Life in the Intermittent Fasting Lane:

What You Need to Know to Answer Patient's Questions About Fasting!

Crystal David, PharmD, BCPS
Clinical Assistant Professor
Oklahoma State University Center for Health Sciences
Crystal.David@okstate.edu
January 22, 2021

Disclosures

I have nothing to disclose.

Objectives

- Describe obesity statistics in the United States
- Define terminology related to intermittent fasting
- Review intermittent fasting regimens
- Review literature on effects of intermittent fasting

Question 1

In the 2017-2018 NHANES survey, which group was found to have the highest prevalence of obesity in adults >20 years of age?

A. Non-hispanic white

B. Non-hispanic black

C. Non-hispanic Asian

D. Hispanic

Question 2

Results from the Harvard Implicit Association Test on Weight, approximately what percentage of respondents had a moderate to strong automatic preference for thin people compared to fat people?

    A. 20%

    B. 40%

    C. 60%

    D. 80%

Question 3

Which hormone is considered antilipolytic and has been associated with weight gain?

A. Cortisol

B. Ghrelin

C. Glucagon

D. Insulin

Question 4

True or False

Fasting insulin secretion rates are based primarily on fasting glucose levels and irrespective of degree of obesity

Question 5

Commonly referred to as "16:8," which of the following describes this fasting regimen?

A. 16 hours of eating and 8 hours of fasting

B. 16 hours of fasting and 8 hours of eating

C. Eat 8 small meals over a 16 hour time period

D. Eat 1600 calories in an 8 hour time period

Obesity

Obesity Statistics

- National Health and Nutrition Examination Survey (2017-2018)
  - Prevalence of obesity in adults: 42.4%
    - No significant differences between men and women
  - Prevalence of severe obesity in adults: 9.2%
    - Higher rates in women than men
  - Both groups: Highest prevalence in non-Hispanic black adults
  - Severe obesity was highest in 40-59 year olds

Hales, et al.

Figure 2. Age-adjusted prevalence of obesity among adults aged 20 and over, by sex and race and Hispanic origin: United States, 2017–2018
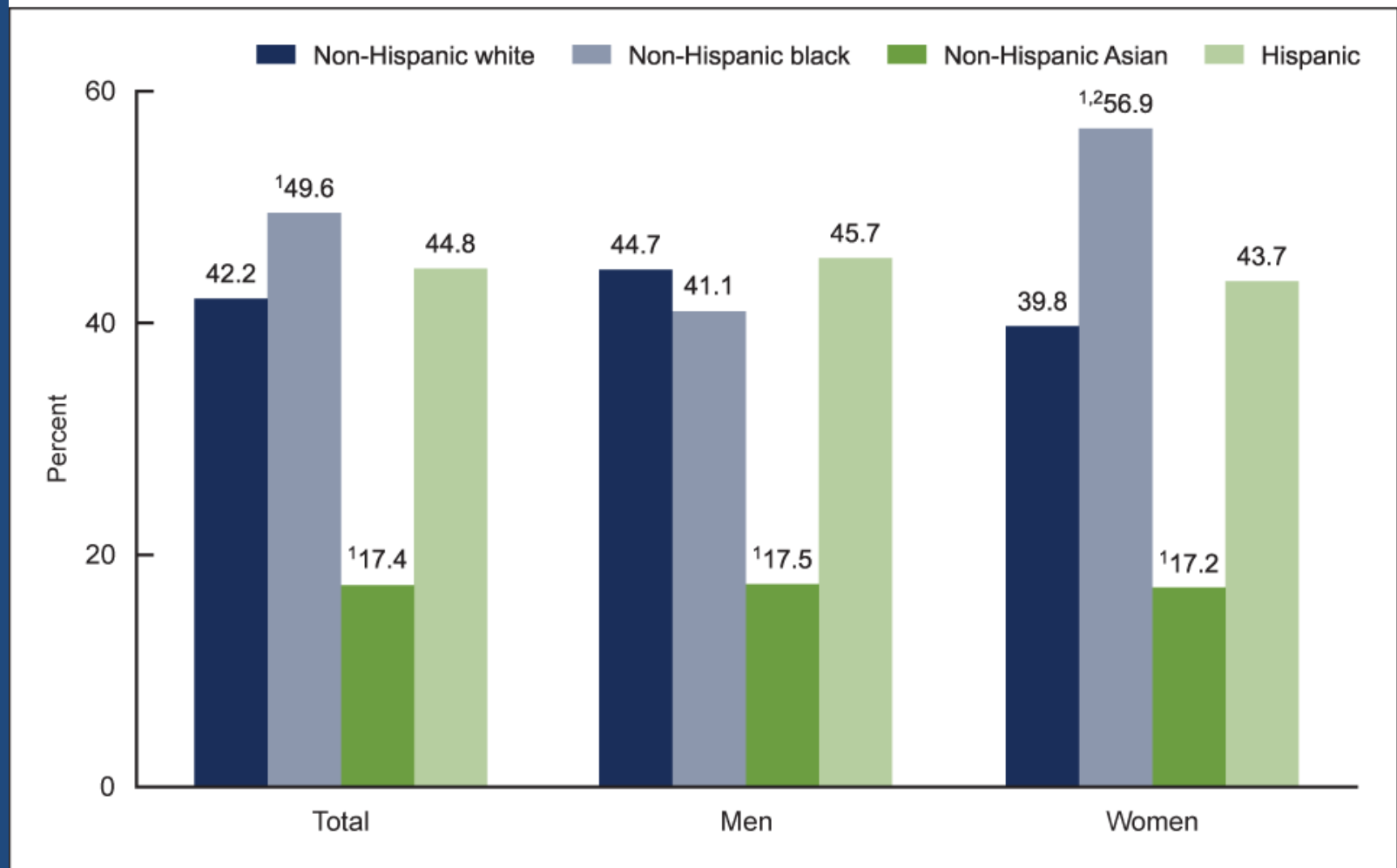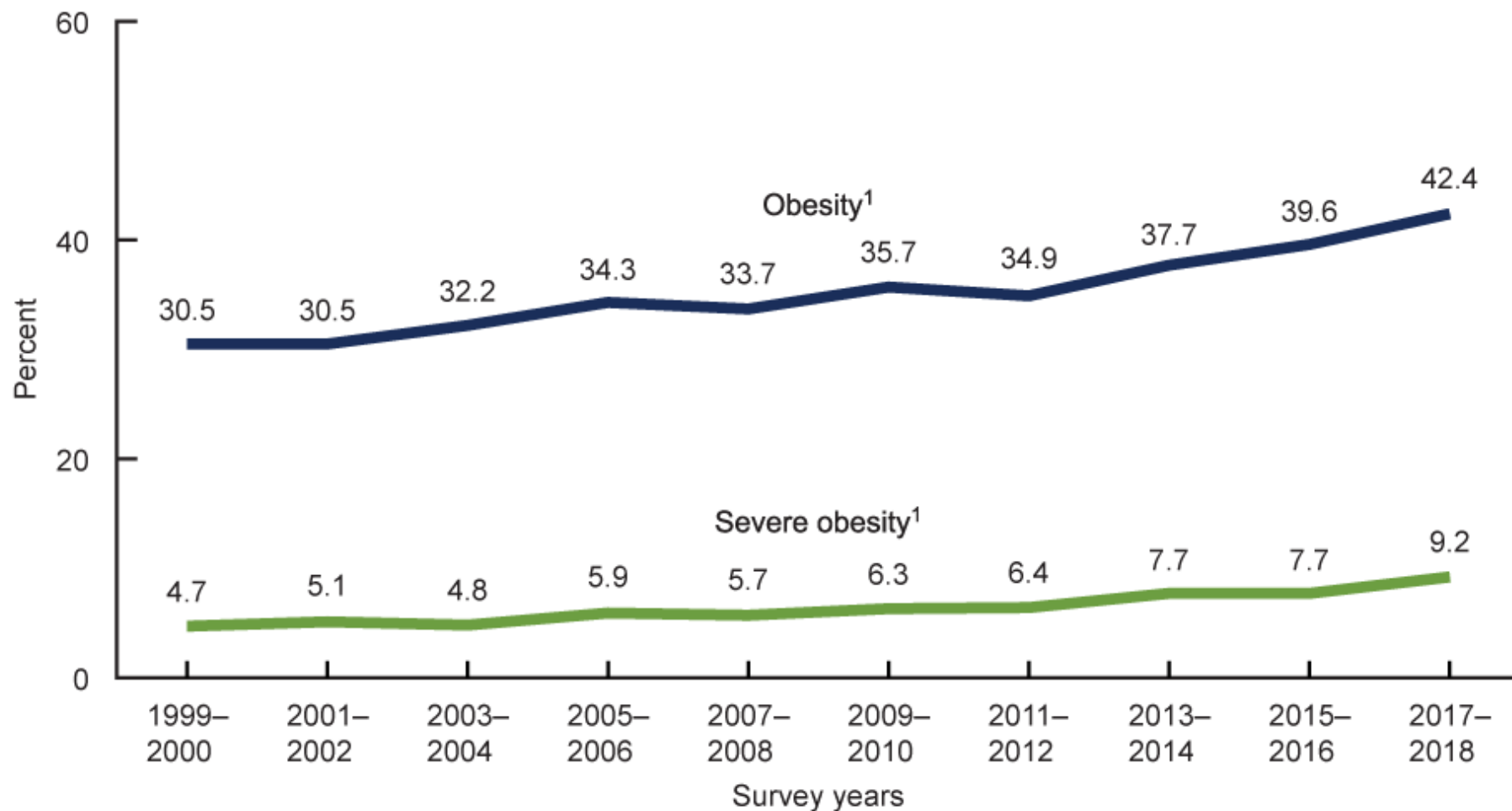
[1]Significantly different from all other race and Hispanic-origin groups.
[2]Significantly different from men for same race and Hispanic-origin group.
NOTES: Estimates were age adjusted by the direct method to the 2000 U.S. Census population using the age groups 20–39, 40–59, and 60 and over. Access data table for Figure 2 at: https://www.cdc.gov/nchs/data/databriefs/db360_tables-508.pdf#2.
SOURCE: NCHS, National Health and Nutrition Examination Survey, 2017–2018.

Hales, et al.

Figure 4. Trends in age-adjusted obesity and severe obesity prevalence among adults aged 20 and over: United States, 1999–2000 through 2017–2018

Hales, et al.

Consequences of Obesity

- Increased healthcare costs
- Increased comorbidities
  - Diabetes
  - Hypertension
  - Coronary artery disease
  - Gallbladder disease
  - Osteoarthritis
  - Cancer
- Increased mortality rates

Consequences of Obesity

- Social
  - Self esteem
  - Stigma
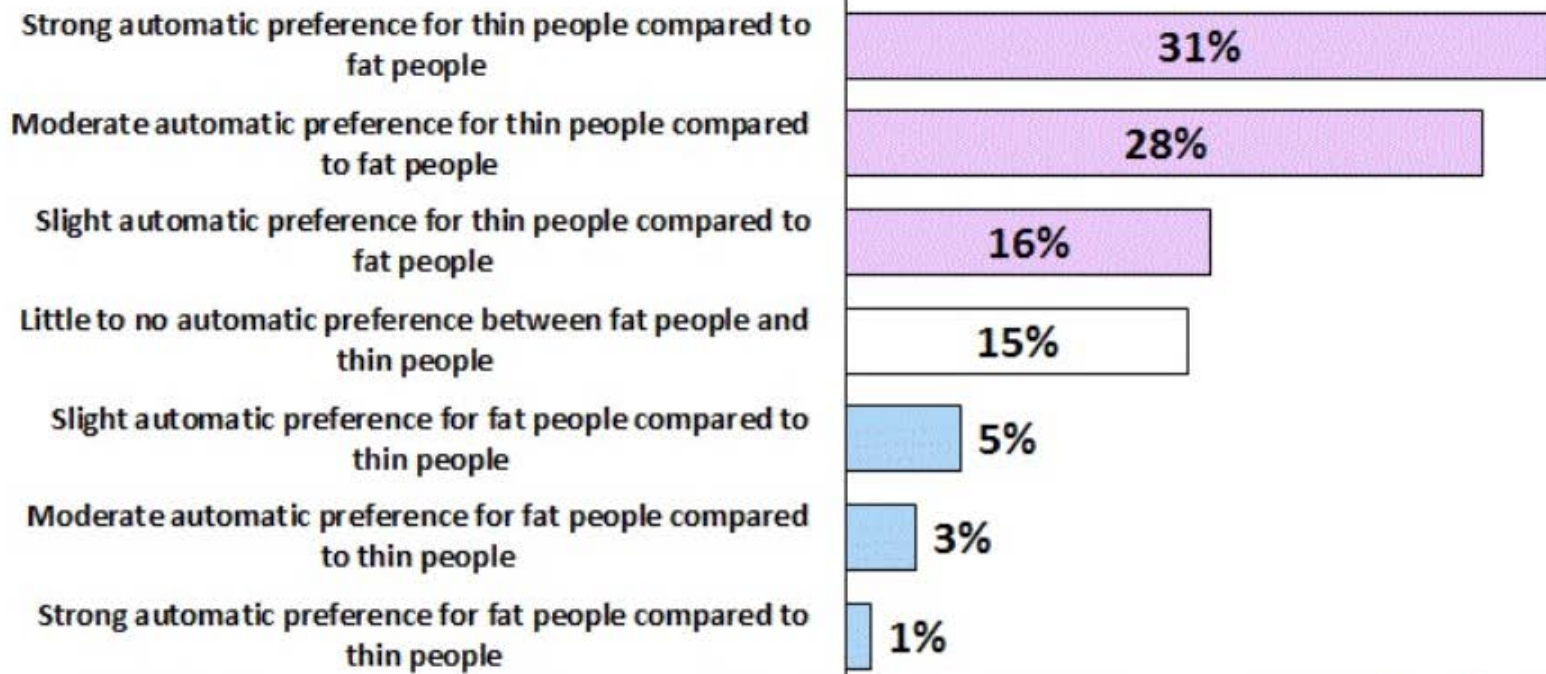   - Harvard Implicit Association Test

https://implicit.Harvard.edu

Weight ('Fat - Thin' IAT)

Weight IAT

- ~10 minutes to take
  - Outlines of "thin" and "fat" people
  - "good" and "bad" words
- Measures associations between concepts and evaluations
  - "An implicit preference for Thin people relative to Fat people means that you are faster to sort words when 'Thin people' and 'Good' share a button relative to when 'Fat people' and 'Good' share a button"

Project Implicit.

Percent of web respondents with each score

| Category	Percent
Strong automatic preference for thin people compared to fat people	31%
Moderate automatic preference for thin people compared to fat people	28%
Slight automatic preference for thin people compared to fat people	16%
Little to no automatic preference between fat people and thin people	15%
Slight automatic preference for fat people compared to thin people	5%
Moderate automatic preference for fat people compared to thin people	3%
Strong automatic preference for fat people compared to thin people	1%

This distribution summarizes 1,121,747 IAT scores for the Weight task completed between April 2004 and December 2015.

Poll Questions 1 and 2

Setting the Stage

Obesity/Weight Gain

- Traditional View
  - People gain weight when they consume more calories than they use
   - Calories In Calories Out (CICO) model

Obesity
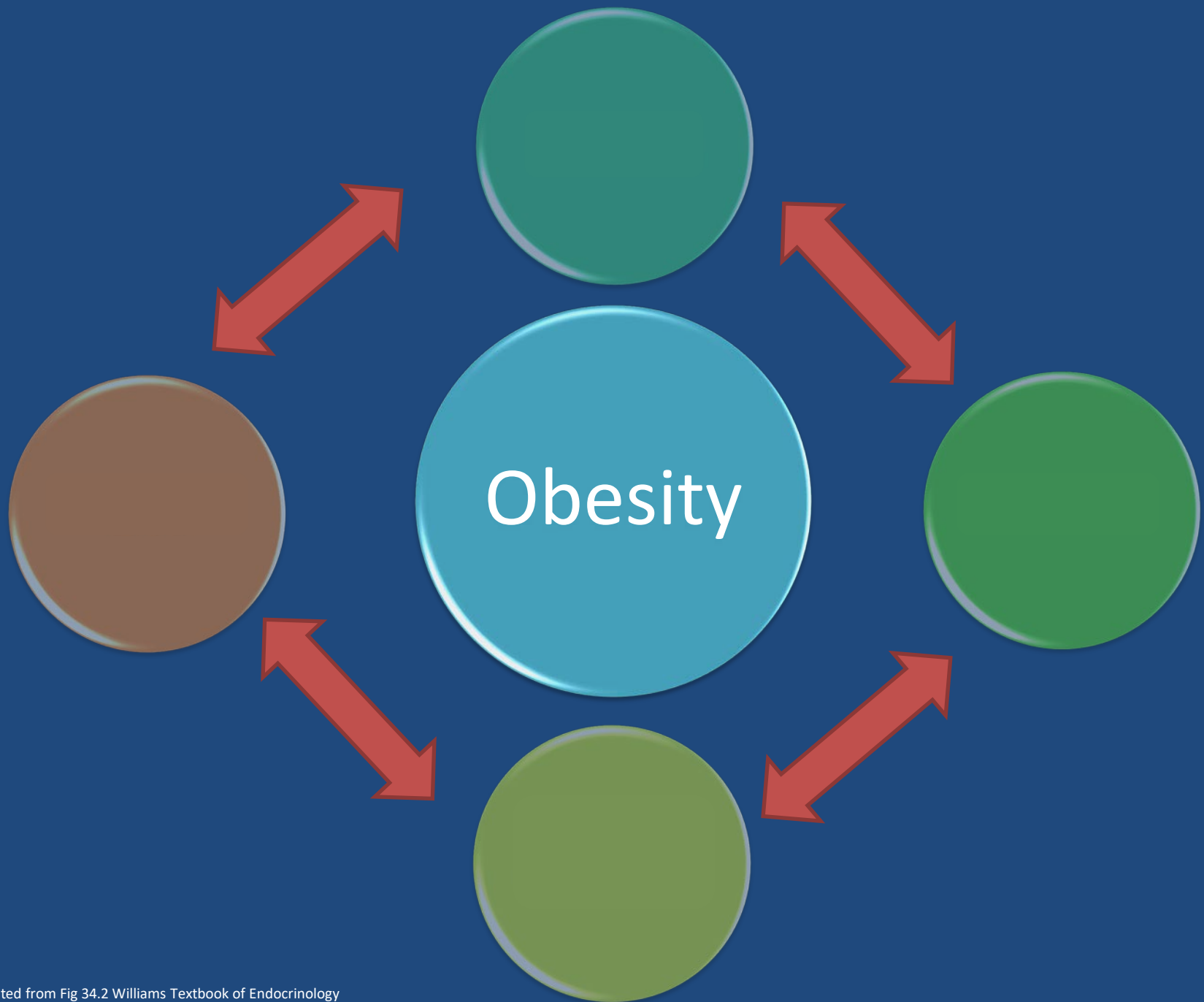
Insulin

- Insulin
  - anabolic hormone
  - directs the storage and use of energy in the adipocytes
 - Antilipolytic

- Insulin resistance
  - Decreased response to insulin
  - More insulin is released as an adaptative mechanism

Carbohydrate Metabolism
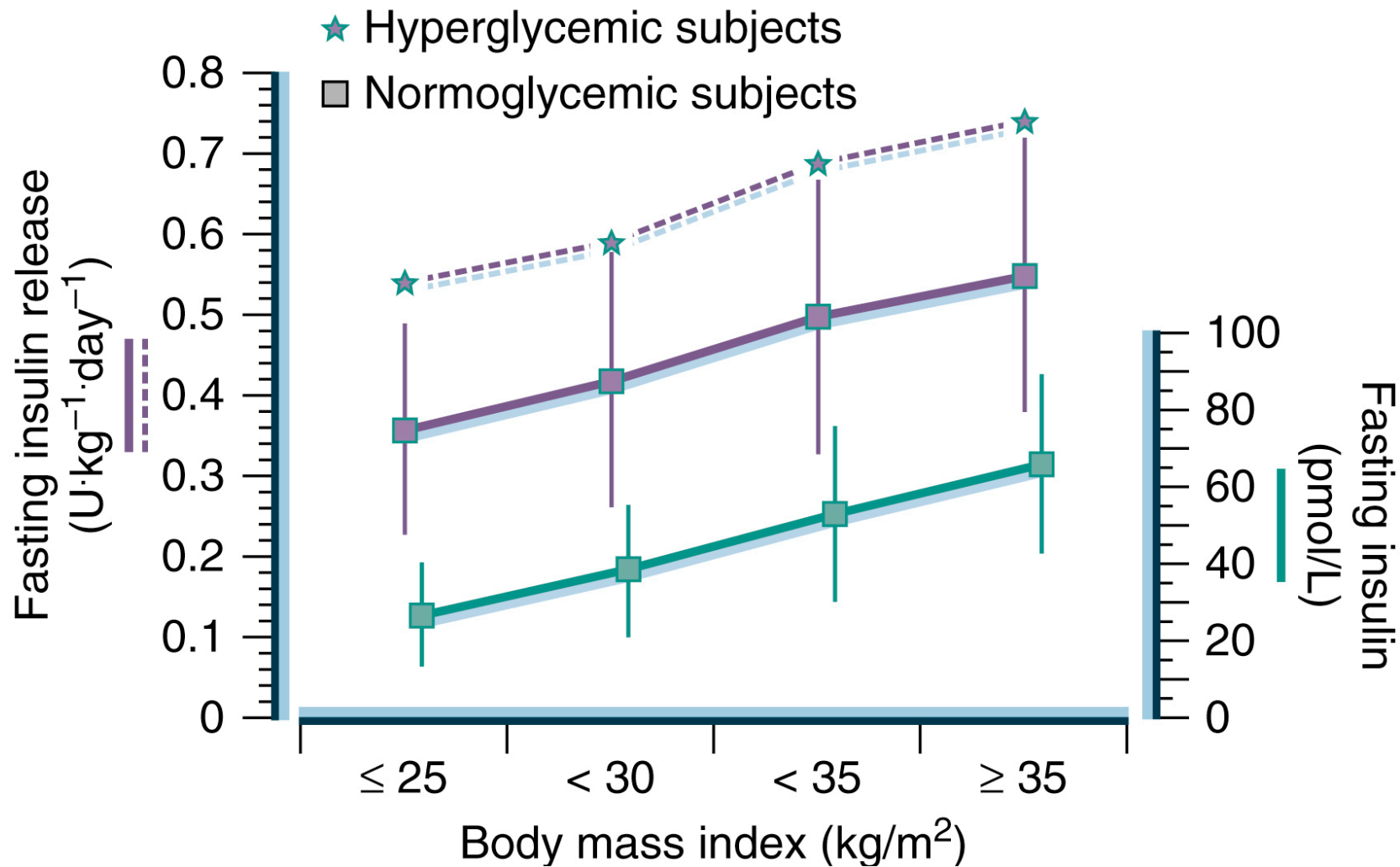
- The main stimulus for insulin secretion is glucose

- High blood glucose (insulin)
  - ↑ glycogen storage
  - ↓ synthesis of glucose
  - ↓ glycogen to glucose
  - ↑ glycolysis

- Low blood glucose (glucagon)
  - ↑ glycogen to glucose
  - ↑ synthesis of glucose
  - ↓ glycogen storage
  - ↓ glycolysis
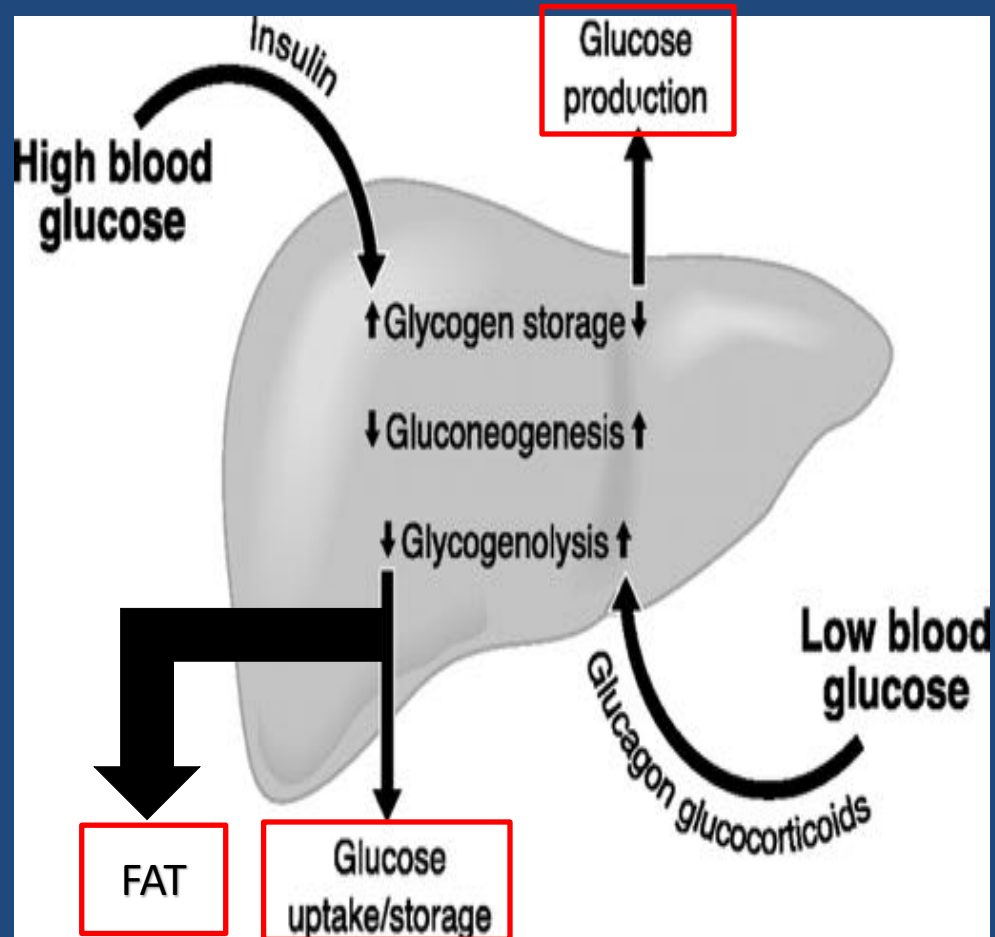
Glucose and insulin secretion: the integrated feedback

Fig 33.4 Williams Textbook of Endocrinology
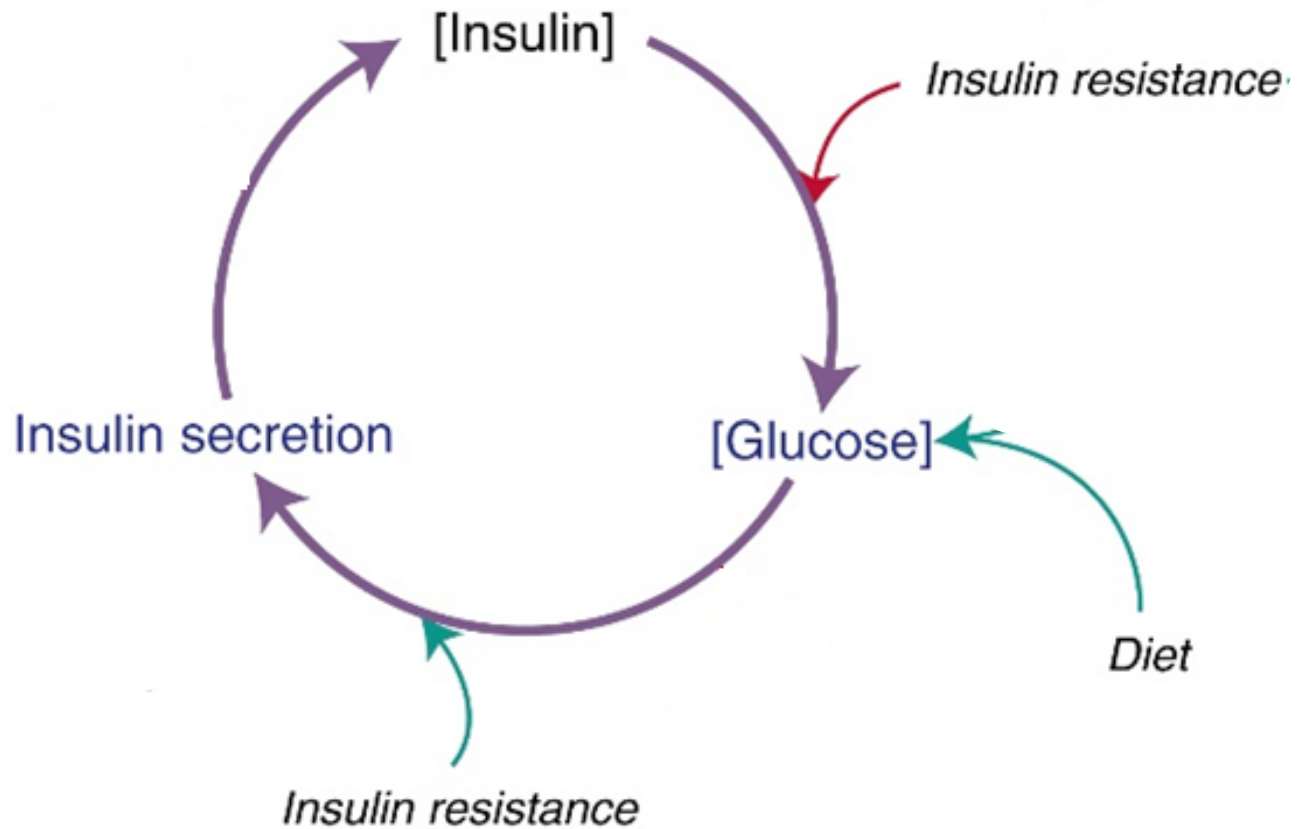
Poll Questions 3 and 4

Intermittent Fasting (IF)

What is IF?

- **Intermittent**: coming and going at intervals; not continuous

- **Fast**: to eat sparingly or abstain from some foods

- **Intermittent Fasting**: an eating plan that switches between fasting and eating on a regular schedule

Intermittent Fasting

- Timing food intake to
    - Mimic historic eating patterns
    - Facilitate reduction in insulin levels
    - Switch energy source from glucose to ketones (from body fat)
    - Stimulate adaptive cellular responses
        - Improve glucose regulation
        - Increase stress resistance
   - Suppresses inflammation

Cabo, et al.

Review from NEJM (2019)

Why It Works

- Metabolic flexibility
  - Glucose for fuel during the fed state
  - Fatty acids and ketones for fuel during the fasted state
- Fasted state needs to be sufficient for liver glycogen stores to be depleted

Cabo, et al.

Carbohydrate Metabolism

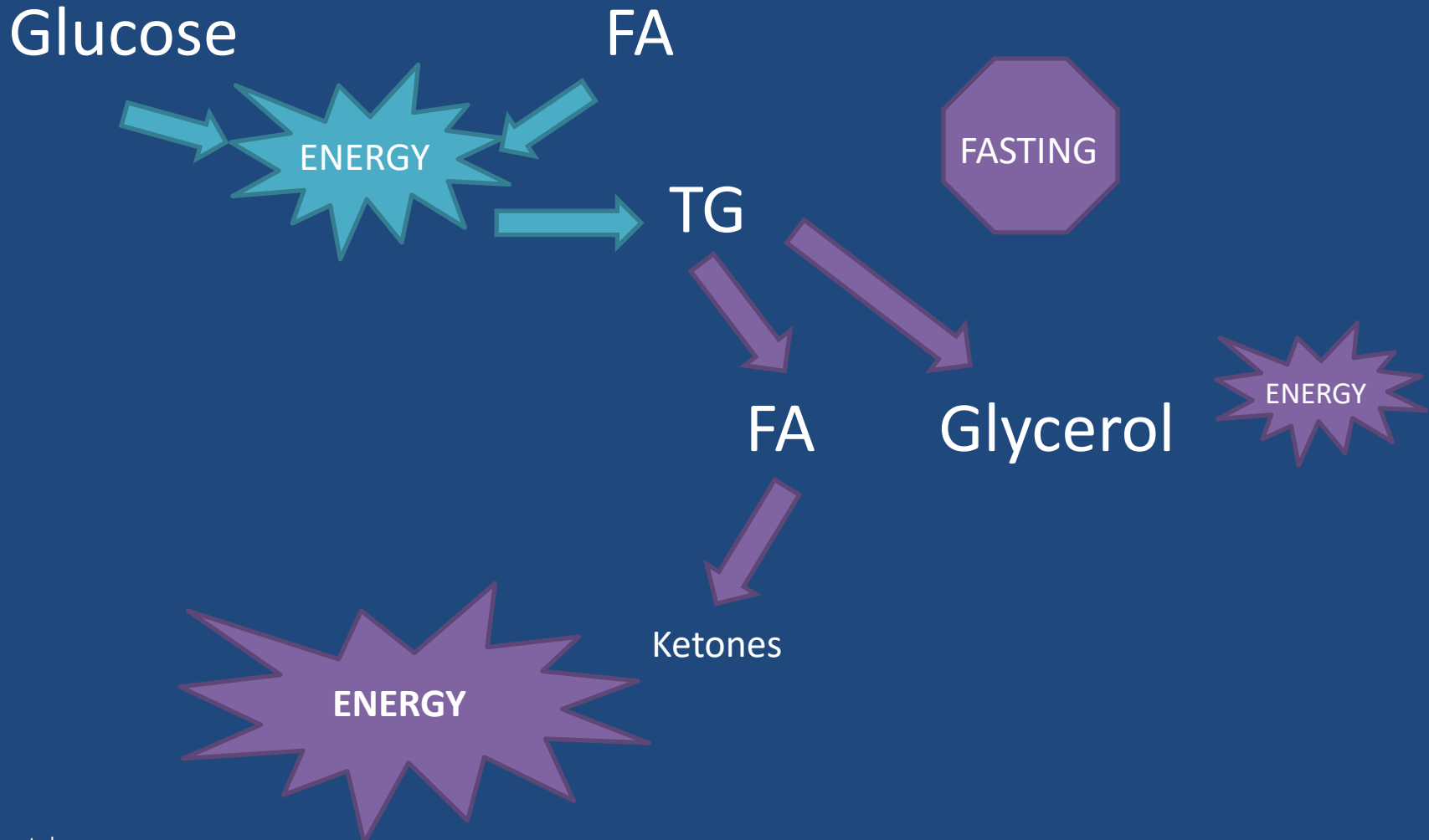- High blood glucose (insulin)
  - ↑ glycogen storage
  - ↓ synthesis of glucose
  - ↓ glycogen to glucose
  - ↑ glycolysis
- Low blood glucose (glucagon)
  - ↑ glycogen to glucose
  - ↑ synthesis of glucose
  - ↓ glycogen storage
  - ↓ glycolysis
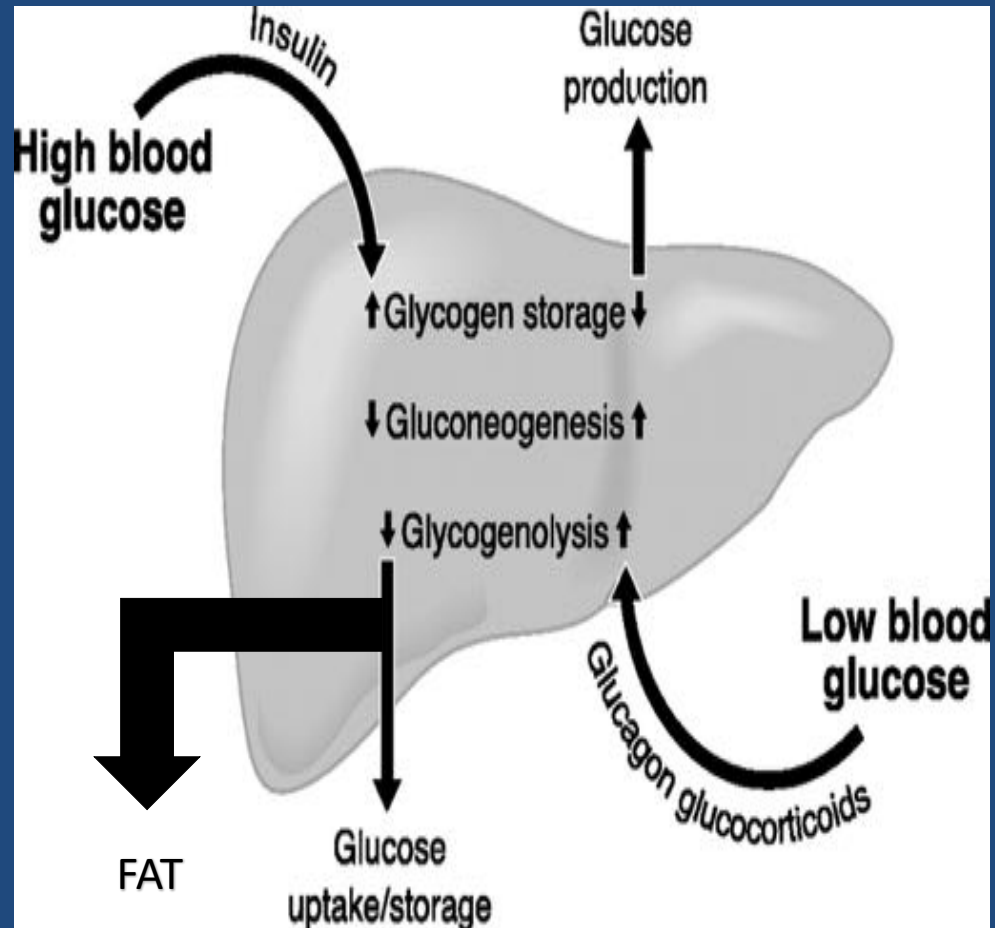
Depleting Stored Glycogen

IF and Metabolic Switching

Glucose

FA

ENERGY

TG

FASTING

FA

Glycerol

ENERGY

Ketones

ENERGY

Cabo, et al.

IF Regimens

IF Regimens

- Daily Fasts
  - Time restricted eating (TRE)
  - Time restricted feeding (TRF)

- Alternate Day Fasts (ADF)

- Extended Fasts (EF)

Daily Fasting Regimens

- Common Daily Regimens
  - Fasting for at least 14 hours is recommended
  - Fasting hours : eating hours

16:8	Fast for 16 hours, eat for 8 hours
20:4	Fast for 20 hours, eat for 4 hours
23:1	Fast for 23 hours, eat for 1 hour

Hoddy, et al.
Cabo, et al.

Alternate Day Fasting

- Common ADF Regimens
  - ADF: Alternate days of regular eating with days of complete fasting

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
EAT	FAST	EAT	FAST	EAT	FAST	EAT
FAST	EAT	FAST	EAT	FAST	EAT	FAST

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
EAT	FAST	EAT	FAST	EAT	FAST	TRE
EAT	FAST	EAT	FAST	EAT	FAST	TRE

- Modified ADF (mADF): calorie restriction on fasting days
  - Usually one meal < 500 calories
  - Some recommend low carb for this meal
  - Some recommend low fat for this meal

Alternate Day Fasting

- 5:2 -- eat 5 days a week, "fast" or eat <500 calories 2 days a week

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
EAT	FAST	EAT	FAST	EAT	EAT	EAT

- 4:3 -- eat 4 days a week, fast or eat <500 calories 2 days a week

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
EAT	FAST	EAT	FAST	EAT	FAST	EAT

Extended Fasting Regimens

- Extended Fasting (EF) Regimens
  - Various definitions
    - Greater than one day
    - Greater than three days
    - A week or longer

Common Acronyms

- OMAD – One Meal a Day
  - Can be any meal
  - 20:4, 22:2, 23:1
- TMAD – Two Meals a Day
  - 16:8
  - 19:5
- CICO – calories in calories out

Eating Window

Poll Question 5

Review from Obesity (2020)

5:2 Diet

- Fast 5 days a week, eat <500 calories 2 days a week
  - 90 % adherence over 8 weeks
  - Weight loss:
    - Weight loss of 4 to 8% over 4-24 weeks
  - Cardiometabolic health
    - Decreases in total cholesterol (13%), LDL (15%) and triglycerides (22%)
  - Insulin sensitivity
    - Improvement seen after 6 months

Hoddy, et al.

ADF and mADF

- Alternate days of regular eating with days of fasting (complete or <500 calories)
  - Reported drop out rates as high as 20%
  - Weight loss
    - Weight loss of 3 to 13% over 4-16 weeks
      - 6 to 11% for some 24 week trials
  - Cardiometabolic health
    - Fasting insulin decrease 21% to 42% in 8 to 24 week studies

Hoddy, et al.

TRF/TRE

- Fast 5 days a week, eat <500 calories 2 days a week
  - Weight loss
    - 2 to 3% over 1 to 4 months
  - Cardiometabolic health
    - Early or midday eating windows may be better than late

Hoddy, et al.

Now What?

Incorporating IF Into Practice

Month	Time-Restricted Feeding (Daily Fasts)	5:2 Intermittent Fasting
1	10 hour feeding period 5 days/week	1000 calories 1 day/week
2	8 hour feeding period 5 days/week	1000 calories 2 days/week
3	6 hour feeding period 5 days/week	750 calories 2 days/week
4	6 hour feeding period 7 days/week	500 calories 2 days/week

Adapted from Fig 4 .Cabo, et al.
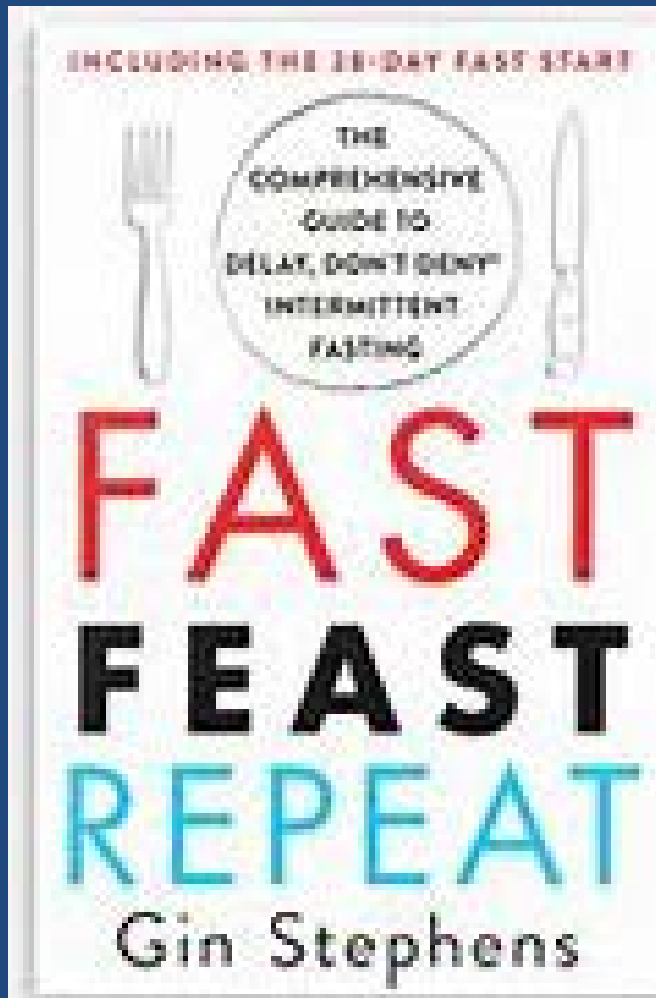
Delay, Don't Deny
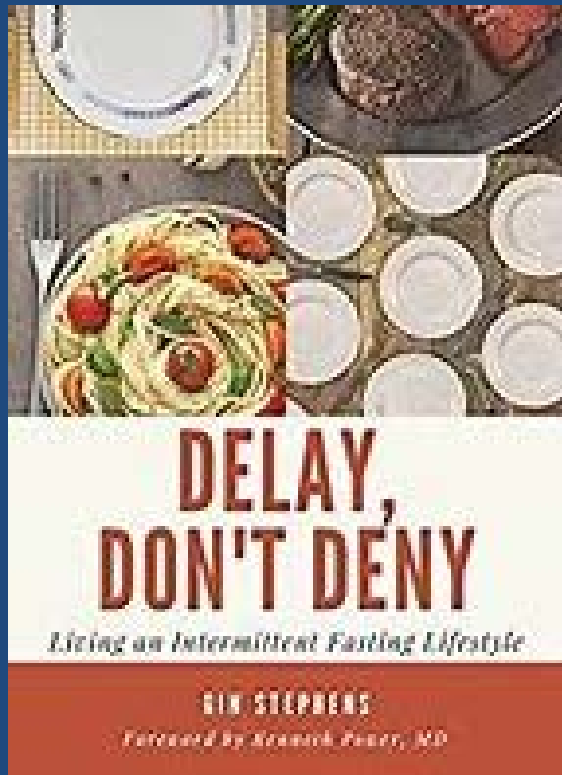
Author: Gin Stephens

Easy read for patients

Good starting point
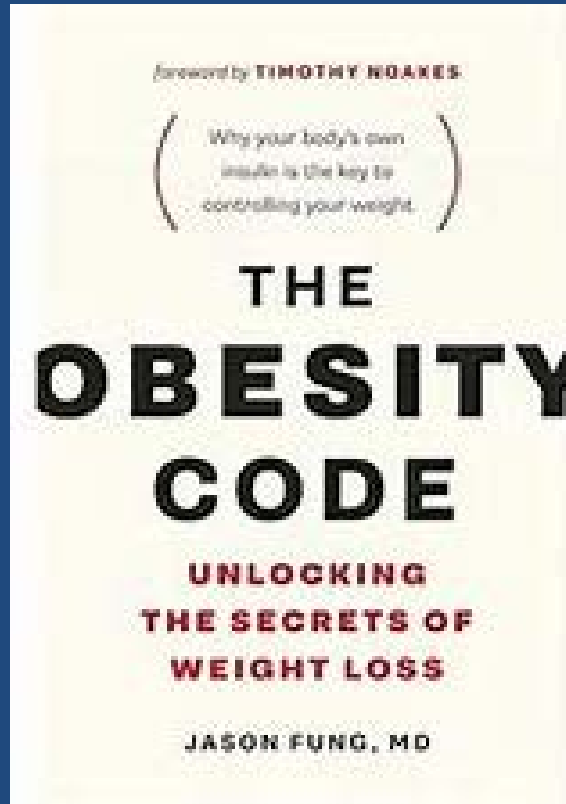
Fast, Feast, Repeat

Author: Gin Stephens

More detailed

Takes a deeper dive into fasting

Fast, Feast, Repeat

Author: Jason Fung, MD

Much more detailed

May be too difficult for some patients

"IF helped me simplify my morning routine immensely!

I practice 16:8 the most and not having to worry about breakfast is great!

I also feel less sluggish and am not hungry all the time.

I really enjoy IF!"

"Without a doubt, weight loss comes down to much more than simply "calories in calories out" and "move more eat less." When you factor in the number of physiological/hormonal issues that must also be taken into account, IF stands tall as a scientifically proven practice to promote long-term weight loss in addition to a multitude of other health benefits that are less glamorous than weight loss itself. Perhaps, best of all, the practice of IF can be applied to any dietary preferences, which makes compliance easier. This is why I recommend IF to my patients struggling with diabetes, inflammatory issues, and obesity while also following it myself"

Life in the Intermittent Fasting Lane:

What You Need to Know to Answer Patient's Questions About Fasting!

Crystal David, PharmD, BCPS
Clinical Assistant Professor
Oklahoma State University Center for Health Sciences
Crystal.David@okstate.edu
January 22, 2021

References

1. "intermittent." Merriam-Webster.com. Merriam-Webster. Web. Accessed January 15, 2021.

2. "fast." Merriam-Webster.com. Merriam-Webster. Web. Accessed January 15, 2021.

3. Intermittent Fasting: What is it, and how does it work? Health. Johns Hopkins Medicine. 2021. https://hopkinsmedicine.org Accessed January 15, 2021.

4. Hales CM, Carroll MD, Fryar CD, Ogden CL. Prevalence of obesity and severe obesity among adults: United States, 2017–2018. NCHS Data Brief, no 360. Hyattsville, MD: National Center for Health Statistics. 2020. https://www.cdc.gov/nchs/products/databriefs/db360.htm. Accessed January 15, 2021.

5. Project Implicit. Harvard. 2011. https://implicit.harvard.edu/implicit/takeatest.html Accessed January 15, 2021.

6. Melmed et al. Williams Textbook of Endocrinology. 14th edition. Elsevier 2019.

7. Cabo R, Mattson M. Effects of intermittent fasting on health, aging, and disease. NEJM. 2019, 381; 26, 2541-2551.

8. Hoddy et al. Intermittent fasting and metabolic health: From religious fast to time-restricted feeding. Obesity. 2020, 28, S29-37.