach
  - 1/2 cup brown rice
  - Spices: cumin, turmeric, paprika
  - 1 tbsp olive oil

**Snack (150 kcal, 15g protein):**

- Cottage cheese (3/4 cup)
- Sliced peaches or pineapple

## Day 7 (Vegan):

**Breakfast (350 kcal, 30g protein):**

- Protein smoothie bowl:
  - 1 scoop vegan protein powder
  - 1 cup almond milk
  - 1/2 banana
  - 1 tbsp almond butter
  - Spinach and ice

**Lunch (400 kcal, 35g protein):**

- Tofu and edamame stir-fry:
  - 4 oz tofu, sautéed
  - 1/2 cup edamame (shelled)
  - 1 cup broccoli and carrots
  - 1 tbsp soy sauce and ginger
  - 1/2 cup brown rice

**Dinner (450 kcal, 40g protein):**

- Vegan chili:
  - 1 cup black beans
  - 1 cup kidney beans
  - Diced tomatoes, bell peppers, onions
  - Chili powder, cumin, garlic
  - 1/2 avocado for garnish

**Snack (150 kcal, 15g protein):**

- Roasted chickpeas (1/2 cup)
- Nutritional yeast for seasoning

# 1200 cal/day (150 gm protein)

### Day 1 (Omnivore - Latino-Inspired)

Breakfast (300 kcal, 50g protein):

- Huevos revueltos con claras y aguacate (1 cup egg whites scrambled with tomatoes, onions, and cilantro)
- 1 small corn tortilla
- ½ small avocado

Lunch (400 kcal, 50g protein):

- Pollo a la plancha (6 oz grilled chicken breast) with lime and garlic
- Arroz con cilantro y limón (½ cup brown rice with cilantro & lime)
- Steamed green beans

Dinner (400 kcal, 50g protein):

- Tilapia Veracruzana (5 oz grilled tilapia with tomatoes, olives, and capers)
- Sautéed bell peppers and zucchini
- ½ cup black beans

Snack (100 kcal, 10g protein):

- 1 scoop whey protein mixed with water

Total: 1200 kcal, 150g protein

### Day 2 (Omnivore - Middle Eastern)

Breakfast (300 kcal, 50g protein):

- Labneh with Za'atar (½ cup low-fat labneh, sprinkled with za'atar)
- 1 boiled egg
- ½ whole wheat pita

Lunch (400 kcal, 50g protein):

- Lean beef kofta (6 oz, seasoned with coriander, cumin, and garlic)
- Grilled zucchini & eggplant
- ½ cup bulgur wheat

Dinner (400 kcal, 50g protein):

- Lemon-garlic shrimp (6 oz, grilled)
- Steamed spinach & sumac
- ½ cup brown rice

Snack (100 kcal, 10g protein):

- Roasted chickpeas (½ cup, spiced with cumin & paprika)

Total: 1200 kcal, 150g protein

### Day 3 (Vegetarian, Indian-Asian Fusion)

Breakfast (300 kcal, 50g protein):

- Besan (chickpea flour) chilla (½ cup besan, water, cumin, turmeric, and chopped vegetables)
- 1 tbsp coconut chutney
- Masala chai (made with almond milk, no sugar)

Lunch (400 kcal, 50g protein):

- Paneer tikka (4 oz grilled paneer, marinated with yogurt, turmeric, and spices)
- Sautéed cabbage & carrots
- ½ cup millet or brown rice

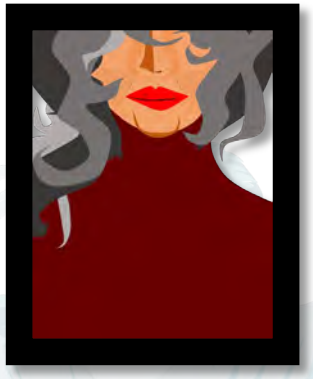
Dinner (400 kcal, 50g protein):

- Soy chunk & tofu stir-fry (½ cup soy chunks, 4 oz tofu, stir-fried with garlic, chili, soy sauce)
- Steamed green beans and mushrooms
- ½ cup red rice

Snack (100 kcal, 10g protein):

- Greek yogurt with cinnamon

Total: 1200 kcal, 150g protein



DIET:

# SIMPLIFY!

# Maintaining Your Muscle Health
# with Protein and Hydration

MCT2D
MICHIGAN COLLABORATIVE FOR TYPE 2 DIABETES

## *EAT ENOUGH PROTEIN*

Protein helps repair and maintain muscle, particularly during weight loss. Eating a greater amount of protein has been shown to help reduce muscle loss while losing weight. Depending on your weight and height, 75-100 gram of protein is a good place to start for most people.

## Recommendations:

- **Aim for 25-30 grams of protein at each meal.**
- Build your meals and snacks around a protein source such as:
  - Animal proteins (fish, chicken, turkey, beef, pork, venison, and lamb)
  - Plant proteins (beans and lentils, tofu and tempeh)
  - Eggs and dairy (Greek yogurt, high-protein yogurt, cottage cheese, and kefir)


- Try pre-made protein shakes, add protein powders to smoothies, or consider a protein bar. Look for varieties without added sugars.

- Pair your proteins with complex carbs (whole grains, fruits, sweet potatoes), non-starchy vegetables (broccoli, beans, leafy greens), and healthy fats (nuts and seeds, olives, avocado) to make a balanced meal.

*These recommendations are for people with normal kidney function. If you have stage 4 or 5 kidney disease, talk with your care team about the right amount of protein for you.*

# HOW MUCH IS 30 GRAMS OF PROTEIN?

Generally, it takes up ¼ of your plate. Here are some examples:

**Chicken**
**1 small breast**
**1.5 large thighs**
**2 medium drumsticks**

**Beef**
**5 oz steak**
**½ cup or 4 oz cooked ground beef**

**Fish**
**5 oz fillet**
**canned fish (1½, 5 oz cans)**
**Shrimp: 4 oz**

**Egg**
**4 whole**
**1 cup egg whites**

**Greek yogurt (plain) or cottage cheese**
**1.3 cups or 10 oz (brands may vary slightly)**

**Tofu (firm)**
**6 oz or 1¼ cups**

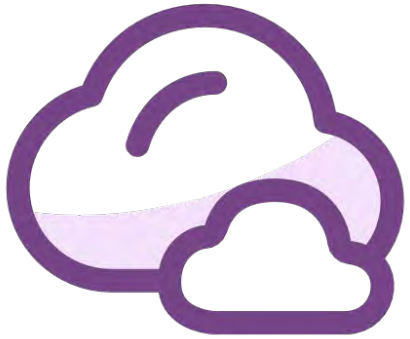
**Cooked Lentils**
**2 cups or 12 oz**

**Cooked Beans (black, pinto, kidney)**
**2 cups or 12 oz**

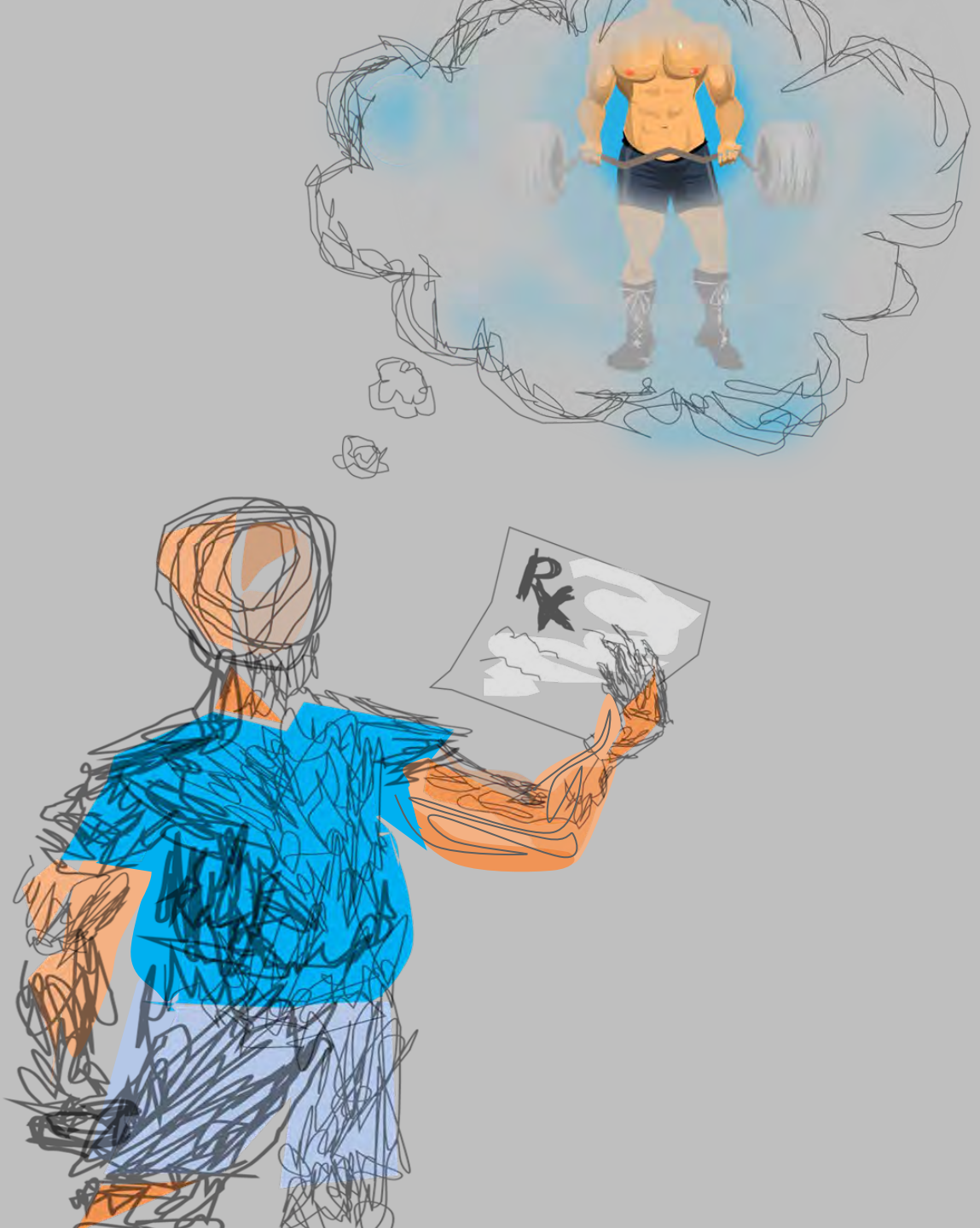
# CASE

## 62-year-old

- You agree to start an incretin mimetic for weight control with the understand that she will follow with you and a dietitian
- Three months post-treatment initiation, she is doing very well with her diet and tracking/logging
- Weight: 240 → 210 (12.5% loss)
- She still notes some emotion-provoked eating but has not yet established with a therapist. She also does not really notice many changes in the mirror despite the comments of others.
- She is tolerating the medication well. She is on the 3rd dose level. She would like to go up on the medication since she still experiences hunger.
- She is not exercising at all.



# Would you increase the dose? Any concerns?




PHYSICAL ACTIVITY

+

EXERCISE

EXERCISE

PHYSICAL ACTIVITY

# EXERCISE: Facts & Myths

- NOT an effective weight LOSS tool, unfortunately.
- Most commonly-used measures of energy. expenditure (ie: fitness trackers; exercise equipment) greatly OVERESTIMATE the number of calories expended during physical activity.
- Exercise IS helpful for **maintaining** a reduced weight state.
- Exercise IS helpful for **preserving lean body mass** during weight loss.
- Exercise SHOULD be performed for **cardiopulmonary health and longevity** - and should be pursued irrespective of weight.
- Therefore, even if weight is not being lost, exercise should be continued for health purposes.


- *Lee, L. Djousse, H.D. Sesso, L. Wang, J.E. Buring, "Physical Activity and Weight Gain Prevention," Journal of the American Medical Association, vol. 303, no. 12, pp. 1173-1179, 2010*
- *R.D. Grave, et al. "Cognitive-Behavioral Strategies to Increase the Adherence to Exercise in the Management of Obesity," Journal of Obesity, vol. 2011, pp. 1-11.*
- *D.L. Ballor and E. T. Poehlman, "Exercise-training enhances fat-free mass preservation during diet-induced weight loss: a meta-analytical finding," International Journal of Obesity, vol. 18, no. 1, pp.35-40, 1994.*
- *J.S. Garrow and C.D. Summerbell, "Meta-analysis: effect of exercise, with or without dieting, on the body composition of overweight subjects," European Journal of Clinical Nutrition, vol. 49, no. 1, pp. 1-10, 1995.*

# EXERCISE: Tips

- Individualize initial recommendations based on:
  - Baseline functional status
  - Comorbid conditions; weight-related conditions
  - Life situation
  - Degree of mechanical stress of the excess weight

- Exercise physiology consultation may be prudent for those with significant comorbid challenges

- Even if there are severe limitations, patients can still be encouraged to carve out time in the day to “reserve” space for exercise

- Activities to enhance core strength and balance should be prioritized in those at risk of frailty and those with metabolic bone disease

# Maintaining Your Muscle Health
# with Strength Training

MCT2D
MICHIGAN COLLABORATIVE
FOR TYPE 2 DIABETES

## *INCORPORATE STRENGTH TRAINING*

Strength training (sometimes called resistance training) is exercise using weights, resistance bands, or even your bodyweight to make your muscles work harder. It is the most effective strategy to preserve muscle and boost your metabolism while losing weight.

### Recommendations:

- If new to strength training, check with your care team before starting an exercise routine to make sure that it is safe for you.
- Work up to three or four sessions per week. Start with simple bodyweight exercises. Then build on this over time by adding resistance bands or free/hand weights.
- Focus on movements that work several muscle groups and joints.
- Add “movement breaks” (brief 2-5 minute periods of movement) throughout the day to break up sedentary behavior.

## *Scan below for video examples of exercises for each muscle group!*


### *Lower Body*

michmed.org/XWRnR


### *Upper Body*

michmed.org/NYxRw


### *Back & Core*

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# DON'T FORGET TO STRETCH AND BUILD YOUR BALANCE

Below are basic stretches to complete after strength training exercises.

Calf stretch

Hamstring stretch

Quadriceps stretch

Hip flexor stretch

Iliotibial band stretch

Knee-to-chest stretch

Shoulder stretch

Neck stretch


# Future?

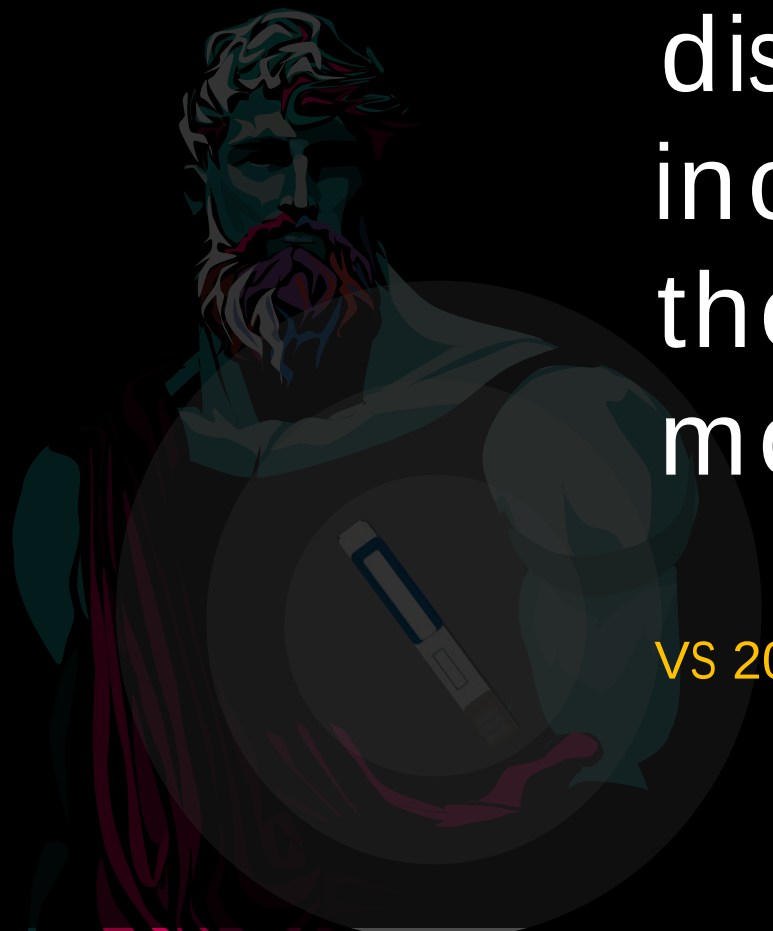
Pharmacotherapies are in the development pipeline that act to preserve muscle

(e.g., Activin receptor inhibitors)

# NUSHs/INCRETINS:

Do they make everything else obsolete?

...no...



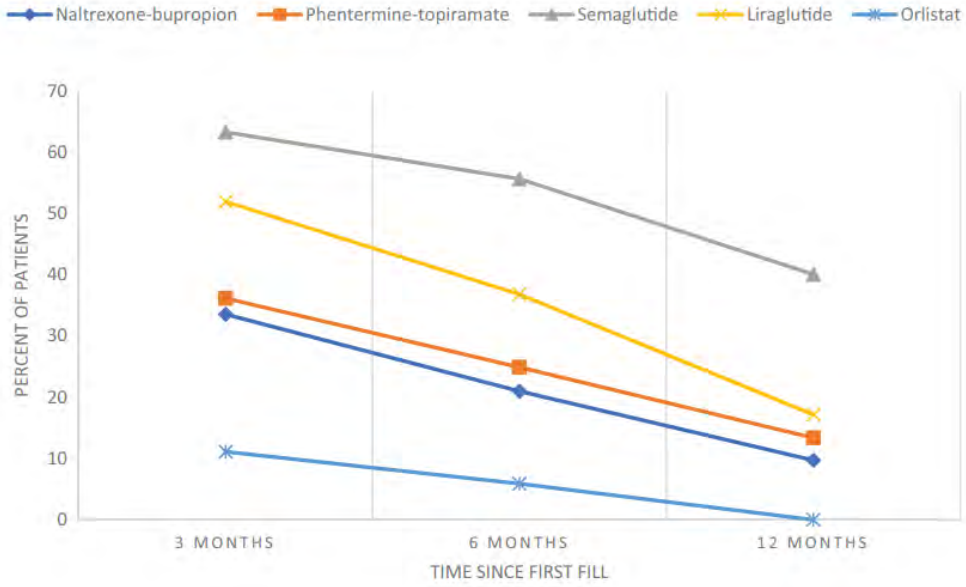
# 70% “real-world” discontinuation rate of incretin mimetic therapy by 24 months?!?

VS 20-30% clinical trials rates

Weiss T, Carr RD, Pal S, Yang L, Sawhney B, Boggs R, Rajpathak S, Iglay K. Real-World Adherence and Discontinuation of Glucagon-Like Peptide-1 Receptor Agonists Therapy in Type 2 Diabetes Mellitus Patients in the United States. Patient Prefer Adherence. 2020 Nov 27;14:2337-2345. doi: 10.2147/PPA.S277676. PMID: 33273810; PMCID: PMC7708309.

# NOTE: this is true for any weight control medicine

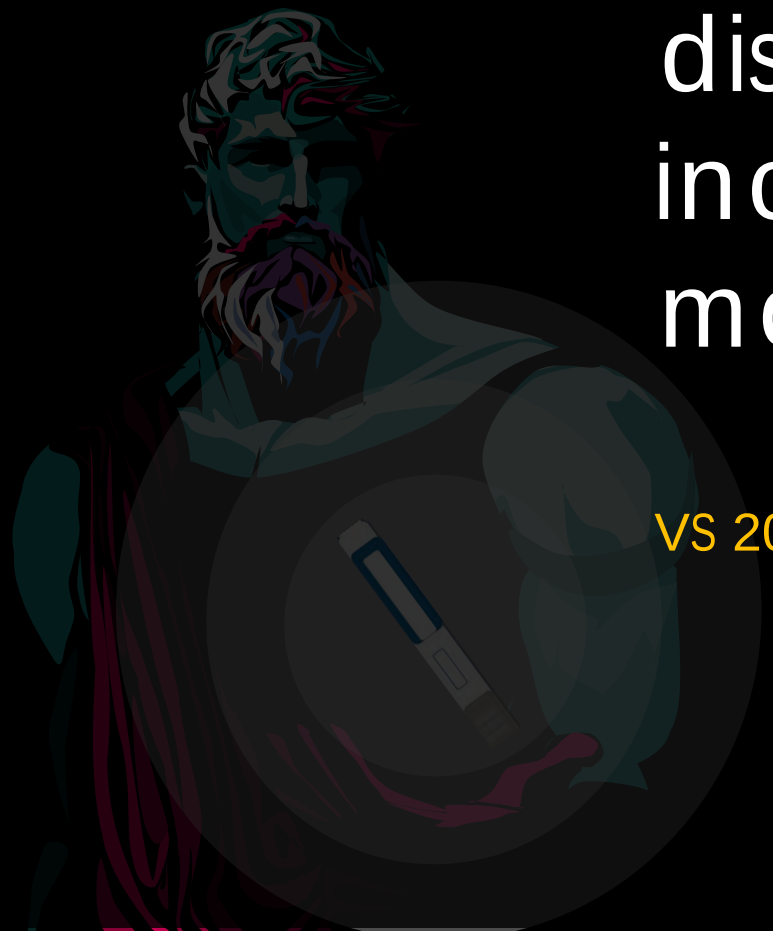
Gasoyan H, Pfoh ER, Schulte R, Le P, Rothberg MB. Early- and later-stage persistence with antiobesity medications: A retrospective cohort study. Obesity (Silver Spring). 2023 Dec 6. doi: 10.1002/oby.23952. Epub ahead of print. PMID: 38053443.




| *Number of persistent patients/those with available follow-up at 3, 6, and 12 months* | | | |
|---|---|---|---|
| | ≥3 months | ≥6 months | ≥12 months |
| Semaglutide | 303/479 | 262/471 | 161/402 |
| Naltrexone-bupropion | 220/656 | 137/653 | 61/628 |
| Phentermine-topiramate | 180/498 | 123/494 | 63/471 |
| Liraglutide | 135/260 | 92/250 | 40/233 |
| Orlistat | 2/18 | 1/17 | 0/17 |

**FIGURE 1** Percentage of patients who were persistent with antiobesity medication (AOM) at early stage, medium term, and long term, by AOM agent. [Color figure can be viewed at wileyonlinelibrary.com]

# WHY?



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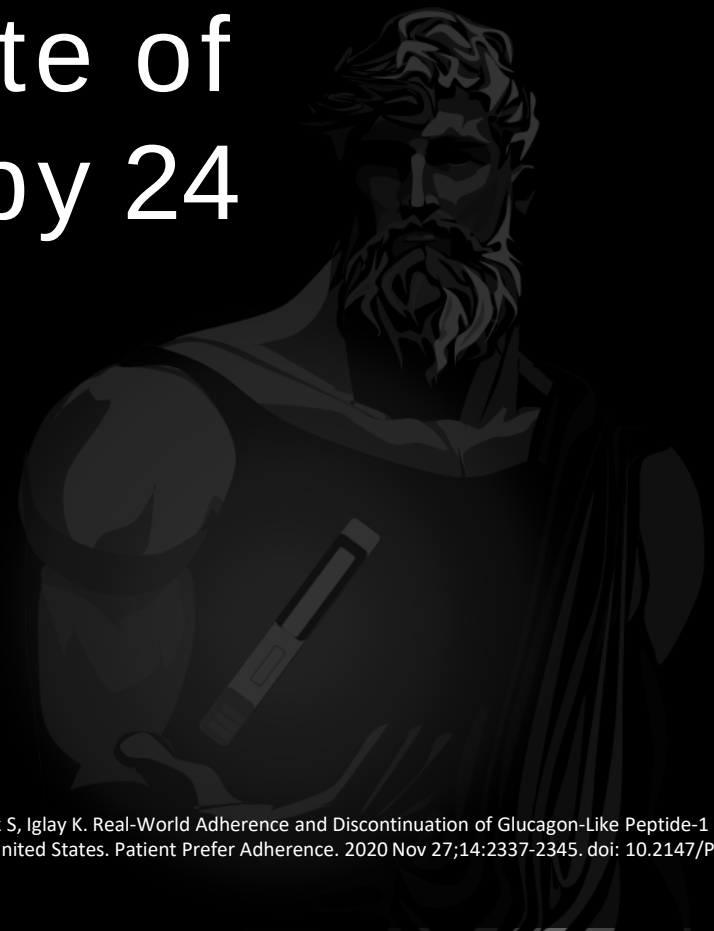

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- Cost
- Coverage
- Tolerance/ side effects
- Shortages
- Lack of true lifestyle changes
- Misaligned expectations
- Lack of education
- Lack of support

# CASE

## 33-year-old with DM

- REVISITED
- Despite improvements in weight and glycemic control, she had to discontinue semaglutide
- The GI side effects (particularly belching) were unmanageable and interfering with her professional singing career

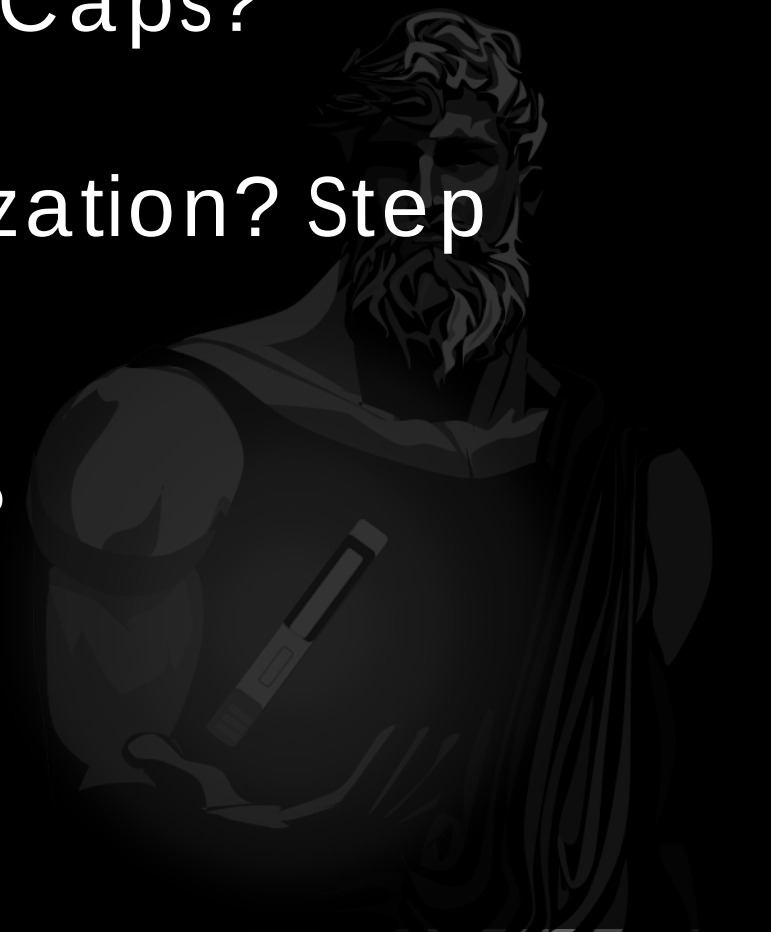
# CASE

## 33-year-old with DM

- REVISITED – part deux
- Recently, we were able to switch to Tirzepatide and she has had return of weight and glycemic control without the GI side effects

# COSTS

- Out-of-pocket:
  - INCRETINS: $900 - $1300 per month (!)
- Coverage? Caps?
- Prior authorization? Step Therapy?
- Deductible?
- Donut hole?

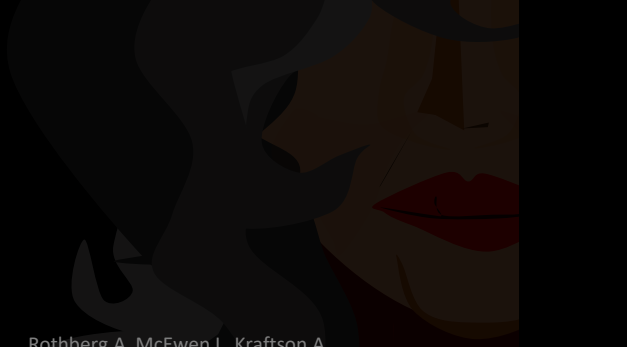


DIETARY RECALL:
0530 - woke
0700 - coffee (creamer) + clementines
1200 - 8 chocolate chip cookies + 2% milk
1930 - flank steak + cheesy rice + veg
2000 - blueberry pie slice
2130 - bed

# CASE

# 62-year-old

- After being recommended to continue on the same dose, establish with a therapist, and start exercise, the patient did not return to the clinic…
- …for two years
- During the intervening time, she had received refills through her PCP
- She was now at 155 lbs.
- She returns since she wants to switch therapy since hunger levels are perceived to be too high and she wants to lose another 10 lbs.

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Castelnuovo et al. Cognitive behavioral therapy to aid weight loss in obese patients: current perspectives. Psychology Research and Behavioral Management. 2017(10): 165-173


# MENTAL HEALTH

- Screening should occur for un/der treated mental health issues
    - Uncontrolled mental health issues significantly interfere with weight & health efforts
- Screening should occur for eating disorders (including binge eating)
- May need to postpone weight control efforts unless/until issue(s) are being managed –and- you get permission from treatment team
- Addressing mental health and disordered eating patterns are NECESSARY but NOT SUFFICIENT for weight loss/ maintenance


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# MENTAL HEALTH

- Help may be needed before/during/after weight change efforts
- Needs can evolve throughout the process
- Do not equate lower weight with increased happiness
- Recognize that weight change impacts the patient and family/friends  this can lead to positive and negative results
    - Watch for domestic abuse
- Watch for transference of coping behaviors and/or addiction
- Support groups can be helpful
    - Needs facilitation & behavior monitoring
    - Does not replace 1:1 therapy


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# MENTAL HEALTH

- Realize there is a poverty of resources
- Advocacy is needed on this front!
- Try and compile a list of local resources
- Some patients may not need mental health support but rather behavioral change support
    - Could involve cognitive behavioral therapy
    - Could utilize tools that are based on CBT principles (e.g., NOOM)

# SUMMARY

- Incretin mimetics have a valuable role in the treatment of patients
- Understanding their strengths and weaknesses is vital
- Health is defined by more than just an A1c or the weight on the scale
- Whole health requires comprehensive care including targeted, evidenced-based nutrition and activity recommendations
- We still have much to learn and improve

# THANK YOU FOR LISTENING!

MCT2D