Obesity in Living Donors - Sustainable Interventions

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Cedars Sinai

CIRCL
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cedars-sinai.org

Disclosures

Velazquez - Advisory Board of Intellihealth, WeightWatchers; Consultant - Novo Nordisk

Objectives

At the conclusion of this session, participants should be able to:

- Understand why weight management in living donors is important
- Recognize obesity as a chronic disease
- Review contributing factors to weight regulation, including uncontrollable ones
- Discuss the set point theory and why it is so difficult to lose weight and maintain it
- Describe current evidence based treatment options for obesity, including their indications
- List the resources available at our Cedars Sinai Center for Weight Management and Metabolic Health

Understand why weight management in living donors is important

Obesity in Living Donors Poses Challenges and Potential Health Risks

- "Most **kidney donor** candidates with a BMI >35–40 kg/m2 are rejected due to concerns regarding long-term renal functional deterioration in the donor."

- "Most centers use a threshold of BMI of ≥30 to 35 kg/m2 to exclude potential **liver donors**. Previous studies have found that recipients who received liver from donors with obesity (BMI ≥30 kg/m2) had a higher incidence of early allograft dysfunction."

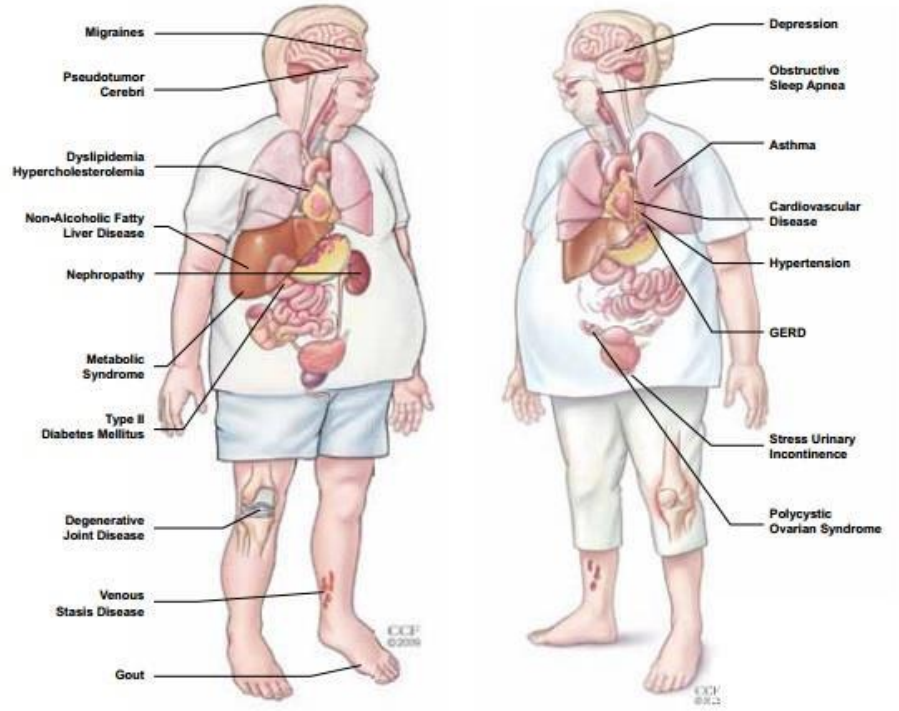
- **Heart donors** with severe obesity (BMI ≥40 kg/m2) was not associated with adverse post-transplant outcomes, however long-term outcomes of allograft vasculopathy and graft coronary atherosclerosis is unknown.

1. Kanbay et al. Clinical Kidney Journal, Vol 16, Issue 2, Feb 2023, Pages 254–261,
2. Lin et al. Donor BMI and Post–living Donor Liver Transplantation Outcomes: A Preliminary Report. Transplantation Direct 9(2):p e1431, February 2023
3. Patel et al. 21st Century Cardiol, Volume 3 (1): 128

Recognize obesity as a chronic disease

Obesity has complex pathophysiology

- Obesity affects every organ system
- Obesity is not only an underpinning of major chronic diseases, **but a serious debilitating condition** in its own right
- This is NOT due to a lack of willpower
- In 2013 - Obesity was **designated a disease** by AMA and numerous health organizations



GERD, gastroesophageal reflux disorder
AMA, American Medical Association
Image courtesy: Adapted from Cleveland clinic (available here)

1. Kushner RF, et al. Circulation 2012.
2. Is Obesity a Disease" Cleveland Clinic Health Essentials. April 21 2022
3. AMA. House of Delegates. Recognition of Obesity as a Disease. Resolution 420(A-13);

Obesity is a chronic disease

#1: Similar to other chronic diseases, obesity has a pathophysiology that is complex and involves interactions among genes, biological factors, the environment, and behavior.

#2: It meets the 3 criteria that constitute a disease (per AMA)

1. ***Must have outward signs or symptoms***
2. ***Cause morbidity or mortality***
3. ***Involve impaired function of one tissue***

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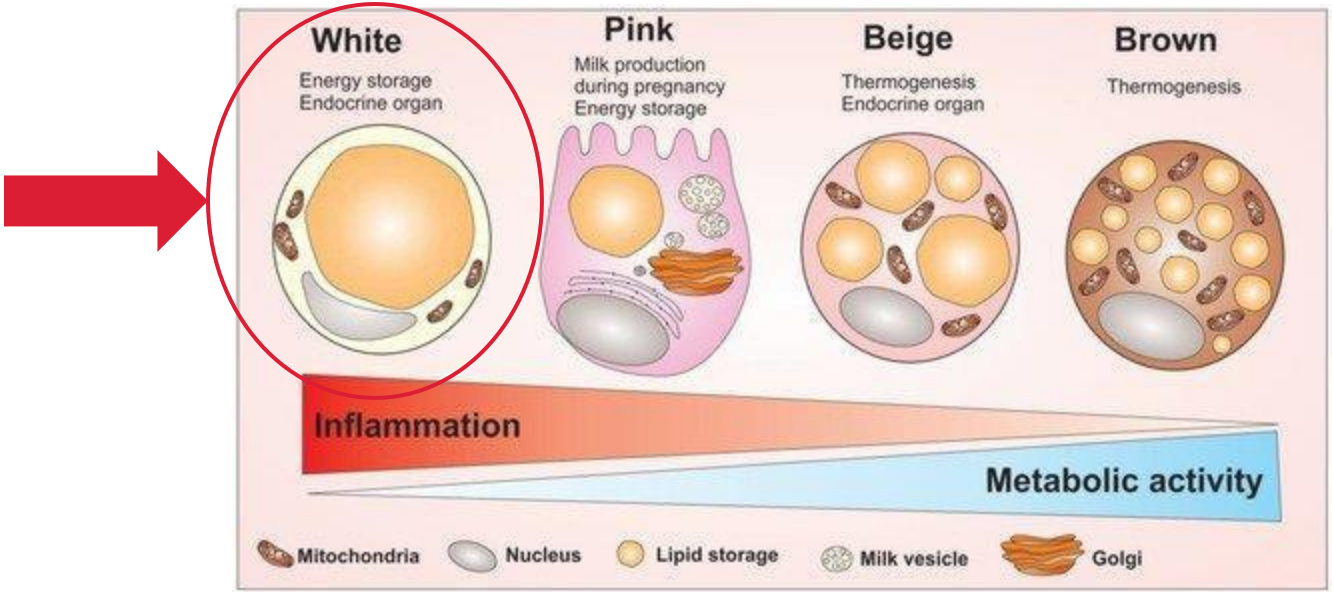
AMA: American Medical Association
AACE: American Association of Clinical Endocrinology
EASO: European Association for the Study of Obesity

Kaw ai et al Am J Physiol Cell Physiol. 2021 Mar 1; 320(3): C375–C391.

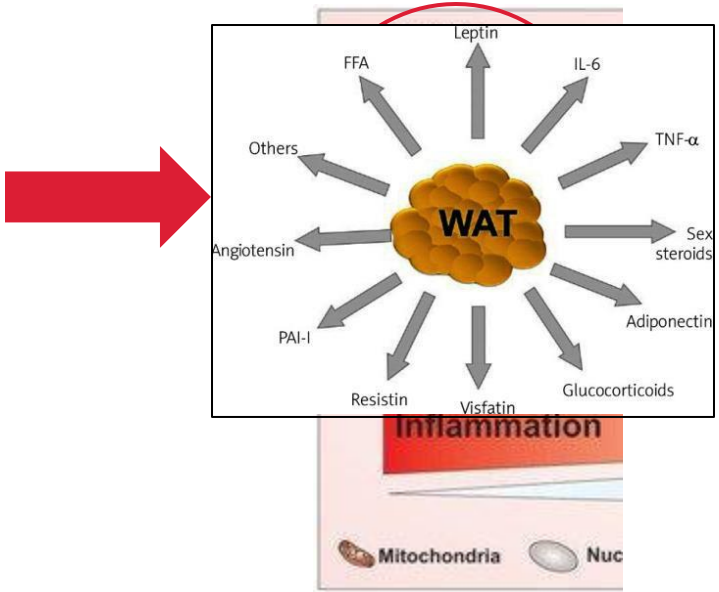
The adipose organ



Adipose tissue (AT) is now fully recognized as a metabolically active organ.

Corrêa LH, Heyn GS, Magalhaes KG..*Cells*. 2019; 8(7):662.
Harvey I, Boudreau A,Stephens JM. 2020 Adipose tissue in healthand disease.Open Biol.

White adipose tissue (WAT)

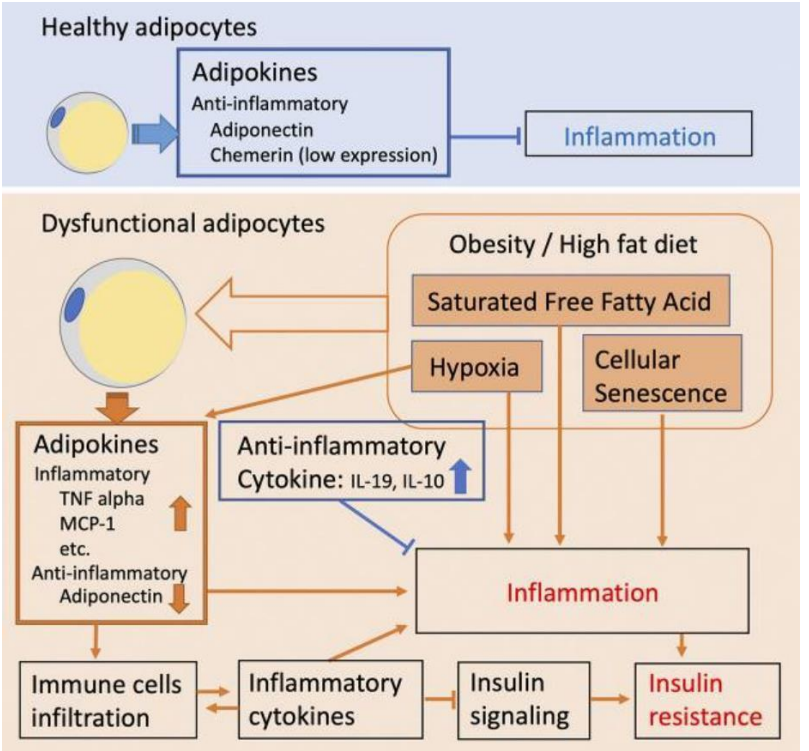


- ✓ Primary site for energy storage in the form of lipid
- ✓ Major endocrine organ
  - produces and secretes adipokines
  - responds to a variety of circulating metabolites and hormones (i.e. lipids, growth hormone, cortisol, insulin, catecholamines, etc.)
  - plays a role in glucose homeostasis

Corrêa LH, Heyn GS, Magalhaes KG..*Cells*. 2019; 8(7):662.
Harvey I, Boudreau A,Stephens JM. 2020 Adipose tissue in healthand disease.Open Biol).
Coelho M, Oliveira T, Fernandes R - Archives of medical science : AMS (2013)

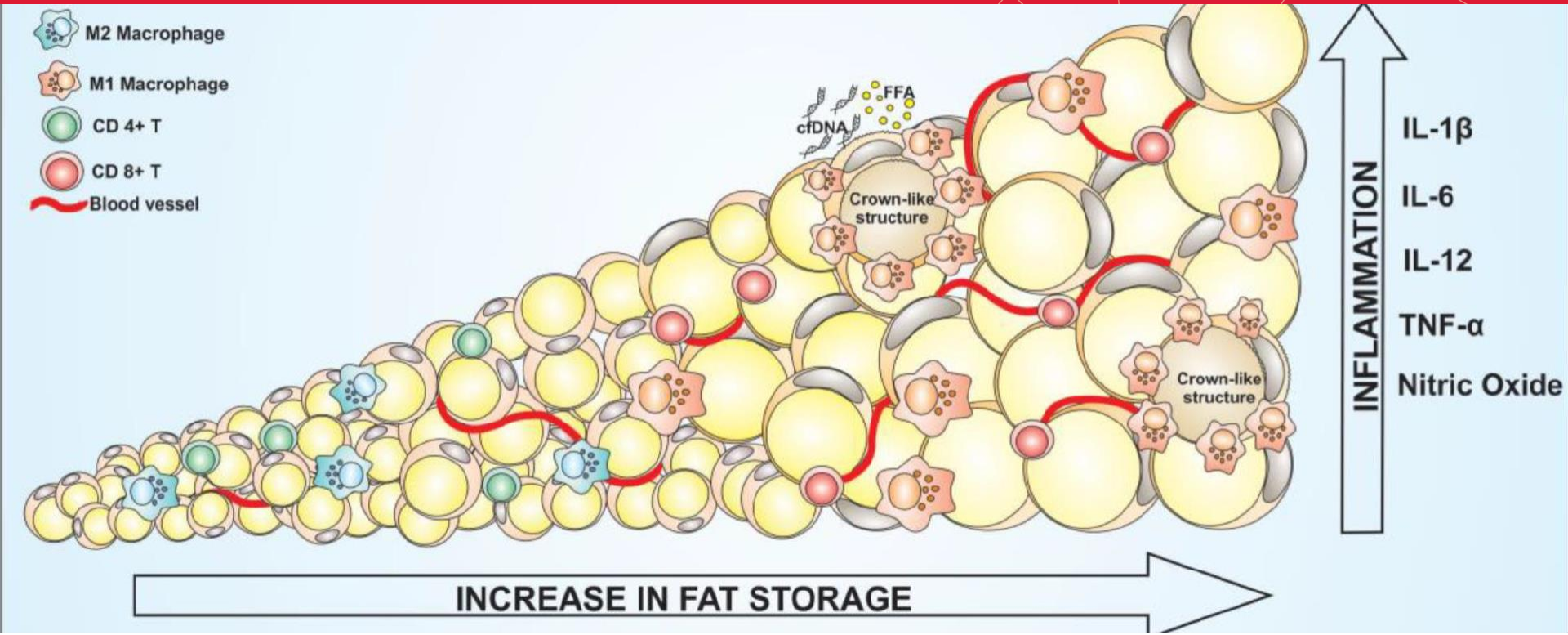
Pathophysiology of adiposopathy

- **On cellular level, adiposopathy ("sick fat"), aka lipotoxicity** leads to excessive energy storage in the form of fat.
- **Exact mechanisms of the initial inflammatory trigger remains unknown at this time**
- Oxidative stress, mitochondrial dysfunction, immune dysfunction, chronic low-grade inflammation and metabolic dysfunction all contribute to the pathogenesis of obesity
- Adiposopathy is sustained by adipocyte hypertrophy, visceral adiposity and/or ectopic fat deposition and secretion of hormones, like leptin, and proinflammatory protein, like the plethora of cytokines



Kaw ai et al Am J Physiol Cell Physiol. 2021 Mar 1; 320(3): C375–C39
De Lorenzo, A., Gratteri, S., Gualtieri, P. *et al. J Transl Med* **17,** 169 (2019).

Inflammation Cascade in Adipocytes



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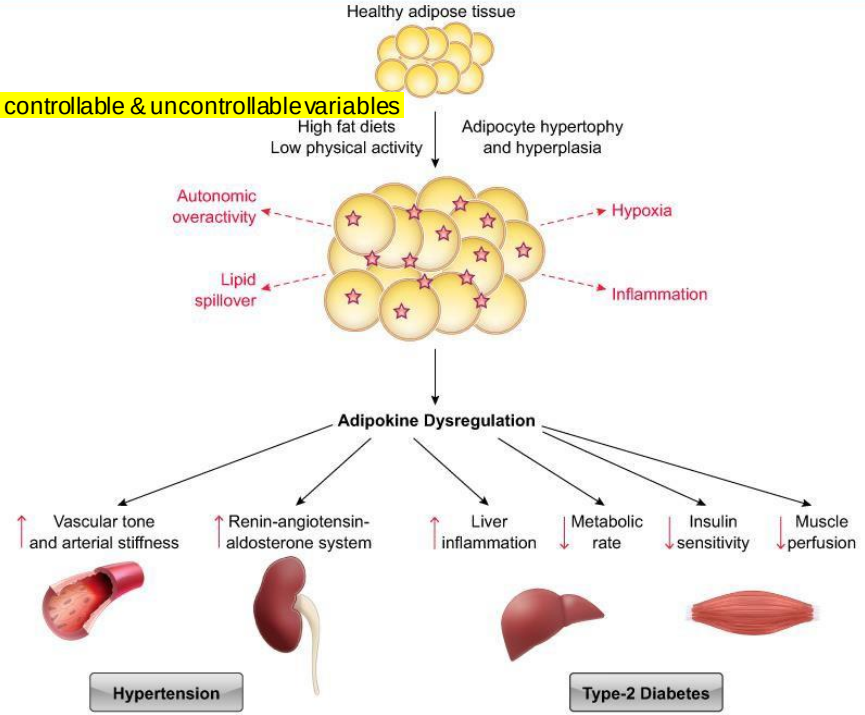
Corrêa LH, Heyn GS, Magalhaes KG..*Cells*. 2019; 8(7):662.
Harvey I, Boudreau A,Stephens JM. 2020 Adipose tissue in healthand disease.Open Biol)

Adipose Inflammation Leads to Organ Dysfunction

Numerous controllable & uncontrollable variables

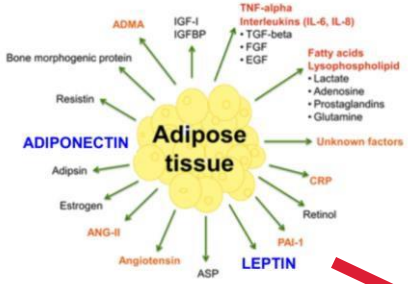


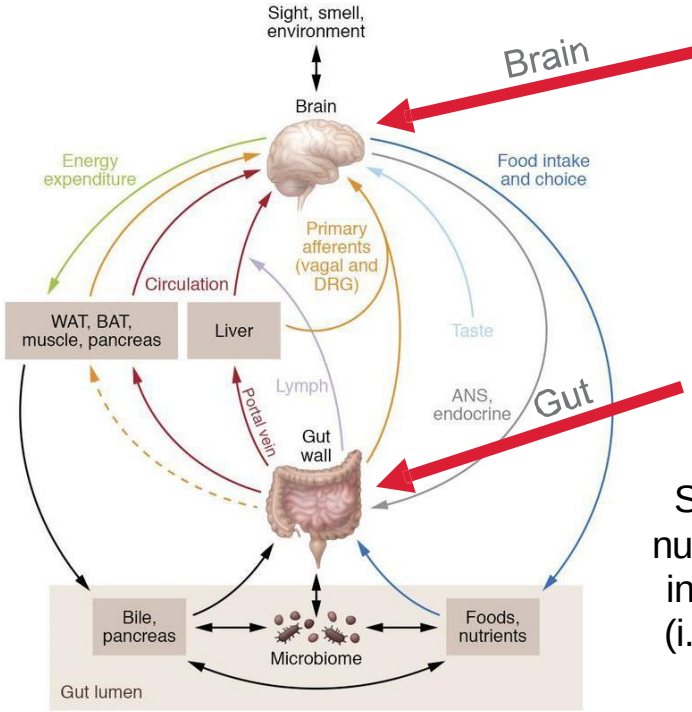
"Despite its low-grade nature, adipose tissue inflammation negatively impacts remote organ function, a phenomenon that is considered causative of the complications of obesity"

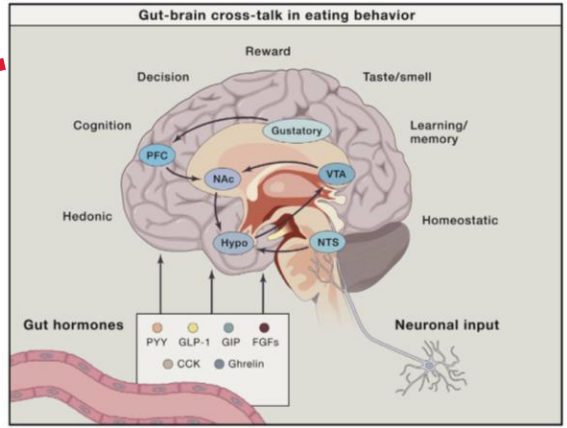
)

Saxton et al. Physiol Rev99: 1701–1763, 2019.
Kaw ai et al Am J Physiol Cell Physiol. 2021 Mar 1; 320(3): C375–C391

The Interplay of Gut-Brain-Microbiota Axis and Adipose Tissue







Brain

Gut

Signals reflecting energy stores, recent nutritional state, and other parameters are integrated in the central nervous system (i.e. hypothalamus) to coordinate energy intake and expenditure.

Xiao H, Kang S. 2020 Apr 7;11:297. doi: 10.3389/fgene.2020.00297.

Obesity is a chronic, relapsing disease

#1: Similar to other chronic diseases, obesity has a pathophysiolo g
interactions among genes, biological factors, the environment, and

#2: It meets the 3 criteria that constitute a disease (per AMA)

- ***Must have outward signs or symptoms***
- ***Cause morbidity or mortality***
- ***Involve impaired function of one tissue***

AACE American Association of Clinical Endocrinology

EASO European Association for the Study of Obesity

Proposed by AACE and EASO

A New Diagnostic Term for Obesity:

Adipose-Based Chronic Disease (ABCD)

Because it describes what we are treating: abnormalities in the mass, distribution, and function of adipose tissue—and why we are treating it, a chronic disease that leads to complications

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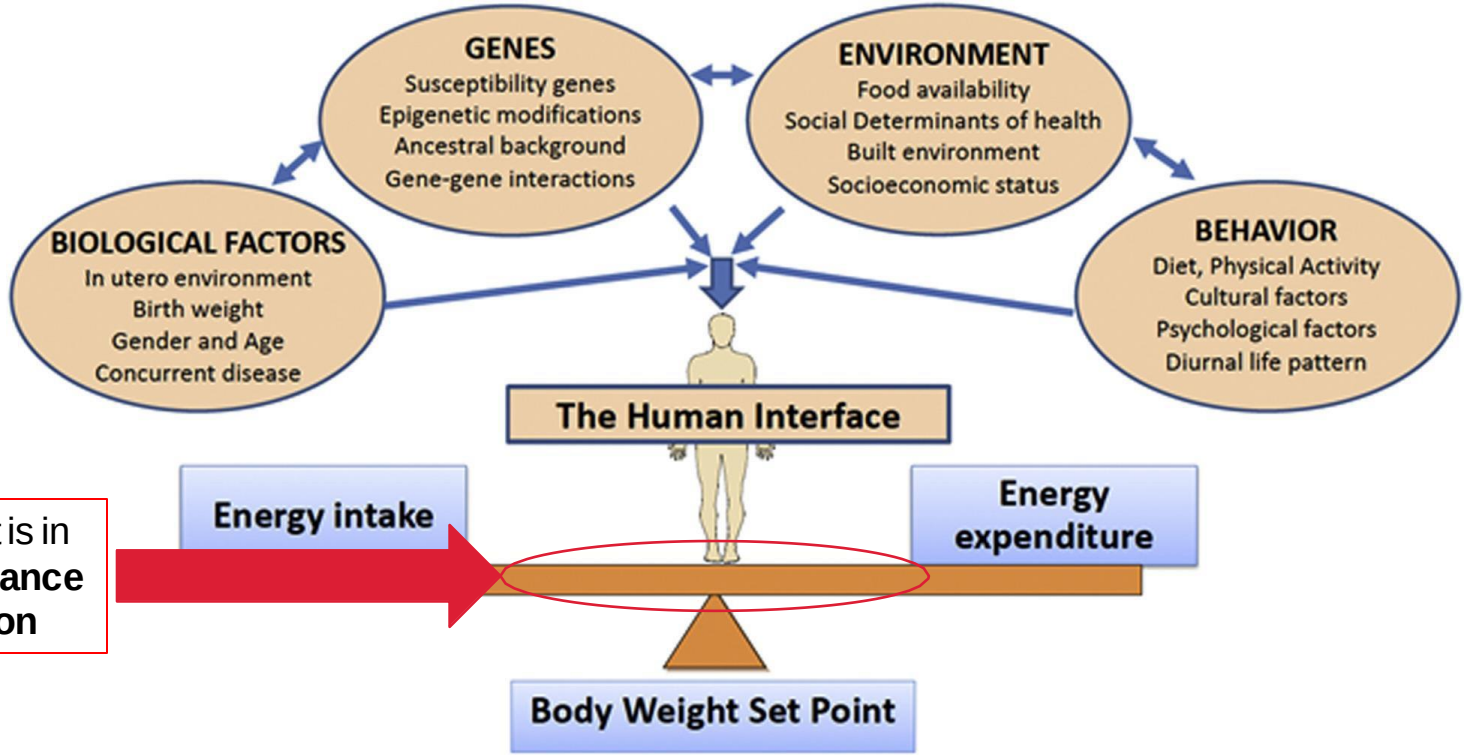
Kaw ai et al Am J Physiol Cell Physiol. 2021 Mar 1; 320(3): C375–C391
Garvey. *Endocrine Practice*. 28 (2022) 214-222. .

Review contributing factors to weight regulation, including uncontrollable ones

Obesity is a multifactorial pathology



The defect is in **energy balance regulation**

Garvey. *Endocrine Practice*. 28 (2022) 214-222.

Contributors to Weight – Uncontrollable and Controllable

Genetics
Prenatal and Postnatal health
Environment
Trauma
Victim of Weight Bias and/or Stigma
Unhealthy diet
Eating patterns
Little or no exercise
Inadequate sleep/Circadian Rhythm disruption
Sedentary behaviors
Pregnancy
Age
Menopause
Life changing event
Weight Promoting Medications
Medical illness
Stress
Alcohol use
Quitting Smoking
Mental health

Genetics

- To date >100 loci related to obesity have been identified
- Family, twin and adoption studies have consistently demonstrated that 40–70% of the variation in body weight can be attributed to heritable factors
- The presence or absence of genetic factors protect us from or predispose us to obesity. i.e. the fat mass and obesity-associated gene (FTO)
- It is the complex interplay of these loci and environmental factors ➔ EPIGENETICS

Riveros-McKay F, et. al. PLOS GENETICS. 2019.

Findings:

- Thinness, like obesity, is a heritable trait with a polygenic component
- Slim individuals had a significantly lower genetic risk score
- Hence, this is first time in research that showed:

"…thin people are generally thin because they have a lower burden of genes that increases a person's chance of being overweight and NOT because they are morally superior, as some people like to suggest."

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Riveros-McKay F, et. al. PLOS GENETICS. 2019.

Prenatal and Early Life Health

Modifiable prenatal factors associated with childhood obesity:

- Mother's smoking habits
  - Meta-analysis of 14 studies found 50% higher risk of childhood obesity
- Mother's weight and rate of weight gain during pregnancy
- Pre-gestational and gestational diabetes

Modifiable postnatal factors associated with childhood obesity

- Rapid infant weight gain during first 6 mo. of life
- Breastfeeding and possibly duration
- Infant sleep duration

1. Oken E, et al. BMJ. 2005; .
2. Langer O. etl. al. Clin Obstet Gynecol. 2000.
3. Ouzilleua C, et. al. CMAJ. 2003.
4. Taveras EM, et. al. 2008.

Environment

- Built Environment: access & quality of foods, recreational facilities, urban design, transportation access, sedentary entertainment
- Organizational: rules, regulations, programs, practices in schools, worksite, community organizations, public policy
- Interpersonal: social networks, social norms, family norms, cultural beliefs, occupations

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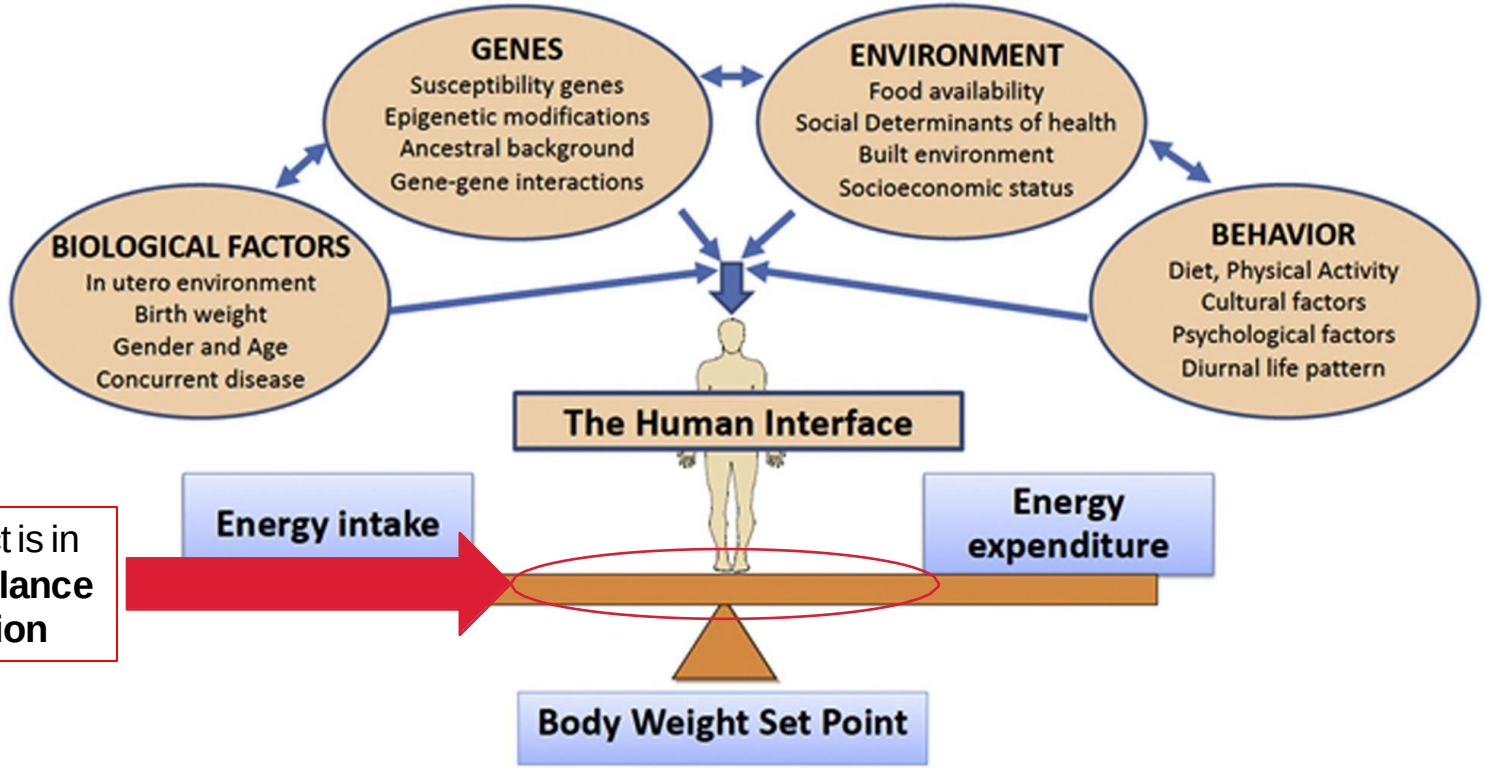
1. Kushner, R.F. et. al. Humana Press, 2007.
2. Haynes-Maslow, Lindsey. Union of Concerned Scientists. April 2015

Obesity is a multifactorial pathology



The defect is in **energy balance regulation**

Garvey. *Endocrine Practice*. 28 (2022) 214-222.

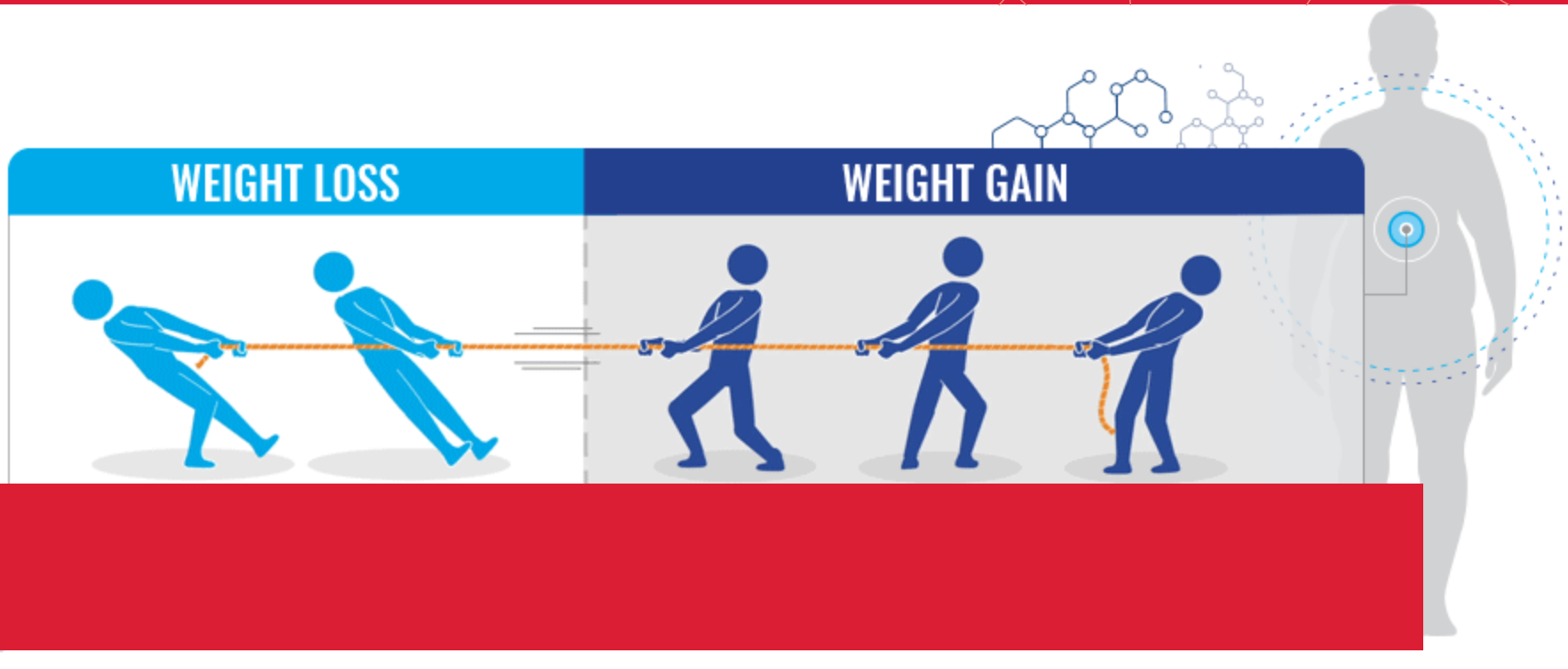
Discuss the set point theory and why it it so difficult to lose weight and maintain it

The set-point theory

"The brain is the primary organ responsible for body weight regulation operating mainly below our conscious awareness via complex endocrine, metabolic, and nervous system signals to control food intake in response to the body's dynamic energy needs as well as environmental influences"

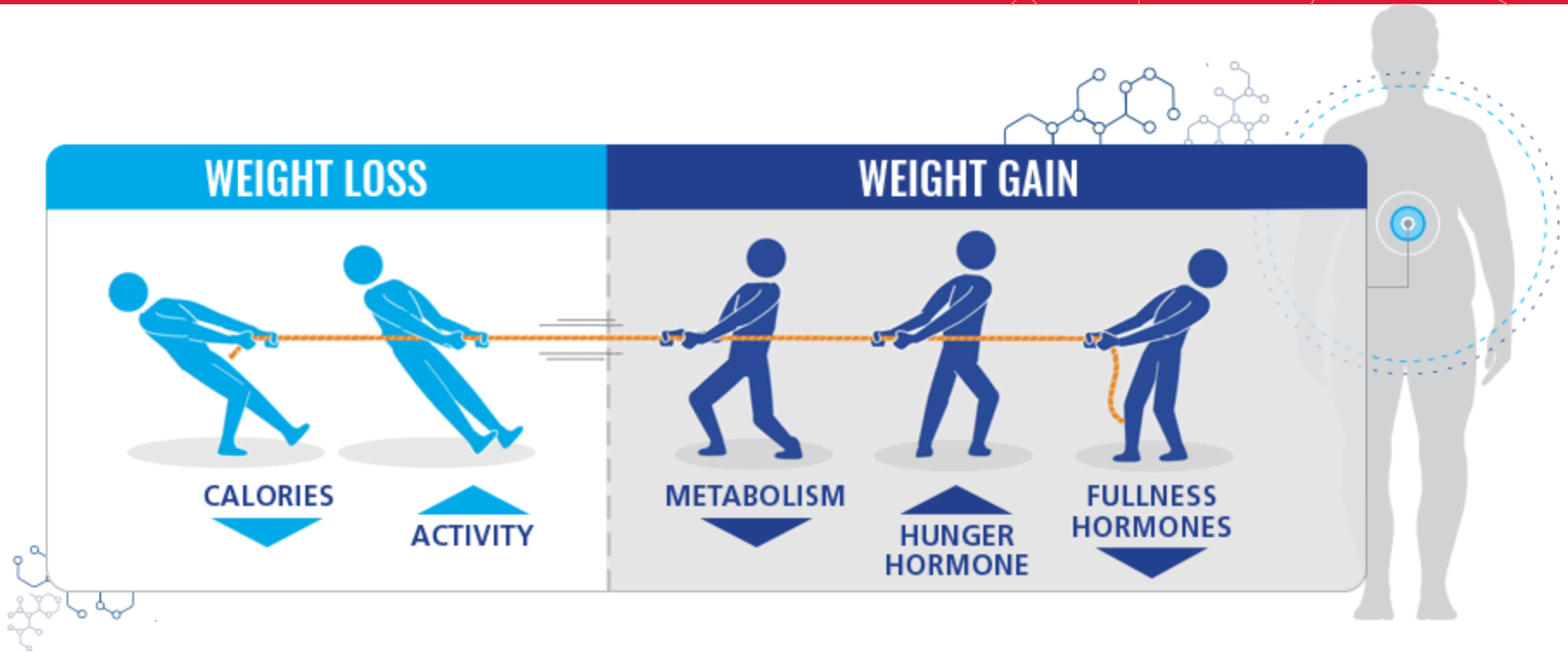
Hall et al. J Clin Nutr 2022;115:1243–1254

Why is it so hard to lose weight and keep it off?



Sumithran P, et al. N Engl J Med. 2011;365(17):1597-1604
www.rethinkobesity.com

Why is it so hard to lose weight and keep it off?



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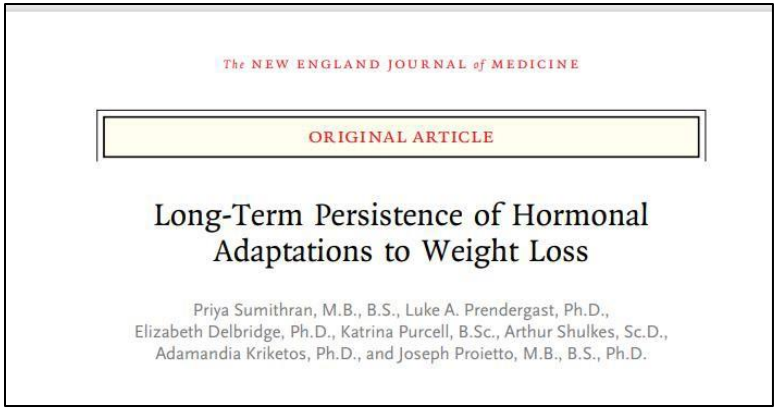
Sumithran P, et al. N Engl J Med. 2011;365(17):1597-1604
www.rethinkobesity.com

Sustained Changes in Peripheral Signals for Up to One Year Following Weight Loss

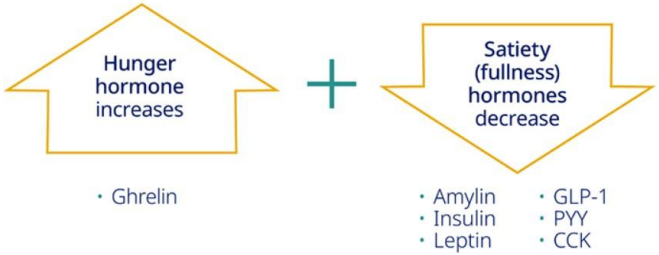


The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Long-Term Persistence of Hormonal Adaptations to Weight Loss

Priya Sumithran, M.B., B.S., Luke A. Prendergast, Ph.D., Elizabeth Delbridge, Ph.D., Katrina Purcell, B.Sc., Arthur Shulkes, Sc.D., Adamandia Kriketos, Ph.D., and Joseph Proietto, M.B., B.S., Ph.D.



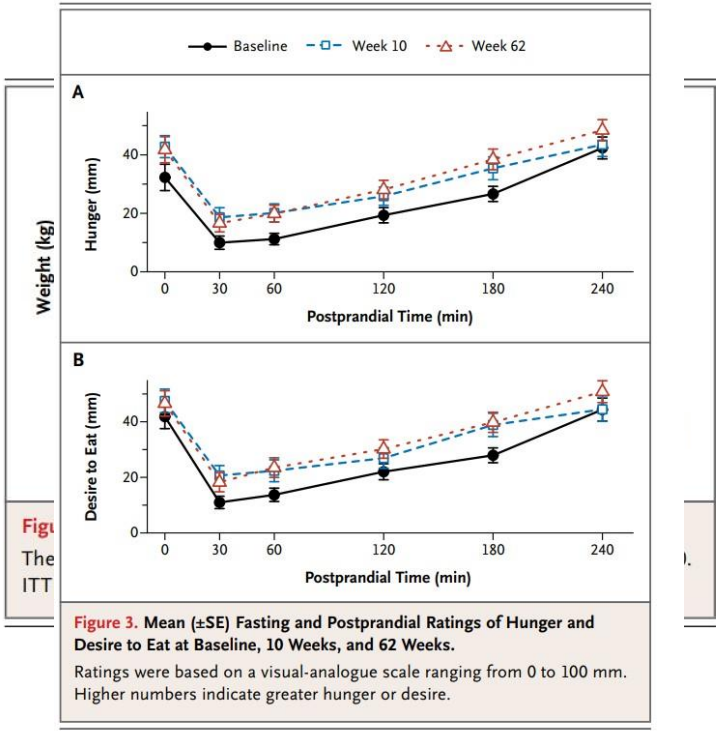


Figure 3. Mean (±SE) Fasting and Postprandial Ratings of Hunger and Desire to Eat at Baseline, 10 Weeks, and 62 Weeks.

Ratings were based on a visual-analogue scale ranging from 0 to 100 mm. Higher numbers indicate greater hunger or desire.

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Sumithran P, et al. N Engl J Med. 2011;365(17):1597-1604

www.rethinkobesity.com

Adaptive Responses to Weight Loss

TABLE 1.2
Adaptive Responses to Weight Loss That Promote Weight Regain

Domain	Parameter	Response to Weight Loss
Appetite	Subjective experience	Hunger increases
	Hormones and neurotransmitters	Satiety falls
	Rewarding properties of food	Leptin falls
		Ghrelin rises
Energy expenditure	Tot	ctivity, and thermic effect of food
	Res	
	Phy	
Metabolism	Ins	
	Fat	
	Ad	
		Increased number of new adipocytes

NET RESULT OF THESE ADAPTIVE RESPONSES :

1) MAKES YOU WANT TO EAT MORE

2) BURN LESS ENERGY

3) STORE FAT

= HARDER TO LOSE AND MAINTAIN YOUR WEIGHT

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Kushner, R et al. *Primary Care:Evaluation and Management of Obesity*. Wolters Kluwer Health, 2020.

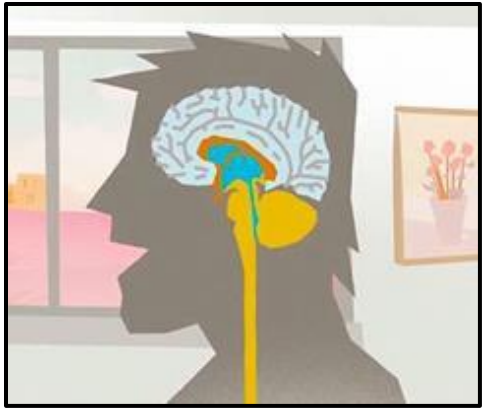
Biological Adaptations

Q: How long do these biological neurohormonal adaptations persist?

- Evidence suggests adaptions to sustained obesity often persist indefinitely
- Biological pressure to restore bodyweight to the highest-sustained lifetime level gets stronger as weight loss increases

Q: Then is a patient ever truly "recovered" from obesity?

- Few individuals ever fully recover from obesity
- Individuals with obesity who lose weight are essentially in "remission" and biologically very different than their counterparts



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Ochner CN., et al.,Physiol Behav 2013; 120: 106–13.
Rosenbaum M, Leibel Int J Obes 2010; 34 (suppl 1): S47–55.
Ochner C.N. Lancet. 2015. 3(4): pp232-234.

Describe current evidence based treatment options for obesity, including their indications

Treatment Modalities

Components of Effective Weight Management Programs

RD/SW/Psychologist/ Sleep Medicine/ PT/OT:

Healthy Lifestyle

Obesity Medicine:

Medical Weight Management

Gastroenterology:

Bariatric Endoscopic Procedures

General Surgery:

Bariatric Surgery

Plastics:

Body Contouring

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Main Components of The Treatment Options

Lifestyle is Foundation

- Diet
- Exercise
- Sleep
- Stress management
- Work through barriers to achieving goals

Medications

- Medications in conjunction w/ lifestyle changes listed above
- Choice of medication depends on numerous variables
- Intended to be long-term treatment

Endoscopic Bariatric Procedures

- Endoscopic Sleeve Gastroplasty
- IntraGastric Balloon
- Revisions

Weight Loss Surgery

- Gastric Sleeve
- Gastric Bypass (Roux-en-Y)
- Revisions

Indications for Treatment

BMI (kg/m^2)	Treatment Plan
> 25	**Reduced calorie diet, exercise, behavioral modification**
≥27-30 + co-morbidity	**Consider adding pharmacotherapy** **Consider bariatric endoscopy procedure**
≥ 30	**Consider adding pharmacotherapy** **Consider bariatric endoscopy procedure**
≥35-40 + co-morbidity	**Consider bariatric surgery**
≥ 40	**Consider bariatric surgery**

1. Apovian CM et al. JCEM online. 2015.
2. The Look AHEAD Research Group. *Obesity (Silver Spring, Md.)* 22.1 (2014): 5–13. *PMC*. Web. 2 Mar. 2016.
3. Burke LE, et al. Obesity 2011; 19:338-44.

2023 ASMBS/IFSO Update to NIH Statement

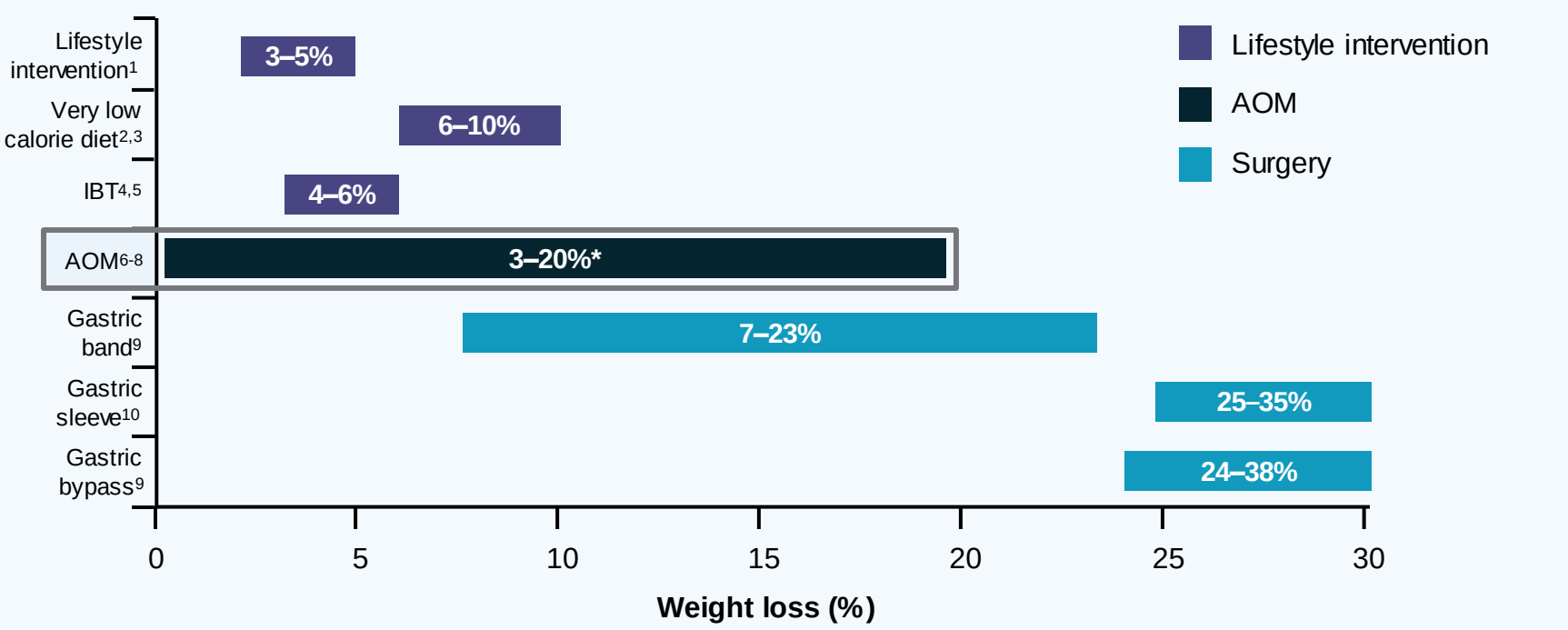
- **BMI** ≥35 regardless of presence, absence, or severity of co-morbidities.
- BMI of 30-34.9 **with presence of metabolic disease**
- Asian population:
  - BMI ≥25 kg/m^2 suggests clinical obesity
  - BMI ≥27.5 kg/m^2 consider MBS
- Appropriate adolescents should be considered

SOARD - VOLUME 18, ISSUE 12, P1345-1356, DECEMBER 2022

FDA Approved Medications for Weight Management

Agents	Mechanism of Action	Effect	Approval Date
Orlistat (Xenical® or Alli®)	• Pancreatic lipase inhibition	• Reduces fat absorption	• 1999
Phentermine	• Sympathomimetic	• Appetite regulation	• 1959
Phentermine/topiramate ER (Qsymia®)	• Sympathomimetic • Anticonvulsant (GABA receptor modulation, carbonic anhydrase inhibition, glutamate antagonism)	• Appetite regulation	• 2012
Naltrexone/bupropion SR (Contrave®)	• Opioid receptor antagonist • Dopamine/noradrenaline reuptake inhibitor	• Appetite regulation	• 2014
Liraglutide (Saxenda®)	• GLP-1 receptor agonist	• Appetite regulation	• 2014
Semaglutide (Wegovy™)	• GLP-1 receptor agonist	• Appetite regulation	• 2021

Efficacy of existing weight loss interventions

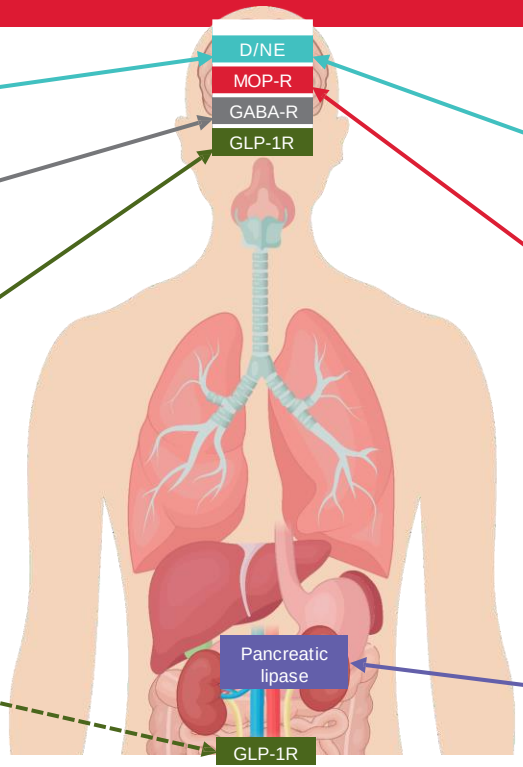


*Based on mean weight loss achieved by the completer populations in the largest phase 3 clinical trial of each respective product's clinical development program as reported in the AACE Guidelines (2016).
AACE, American Association of Clinical Endocrinology; AOM, anti-obesity medications; IBT, intensive behavioral therapy.

1. le Roux CW et al. Lancet 2017;389:1399–409; 2. Lean ME et al. Lancet 2018;391:541–51; 3. Tsai AG and Wadden TA. Obesity 2006;14:1283–93; 4. Wadden TA et al. Obesity 2011;19:1987–98; 5. Wadden TA et al. Obesity 2019;27:75–86; 6. Garvey WT et al. Endocr Pract 2016;22(Suppl 3):1–203; 7. Tak YJ and Lee SY. Curr Obes Rep 2021;10:14–30; 8. 10. Novo Nordisk. Wegovy (semaglutide). Package Insert. Available at: https://www.novo-pi.com/wegovy.pdf. Accessed August 2022; 9. Courcoulas AP et al. JAMA 2013;310:2416–25; 10. IFSO Sleeve Gastrectomy. Available at: https://ifso.com/patient-sleeve-gastrectomy/. Accessed August 2022;

Approved anti-obesity medications

Sites of action



Phentermine/Topiramate[1,2]
Sympathomimetic amine anorectic and ER antiepileptic

Bupropion/Naltrexone[1,2]
Opioid antagonist/dopamine and norepinephrine reuptake inhibitor

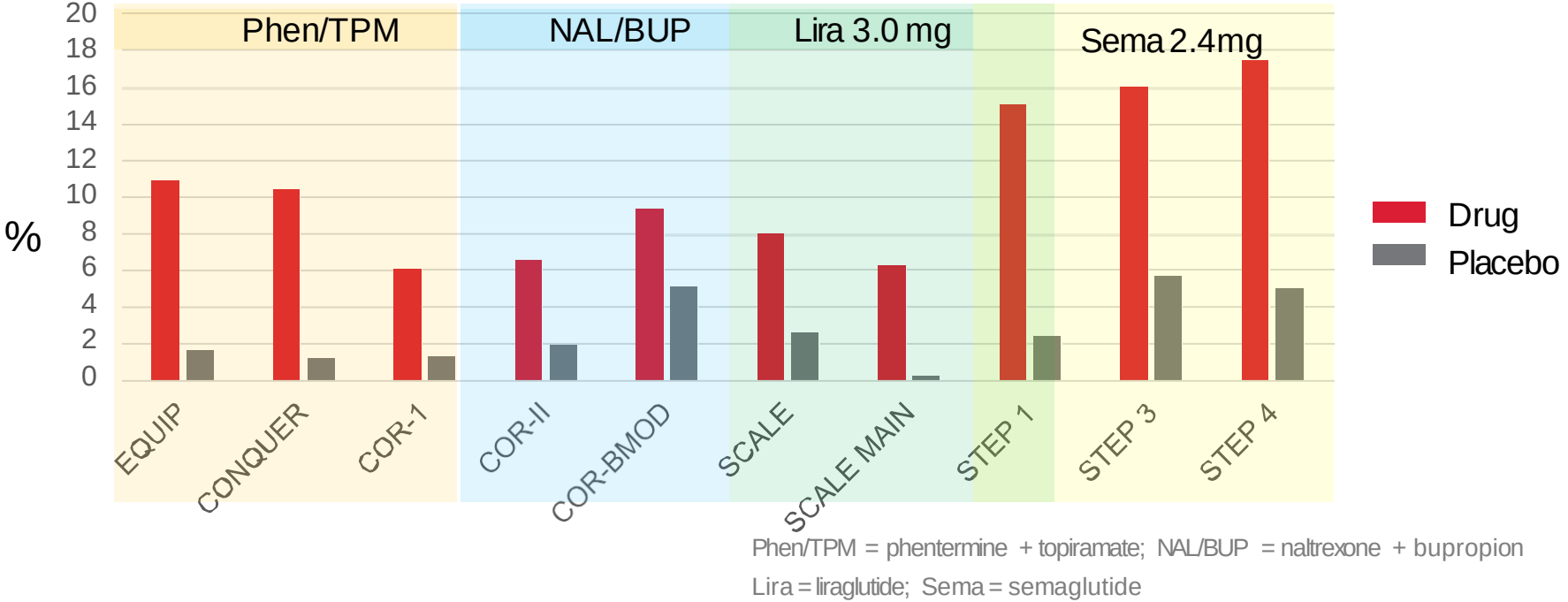
Liraglutide[1,2]
Semaglutide[3]
GLP-1 receptor agonists

Orlistat[1,2]
Pancreatic lipase inhibitor

D/NE, dopamine/norepinephrine; ER, extended release; GABA-R, gamma-aminobutyric acid receptor; GLP-1R, glucagon-like peptide-1 receptor; MOP-R, μ-opioid peptide receptor.

1. Srivastava G and Apovian CM. Nat Rev 2018;14:12–24; 2. Patel D. Metabolism 2015;64:1376–85; 3. FDA. FDA approves new drug treatment for chronic weight management. Available at: https://www.fda.gov/news-events/press-announcements/fda-approves-new-drug-treatment-chronic-weight-management-first-2014. Accessed September 2022.

Percent Weight Loss (Drug versus Placebo) for 3 AOMs



Phen/TPM = phentermine + topiramate; NAL/BUP = naltrexone + bupropion
Lira = liraglutide; Sema = semaglutide

The data supporting these tables are derived from the Prescribing Information labeling approved by the U.S. Food and Drug Administration.
*Data from randomized controlled trials >52 weeks in duration; †
Adapted from Bray GA et al. Lancet 2016;387:1947–56.

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Once-Weekly Semaglutide in Adults with Overweight or Obesity

John P.H. Wilding, D.M., Rachel L. Batterham, M.B., B.S., Ph.D., Salvatore Calanna, Ph.D., Melanie Davies, M.D., Luc F. Van Gaal, M.D., Ph.D., Ildiko Lingvay, M.D., M.P.H., M.S.C.S., Barbara M. McGowan, M.D., Ph.D., Julio Rosenstock, M.D., Marie T.D. Tran, M.D., Ph.D., Thomas A. Wadden, Ph.D., Sean Wharton, M.D., Pharm.D., Koutaro Yokote, M.D., Ph.D., Niels Zeuthen, M.Sc., and Robert F. Kushner, M.D., for the STEP 1 Study Group*

N Engl J Med 2021;384:989-1002

Injected Drug Delivers Up to 20% Weight Loss in Trial

U.S. News & WORLD REPORT

'A Game Changer': Drug Brings Weight Loss in Patients With Obesity

In a clinical trial, participants taking semaglutide lost 15 percent of their body weight, on average.

Diabetes medication almost twice as effective as other anti-obesity drugs, researchers say

A study from Northwestern Medicine found that, at a higher dosage, the diabetes medication semaglutide is more effective than FDA-approved weight-loss drugs currently on the market.

By Mari Devereaux | Feb 10, 2021, 8:00pm CST

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The New York Times

CHICAGO SUN-TIMES

Emerging Anti-Obesity Pharmacological Therapies

Category	Mechanism	Drug	Stage of Development
Hormonal	GLP-1 receptor agonist	Semaglutide	Approved 2021*
	GLP-1/GIP receptor agonist	Tirzepatide	Phase 3
	GLP-1/glucagon receptor agonist		Phase 2
	GLP-1/GIP/glucagon		Phase 2
	Amylin analogue	Cagrilintide	Phase 2
	GLP-1/amylin analogue		Phase 1
	Ghrelin antagonist		Phase 1
	PYY analogue		Phase 1
	GLP-1 small molecule receptor agonist	Danuglipron	Phase 1
Neuropeptide	Melanocortin-4 receptor agonist	Setmelanotide	Approved 2020 for rare genetic conditions*
Enzyme inhibition	Sodium-glucose transporter-1 and 2 (SGLT1, SGLT2 inhibitor)	Licoglifloxin	Phase 2
Monoamine receptor uptake inhibition	Noradrenaline, dopamine, serotonin update inhibitor	Tesofensine	Phase 3
Monoclonal antibody	Activin type II receptor antagonist	Bimagrumab	Phase 2

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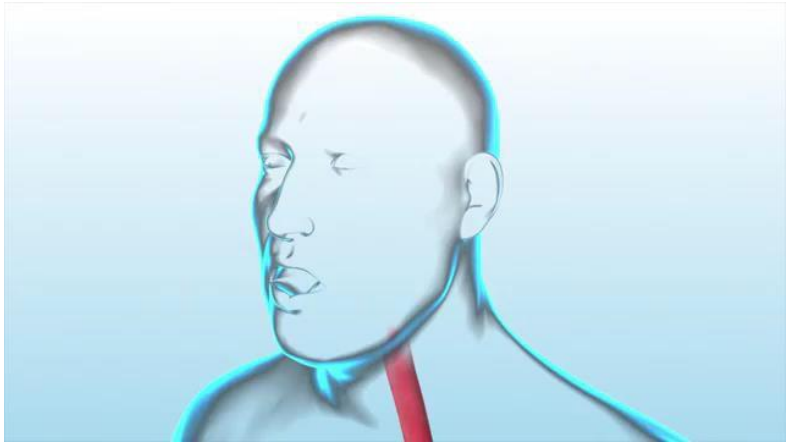
*selected approval according to local regulatory agencies

Intragastric Balloon (IGB)

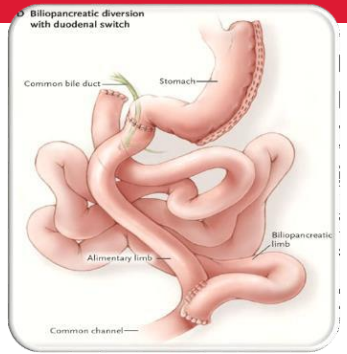
- Silicone balloon inflated inside the stomach with either saline or gas
- Physically occupies space in the stomach and delays gastric emptying to cause early satiety
- Balloon left in place for 6 months and removed
- Total Body Weight Loss: 6-8 months: 7.1 - 14.9%
  12 months: 7.6 - 9.2%



Endoscopic Sleeve Gastroplasty (ESG)

- Reshaping and reducing the size of the stomach from within, using full thickness endoscopic sutures
- No cutting or removal of any part of the stomach
- All endoscopic and outpatient procedure (~1 hour)
- Expected total body weight loss at 1 year is 15-19%

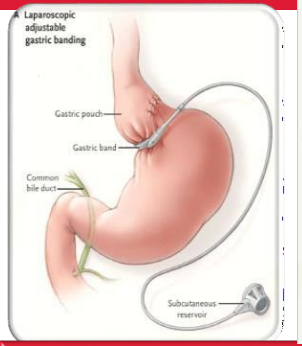
Bariatric Surgeries

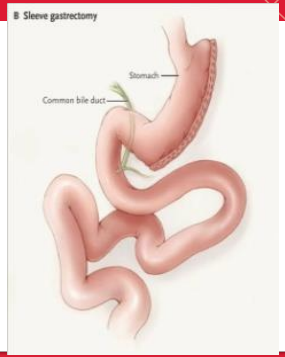


Malabsorption

Reduce Absorption

- **Biliopancreatic diversion with Duodenal Switch**

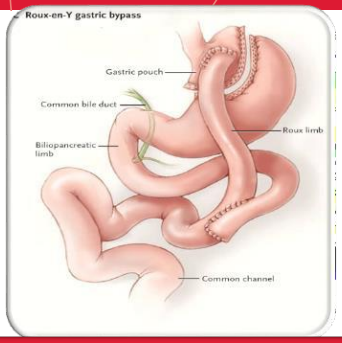




Restriction

Pouch Limits Quantity

- **Gastric Banding**
- **Vertical Sleeve Gastrectomy**

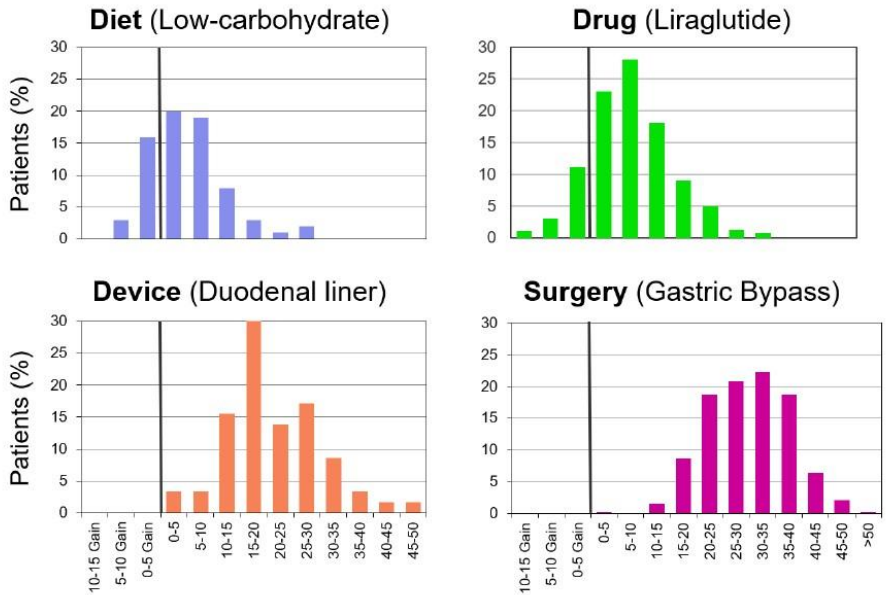


Combination

restrictive and malabsorptive

- **Roux-en-Y Gastric Bypass**

Different People Vary In Response to Treatment Options



Source: Presentation by Lee Kaplan, 30th Blackburn Course in Obesity Medicine, Treating Obesity 2017

- Obesity comes in many forms and flavors (think about cancer)
- <u>Among proven options:</u> Average response doesn't matter so much as your response
- A good provider can find the options that work for you

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Describe the resources available at The Cedars Sinai Center for Weight Management and Metabolic Health

Center for Weight Management and Metabolic Health – Multidisciplinary Treatment

RD/SW/Psychologist/ Sleep Medicine/ PT/OT:

Healthy Lifestyle

Obesity Medicine:

Medical Weight Management

Gastroenterology:

Bariatric Endoscopic Procedures

General Surgery:

Bariatric Surgery

Plastics:

Body Contouring

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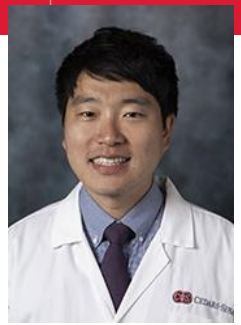
Center for Weight Management and Metabolic Health – Our Team

Miguel Burch, MD, FACS

Scott Cunneen, MD, FACS

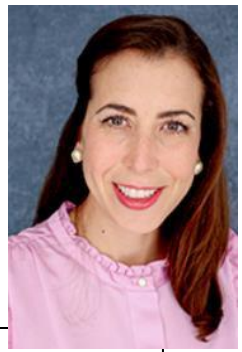
Kulmeet Sandhu, MD, FACS, FASMBS

Rabindra Watson, MD



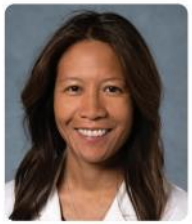
Ken Park, MD

Amanda Velazquez, MD DABOM

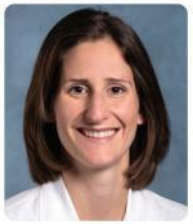


- **Extensive experience since 1999**
  - Over 4,000 weight loss operations
  - 300+ per year
  - Best-in-class outcomes
- **World-class research**
  - Electrical gastric pacemaker, LapBand® study, Realize™ band study, TOGa (first endoluminal weight loss procedure)

Center for Weight Management and Metabolic Health – Our Center's Team Continued



Kristine Acorda Reece, NP
Nurse Practitioner



Zsofia LaRue, NP
Nurse Practitioner

Emily Cain, PA-C
Physician Assistant

Albert Albayev, RD
Dietitian

Carolina Castillo, RD
Dietitian

High Quality and Evidence Based Care

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Private Insurance Center of Excellence: Blue Cross, Blue Shield, Cigna, Aetna, Etc.

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ASMBS American Society for Metabolic and Bariatric Surgery

Take Away Points

- Addressing obesity in potential organ donors is critical
- Obesity is a chronic disease with complex pathophysiology
- Adipose tissue is an active endocrine organ and involved in the cross-talk between the gut, brain, and microbiome in energy regulation
- Dysregulation to energy homeostasis is multifactorial in origin, and results from controllable and uncontrollable factors
- Losing weight and maintaining it is challenging because of metabolic adaptations that counteract weight-loss efforts
- Numerous evidence-based treatments for obesity exist. Please feel free to refer those with medically complex obesity to our center!

"Patient success is dependent on a shift in the way healthcare professionals think about obesity, otherwise, patients are destined for failure."

- Lee Kaplan, MD, PhD
Director, The Obesity and Nutrition Institute
Mass General Hospital
Past President of The Obesity Society

Thank you

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Session Survey

Amanda Velazquez, MD | April 19th 2:45 PM-3:30 PM

14th Annual Living Donation Conference