

Fatal Fat:

The Latest Skinny on the Entero-endocrine Disorder

*This is a
guilt-free zone!*

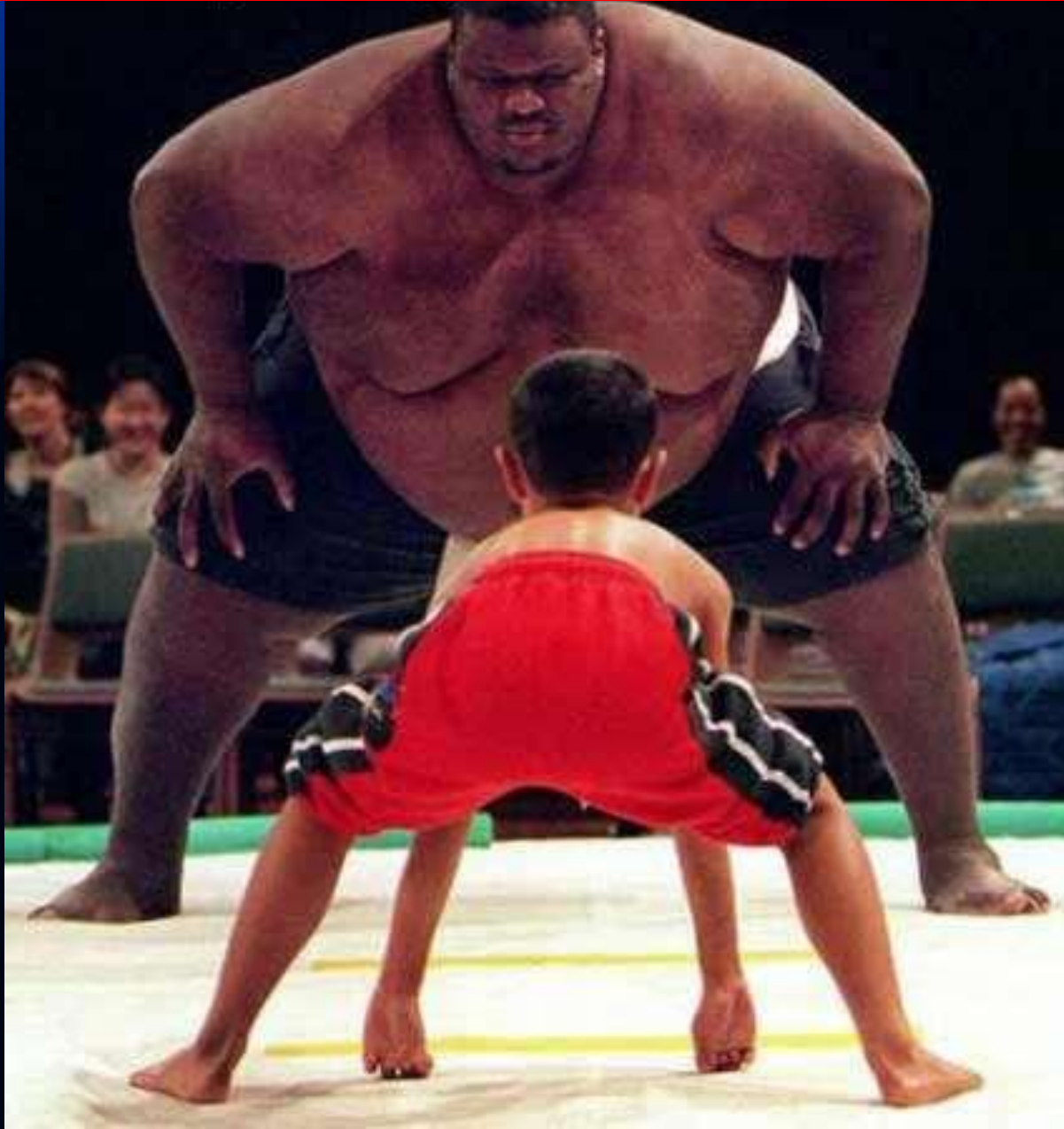


Christine Kessler MN, CNS, ANP, BC-ADM

Objectives

- At the conclusion of this talk, the attendee will be able to
 - Discuss trends and etiologic factors in our nation's obesity epidemic
 - Describe various interconnection between fat, selected adipokines, intestinal biopeptides & brain satiety regions
 - Discuss pharm & non-pharmacologic , and surgical interventions for weight reduction

TACKLING A BIG PROBLEM



Case Studies in Obesity

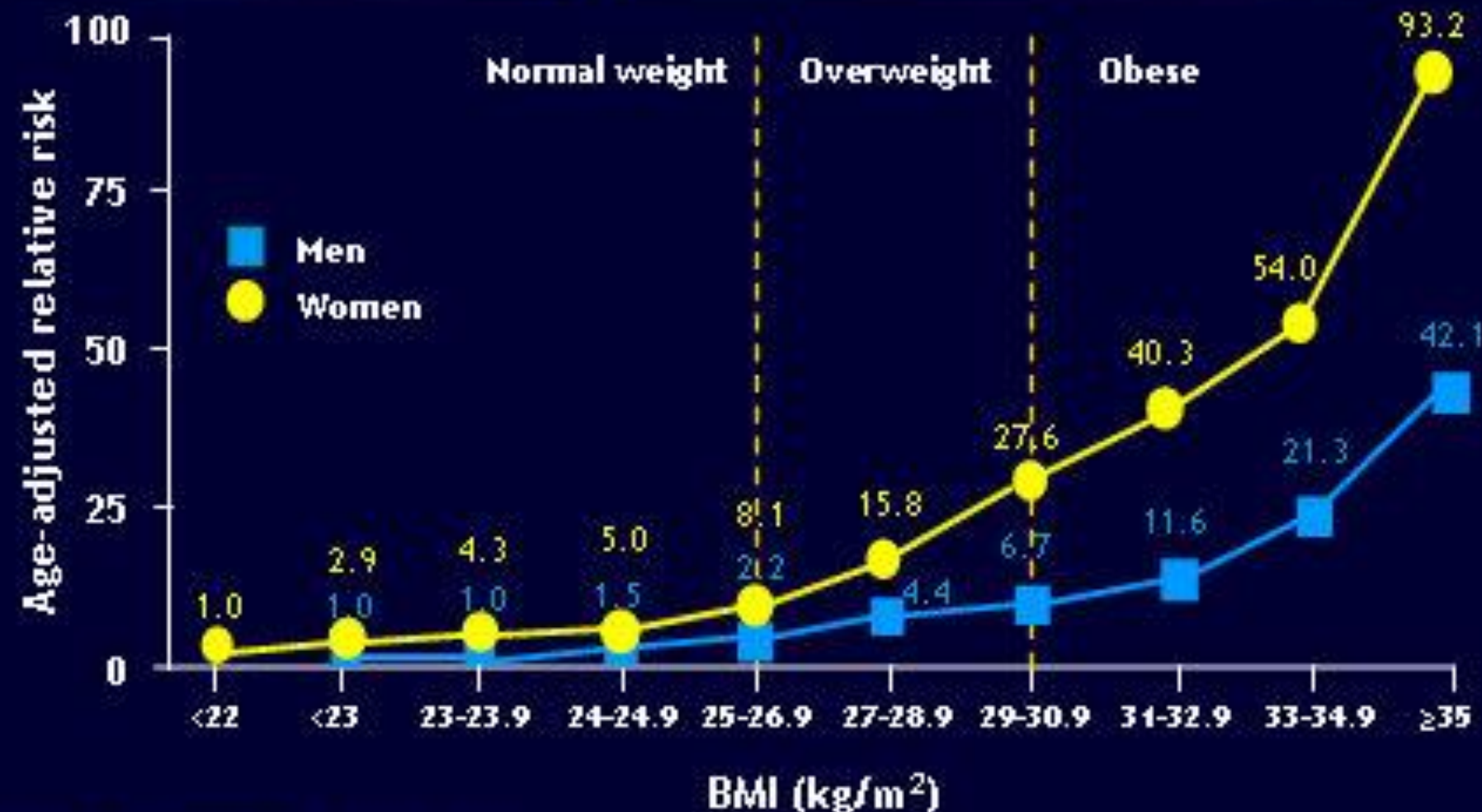
- Just look around
 - At work
 - At the mall
 - At Disneyworld
 -etc

Size of the Problem

- CDC reports obesity has **doubled** in adults and nearly **tripled** in our youth since 1980!!
- Increasing the risk of:
 - Hypertension
 - Dyslipidemia
 - Type 2 diabetes
 - Coronary heart disease
 - Stroke
 - Gallbladder disease/ fatty liver disease/ pancreatitis
 - Sleep apnea & respiratory issues
 - Cancers (endometrial, breast & colon)
 - Dementia



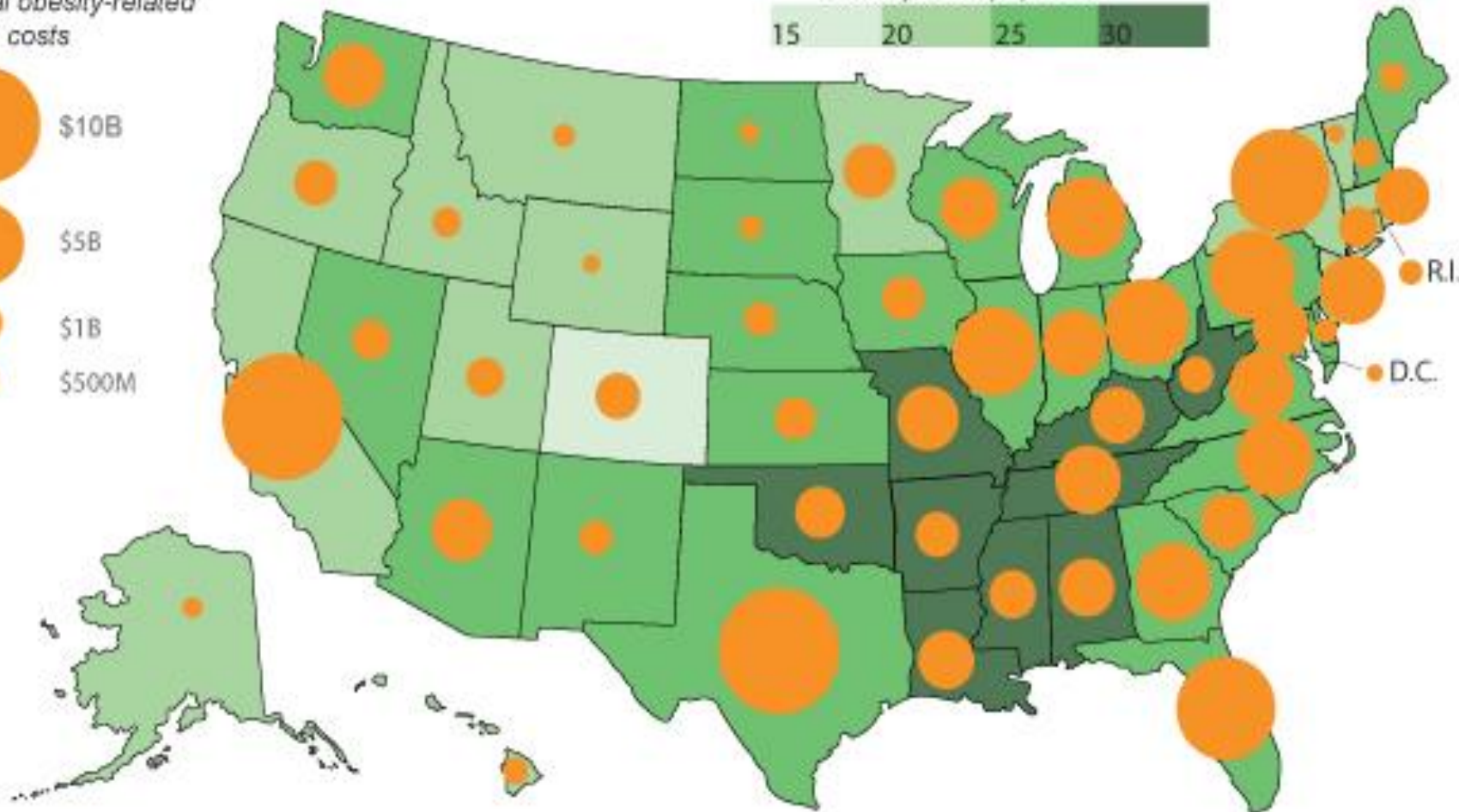
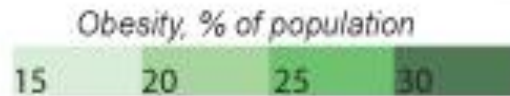
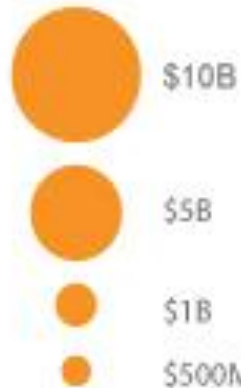
Relationship Between BMI and Risk of Type 2 Diabetes Mellitus



The Economic Costs of Obesity, 2009



Annual obesity-related health costs



Source: CDC Behavioral Risk Factor Surveillance system; U.S, Census Bureau, population division, Dec, 2009

Obesity or Overweight?

- BMI over 30% = obesity
- BMI over 25 to 29% = overweight
- BMI controversy
- Waist or weight?



Age-adjusted Percentage of U.S. Adults Who Were Obese or Who Had Diagnosed Diabetes

Obesity (BMI ≥ 30 kg/m²)

1994



2000

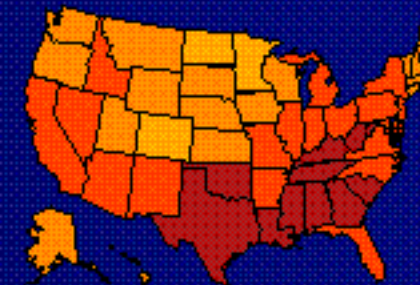


Diabetes

2000



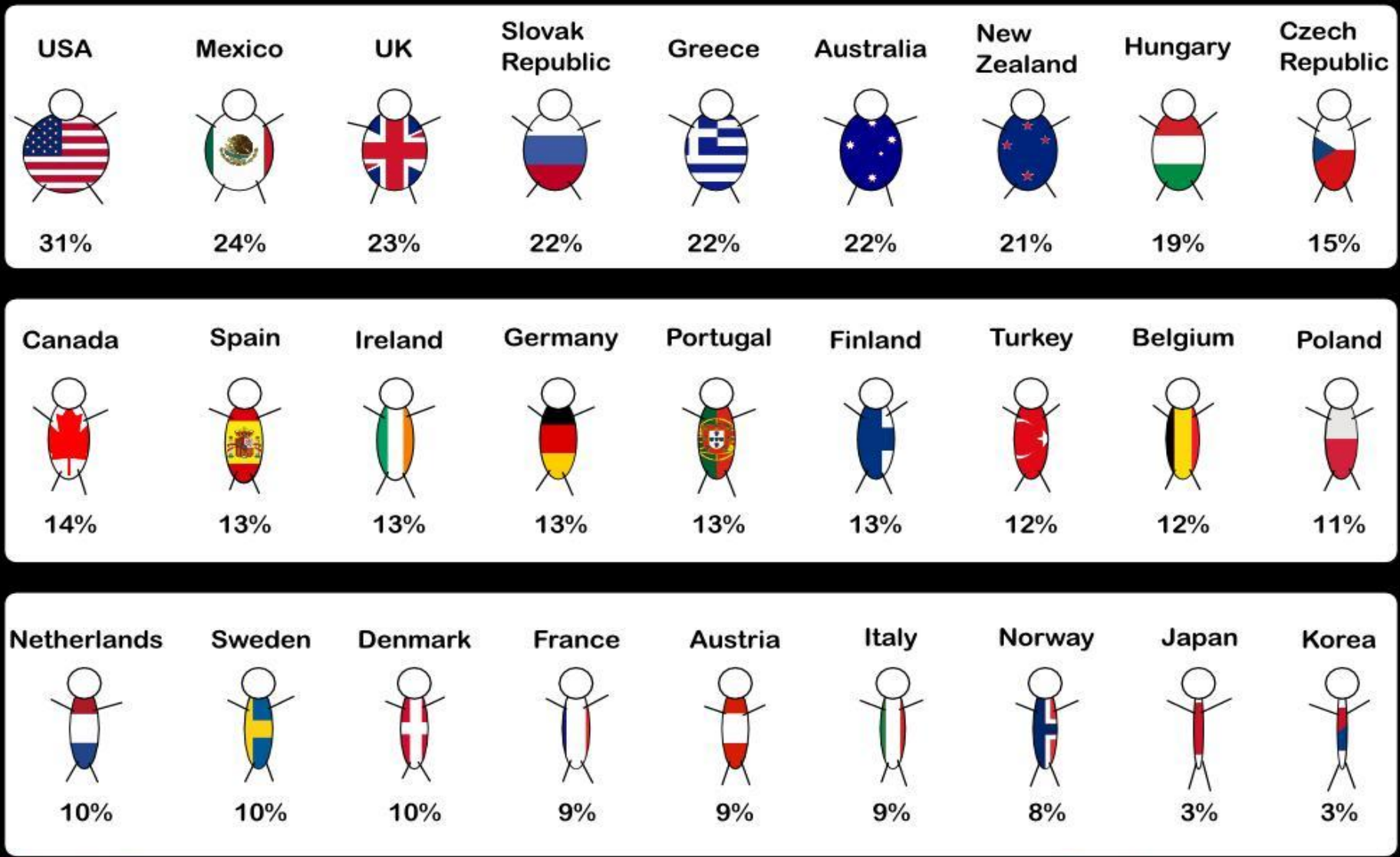
2007



And we keep growing

OBESITY:

The percentage of the population older than 15 with a body-mass index greater than 30.



Data taken from:
<http://en.wikipedia.org/w/index.php?title=Image:Bmi30chart.png&oldid=107854217>

Drawing by:
<http://www.WellingtonGrey.net>

Obesity in the Young

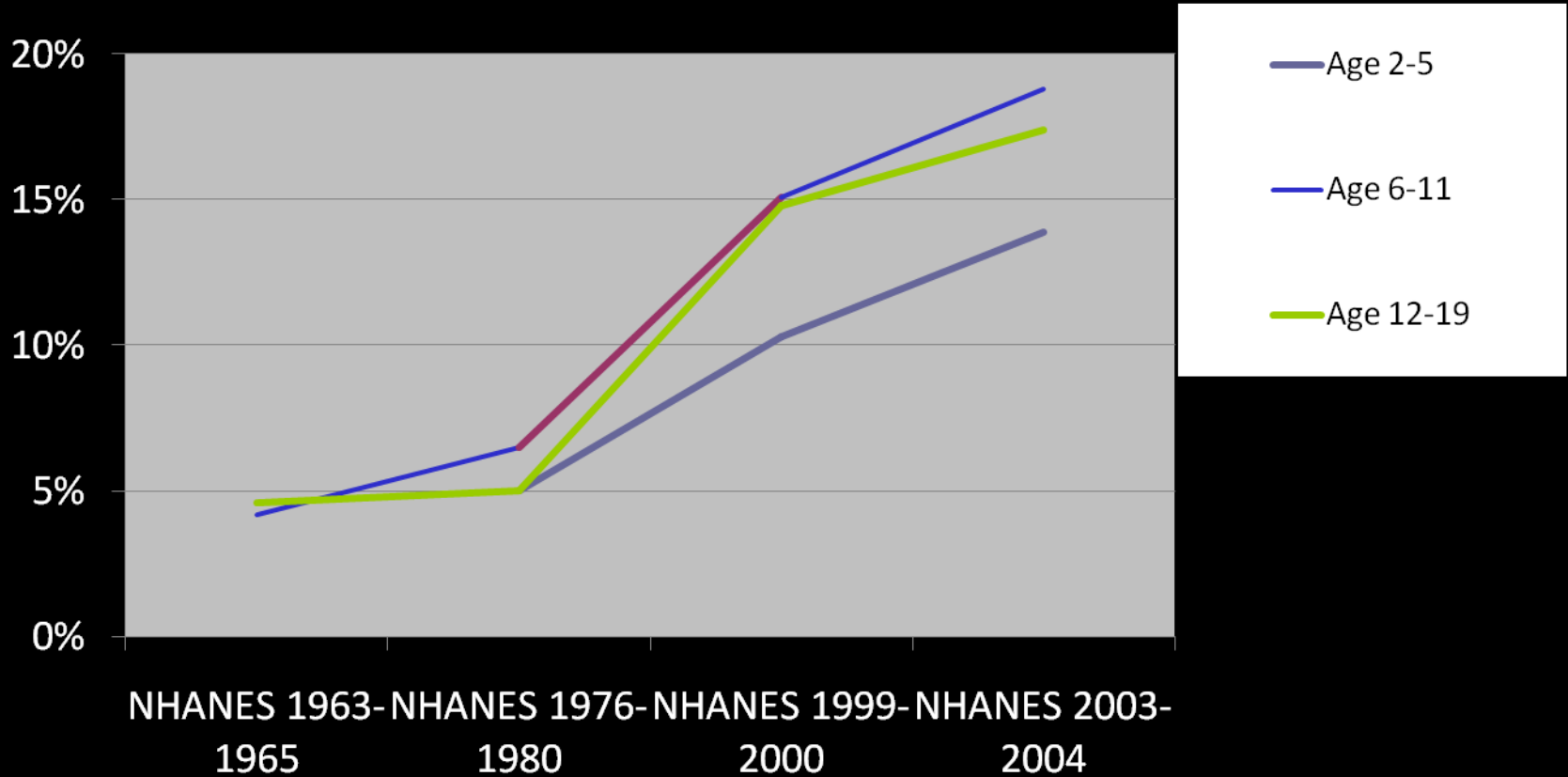
- Approximately 17% (or 12.5 million) of children and adolescents aged 2—19 years are obese (up from 5% in 1980)

OBESITY: A Weighty Issue for Children



NHANES

Prevalence of Overweight Youth Ages 2-19



SO WHY THE BODY EXPLOSION????



SO WHY THE BODY EXPLOSION?

- Food...quantity or quality?
- Sedentary lifestyle?
- Genes?
- Bugs
 - Adenoviruses?
 - Intestinal microbiata?

ALL OF THE ABOVE

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Obesity is a disease

Waist more a problem than weight



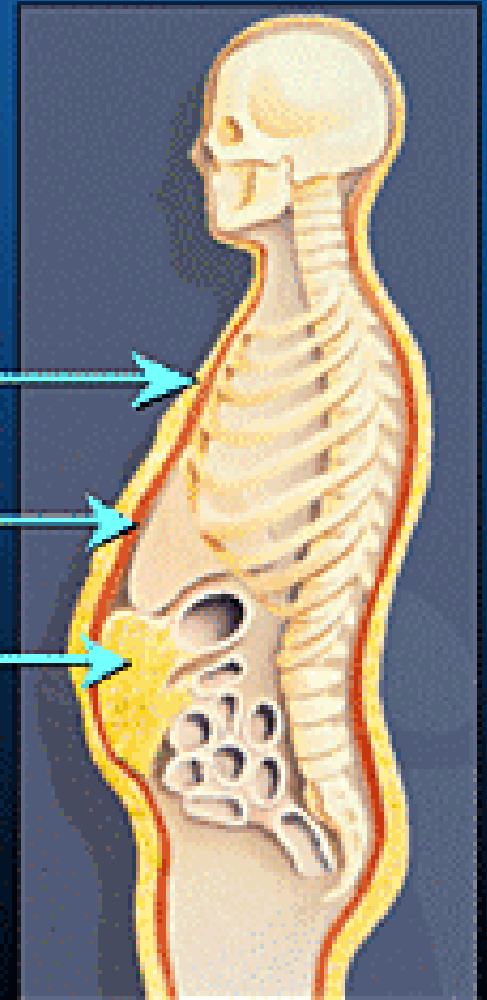
Visceral Adiposity: The Critical Adipose Depot



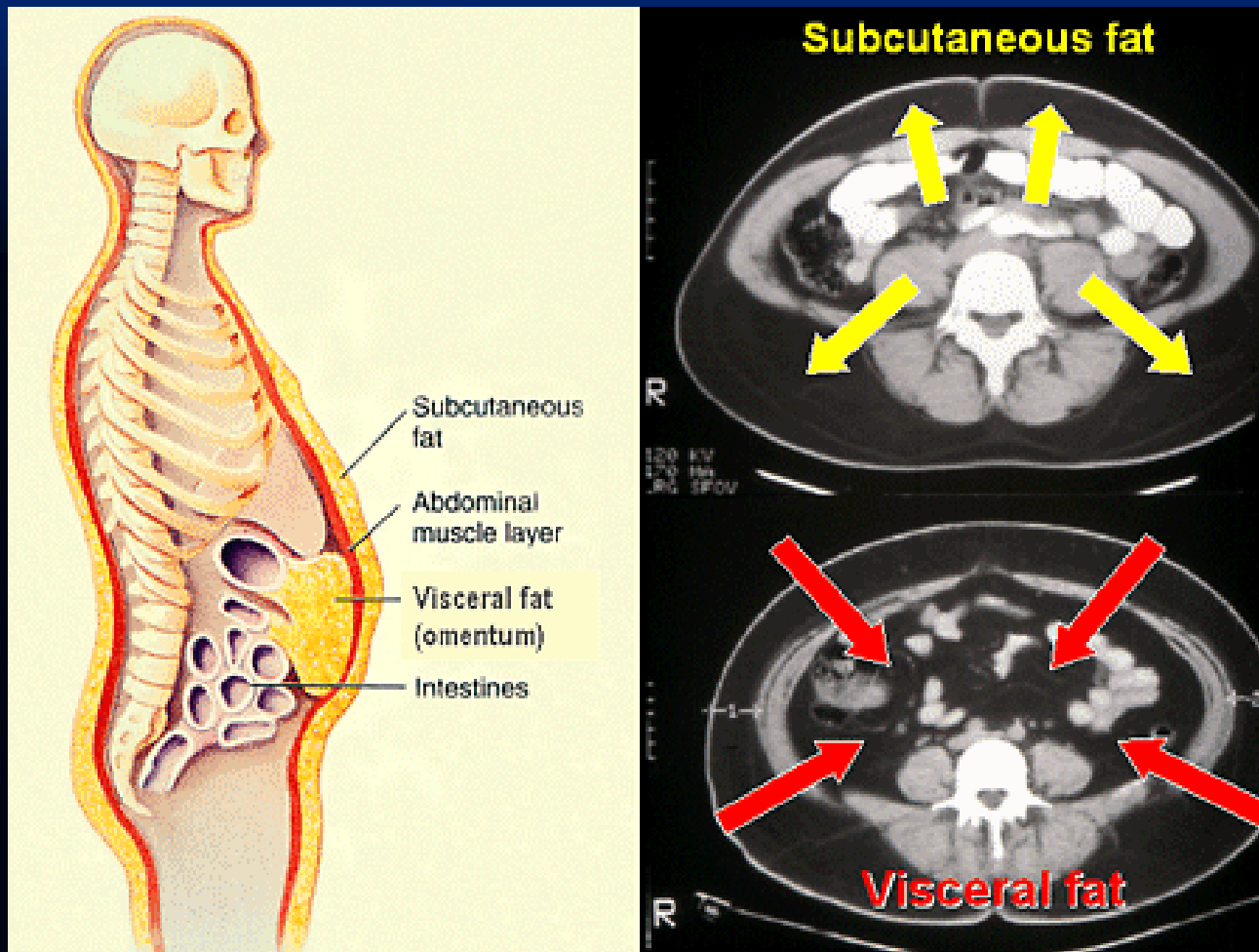
Subcutaneous
Fat

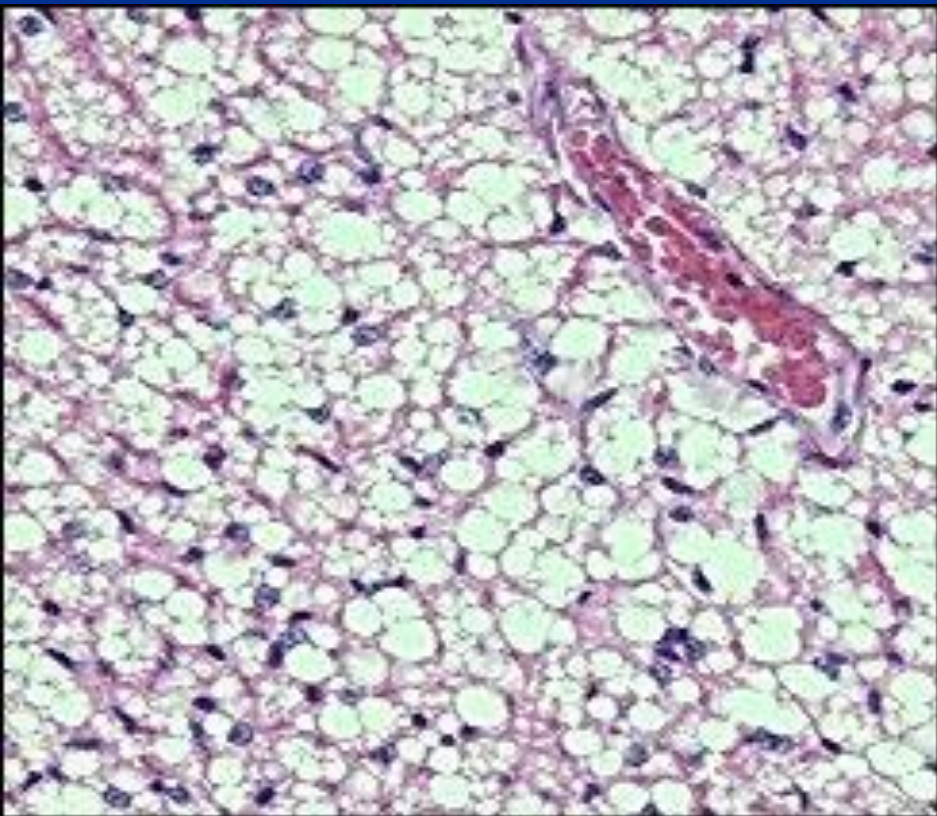
Abdominal
Muscle Layer

Intra-
abdominal Fat

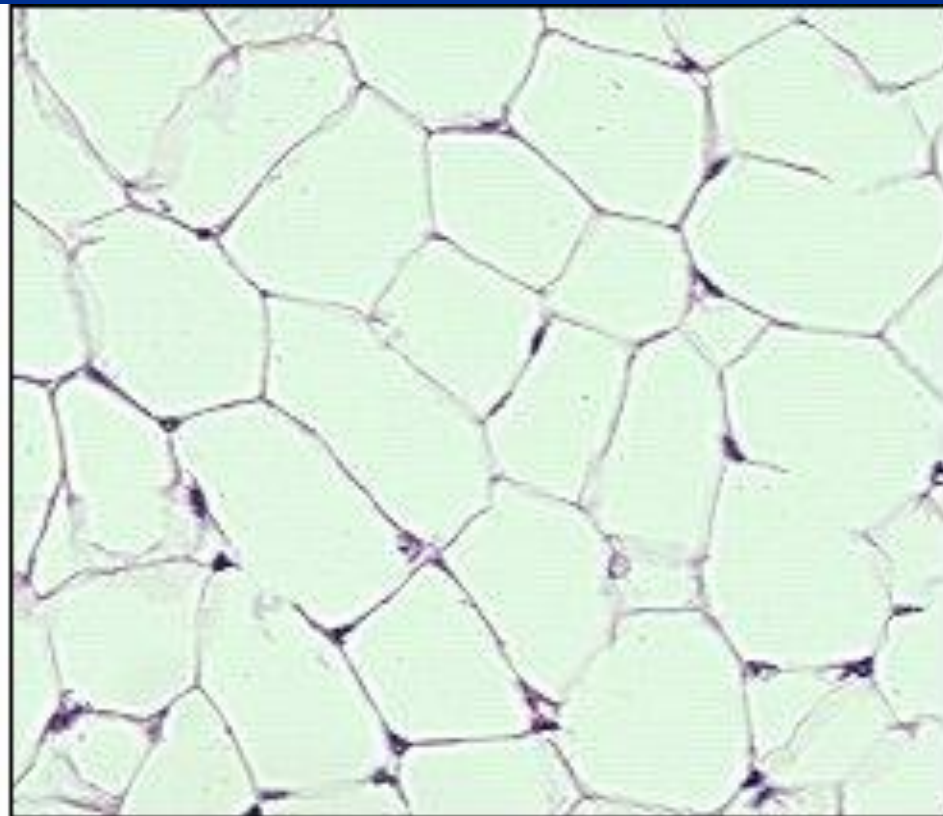


Location...location...location

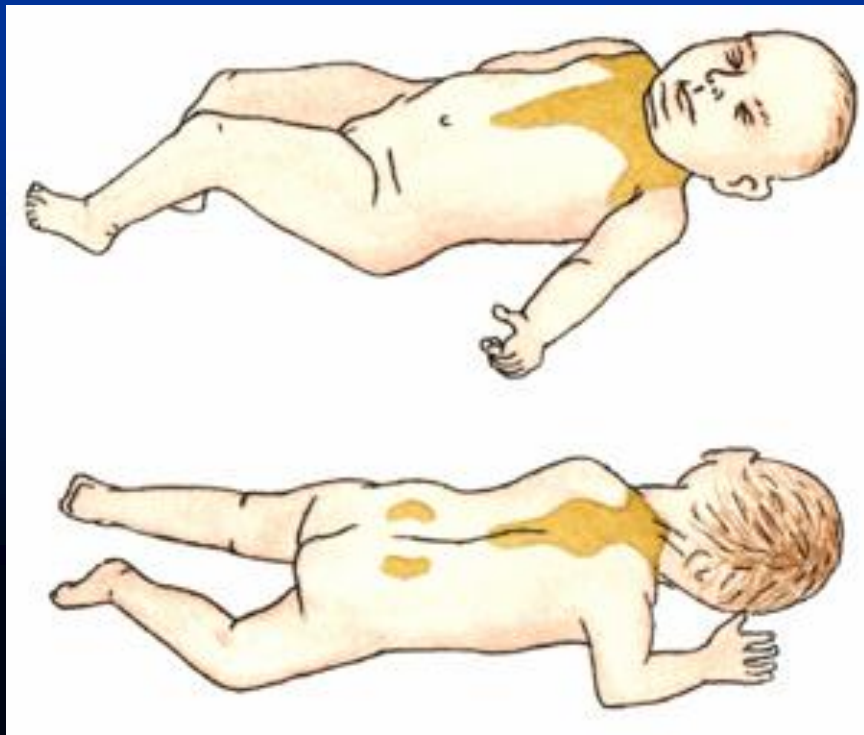




Brown fat



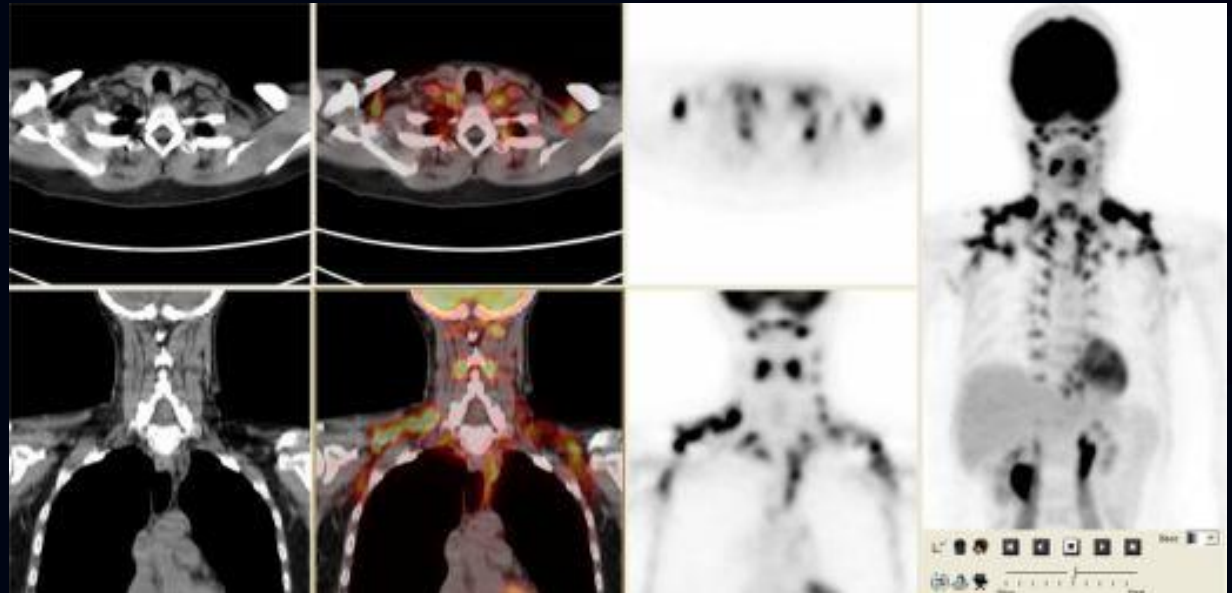
White fat



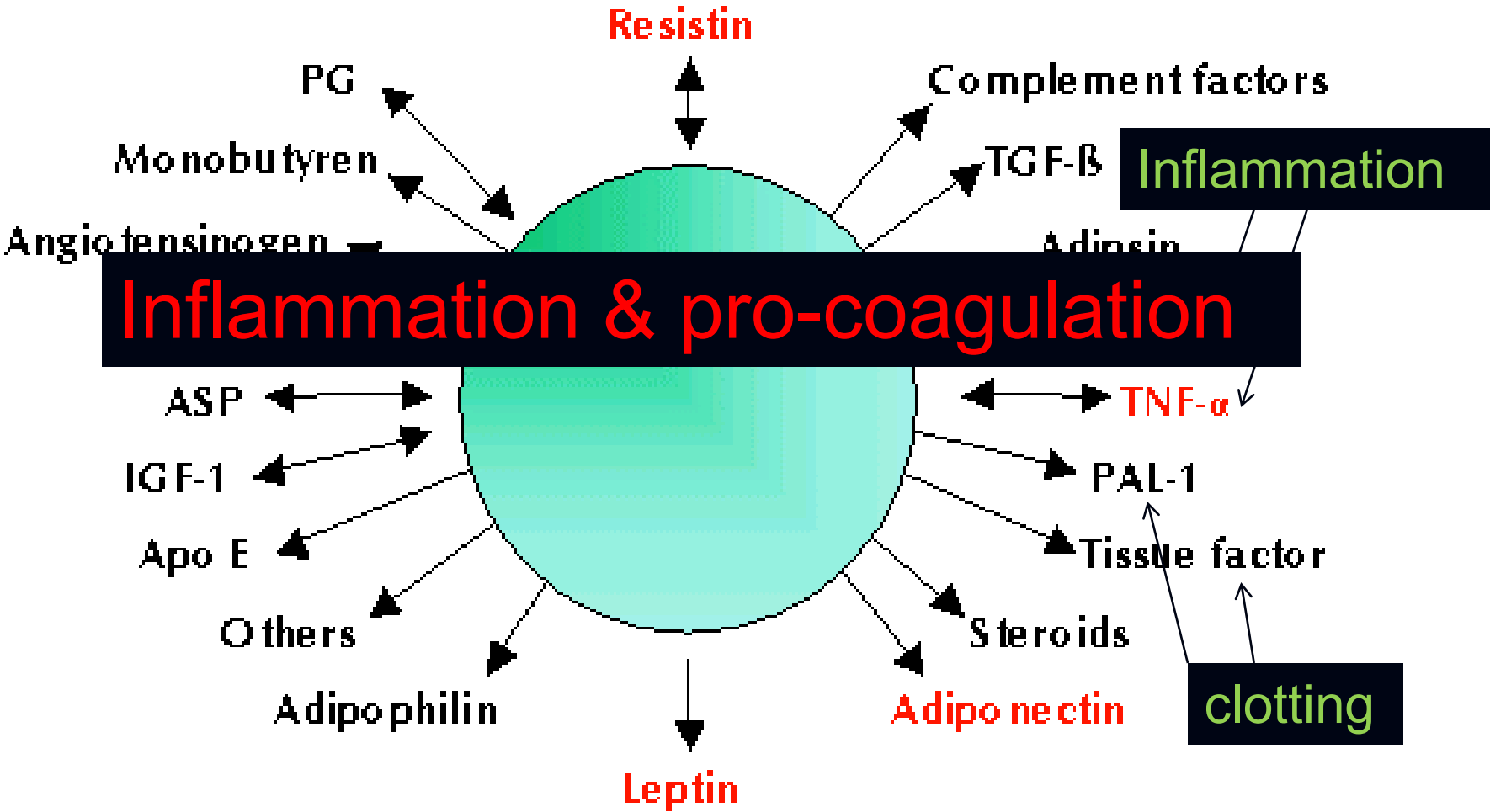
Most abundant in babies:
Generates non-shivering heat
(via TGs)

Counters pro-obesity white fat?

Same precursors as skeletal
muscle



Adipose Tissue as an Endocrine Organ



Cerna Frilbeck, Obesity Matters, 2001,4, 16-19.

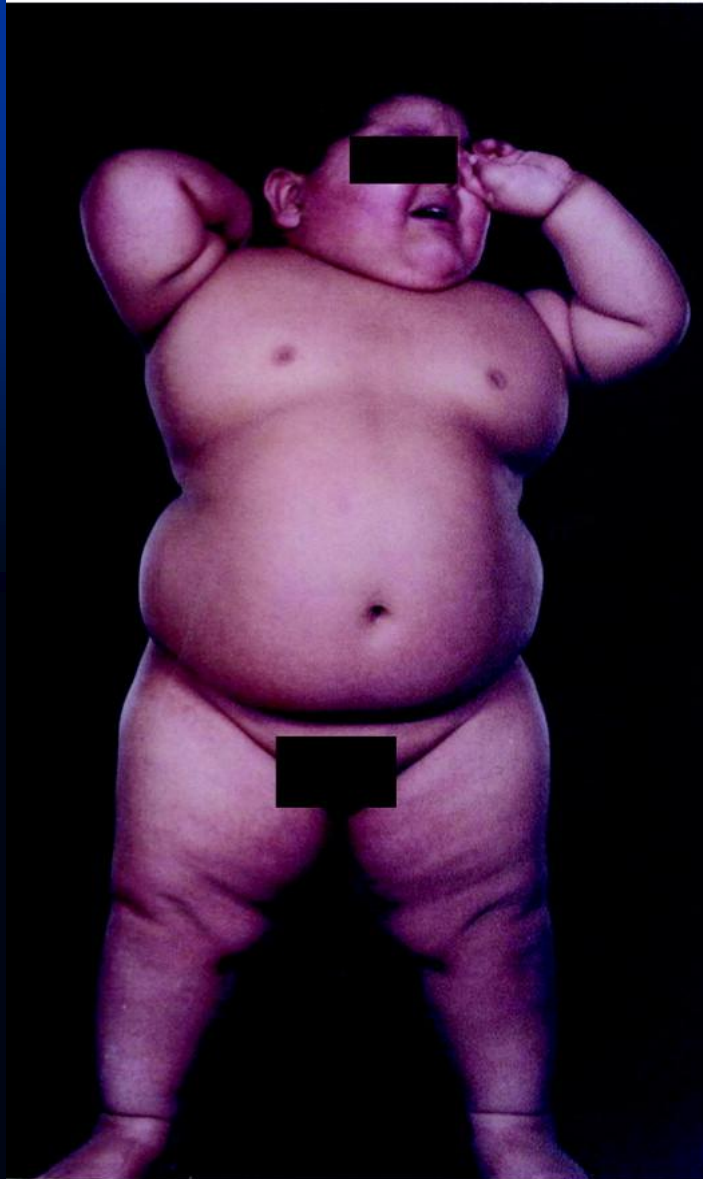
Notable Adipokines

- Leptin
 - Pro-satiety...but
- Adiponectin
 - Anti-inflammatory...but

SO WHY THE BODY EXPLOSION?

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ALL OF THE ABOVE



weight = 40kg, age 3yrs

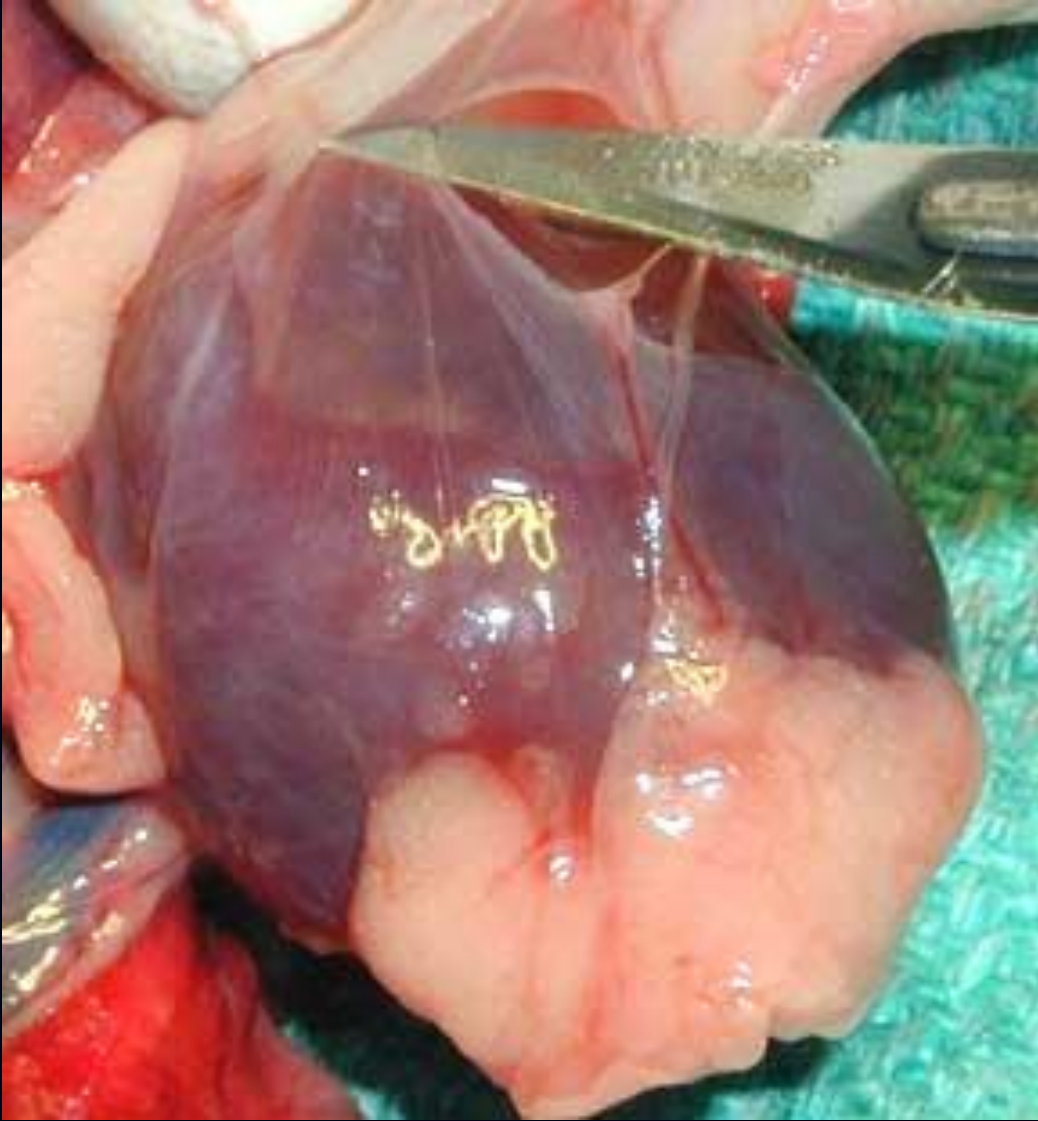
BEFORE LEPTIN



© Addenbrooke's NHS Trust

weight = 29kg, age 6yrs

AFTER LEPTIN



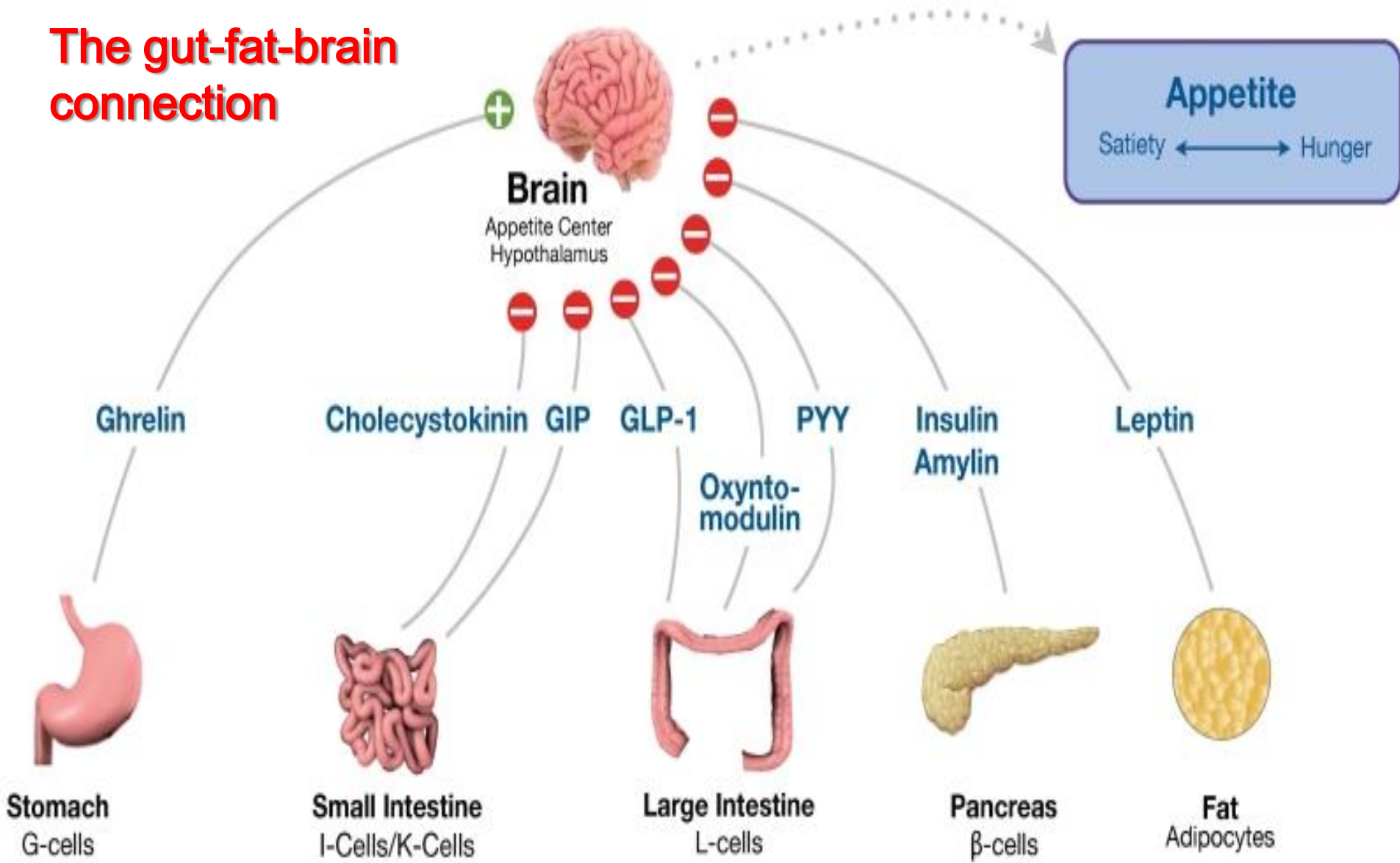
The
FATTY HEART

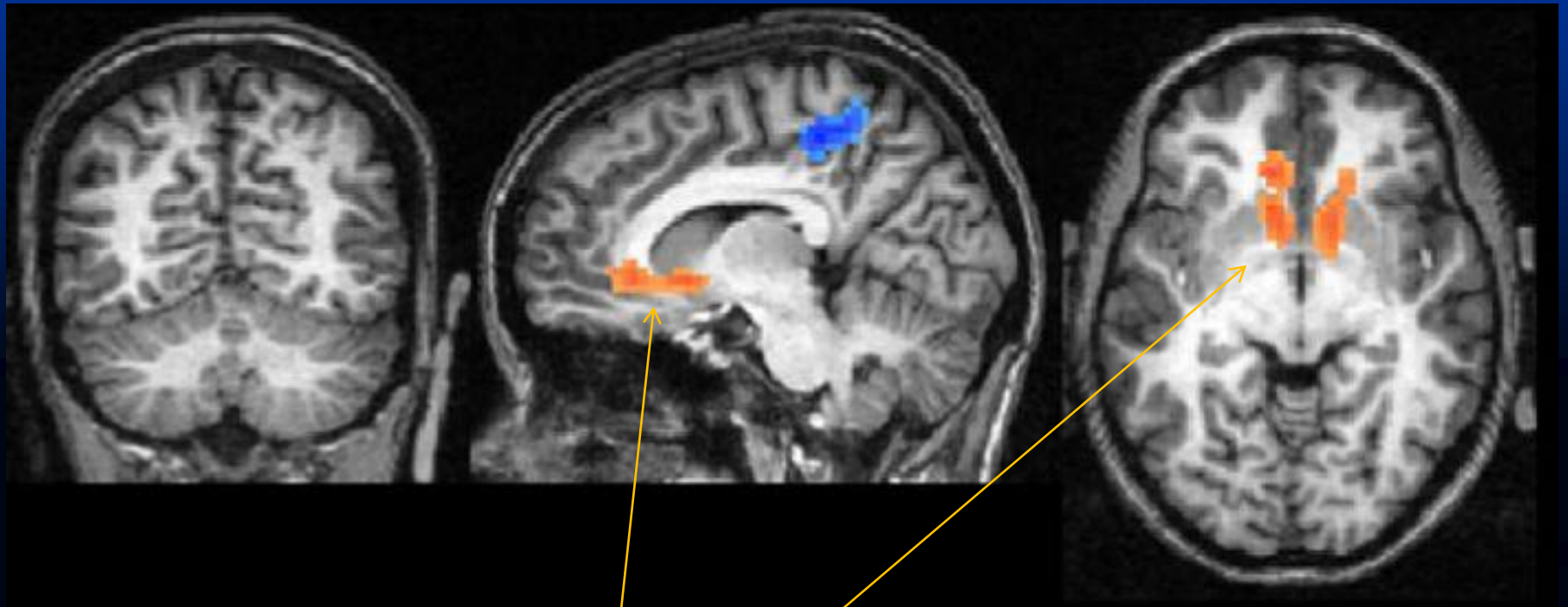
Satiety!



Gut Peptides That Regulate Appetite

The gut-fat-brain connection





Satiety = reward

So What Can We Do?



This Doesn't Work





Handling the ENERGY crisis!

Find a diet and stick with it...

Low glycemic

High protein

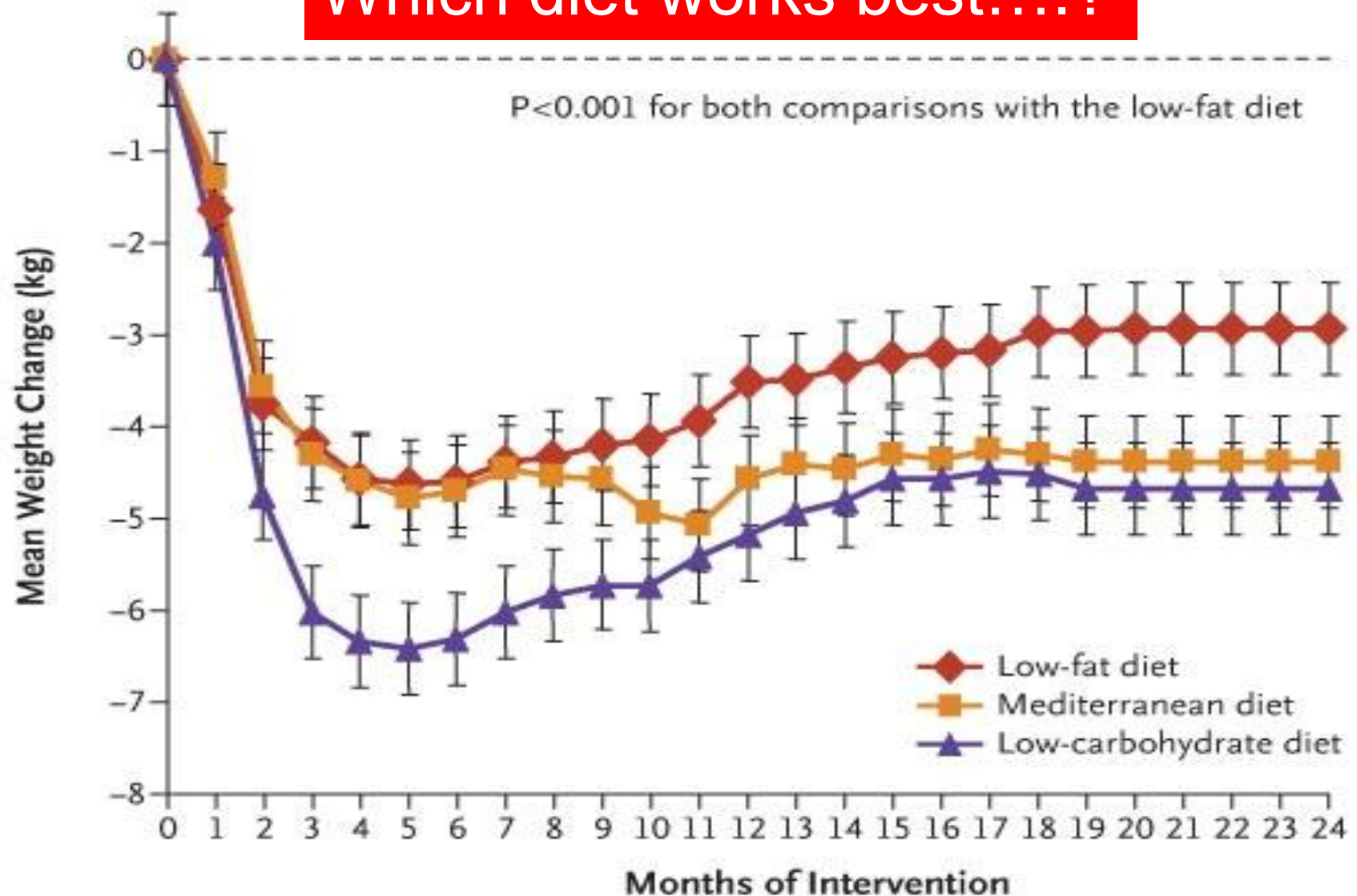
Low fat

Vegan????!

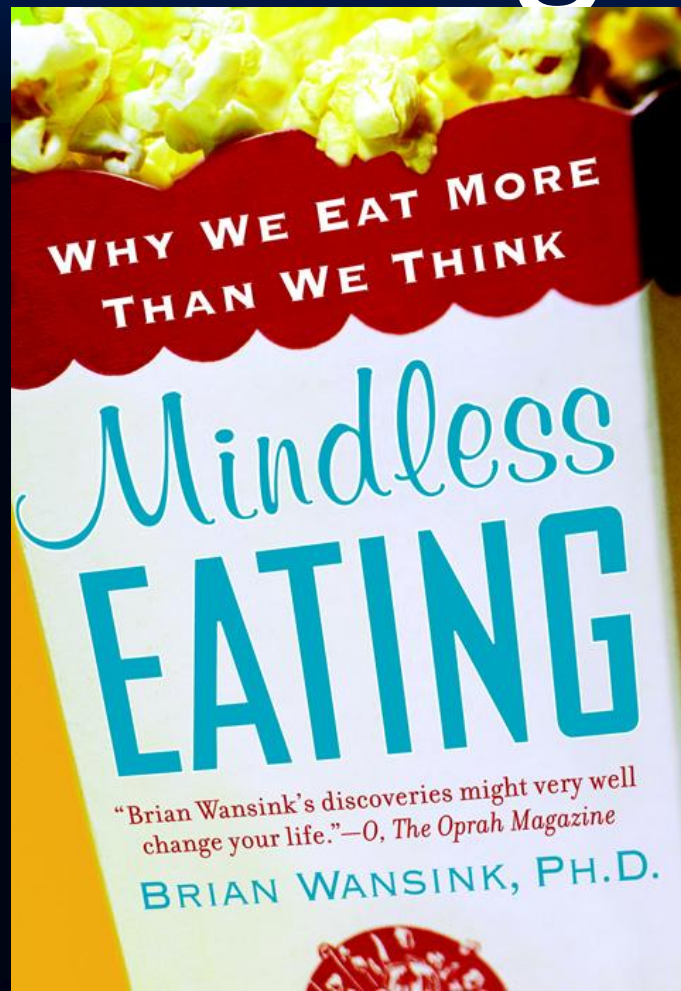
Avoid fasting

NEJM

Which diet works best....?



STOP mindless eating



Portion control!!



WHAT YOU CAN DO?

- Stop mindless overeating
- Consume foods that are low in calories but high in fiber and water
- Use smaller plates and serving utensils to control portion sizes.
- Beware of the "clean plate" mentality: visualize how much you're going to eat before you start eating.
- Avoid all-you-can-eat restaurants and buffets
- Eat slowly; it takes the brain 20 minutes to sense that you're full.
- Don't do other activities while you eat, such as watching TV.

More Eating Tips...

1. Eat “around the plate”:
protein, fat first...delay
carbs
2. Fiber, fiber, fiber
3. Drink before or after...not
during
4. Slooowww it down
5. Don't eat 3 hours before
bed
6. Others.....



 Weight Watchers®





Mixed messages



So Exercise!!!

Why?

When?

What type?

How much?



Overview

Shifting the Paradigm:

Exercise



Activity

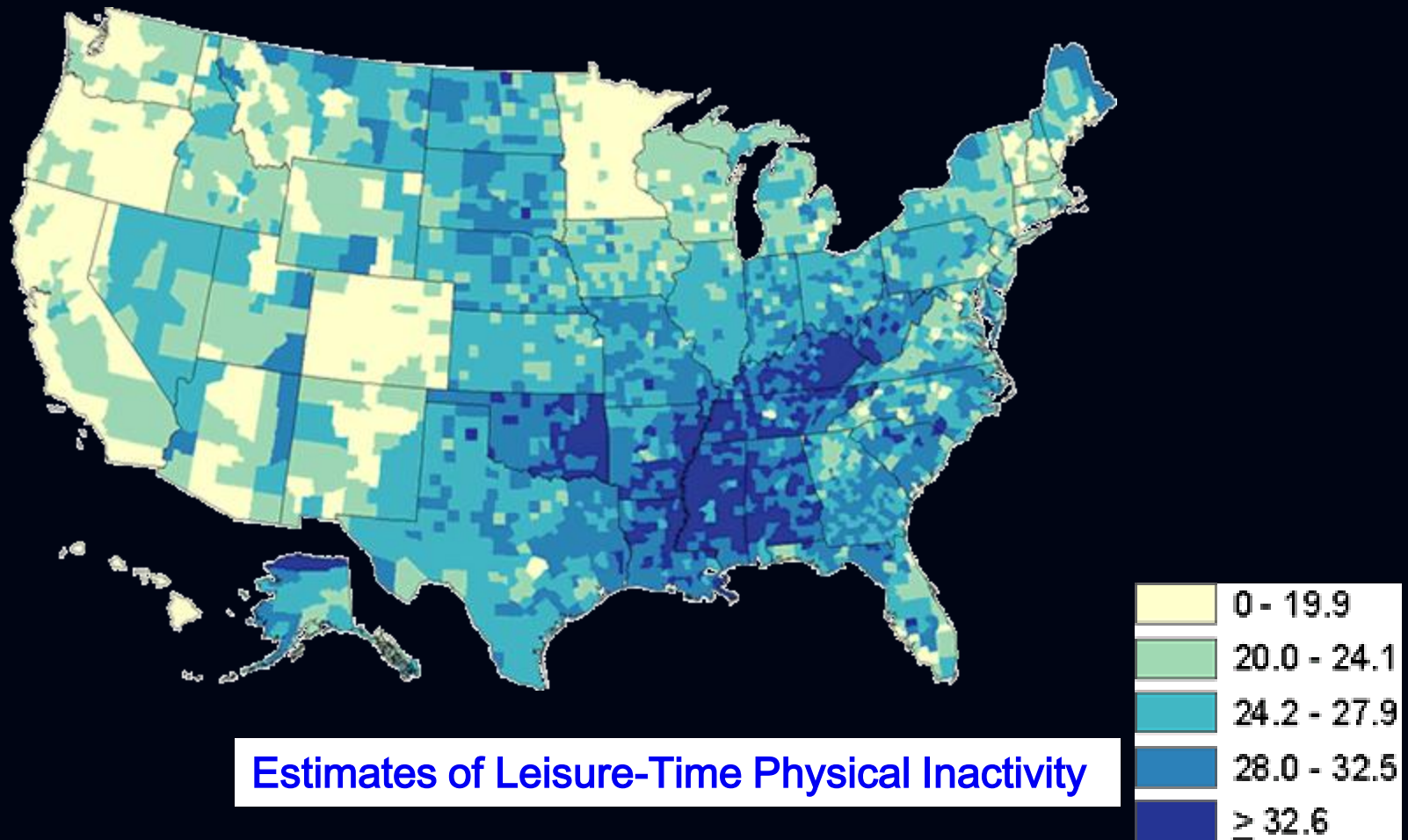


Exercise = Training



**Activity = Play, Fun,
Functional Fitness**

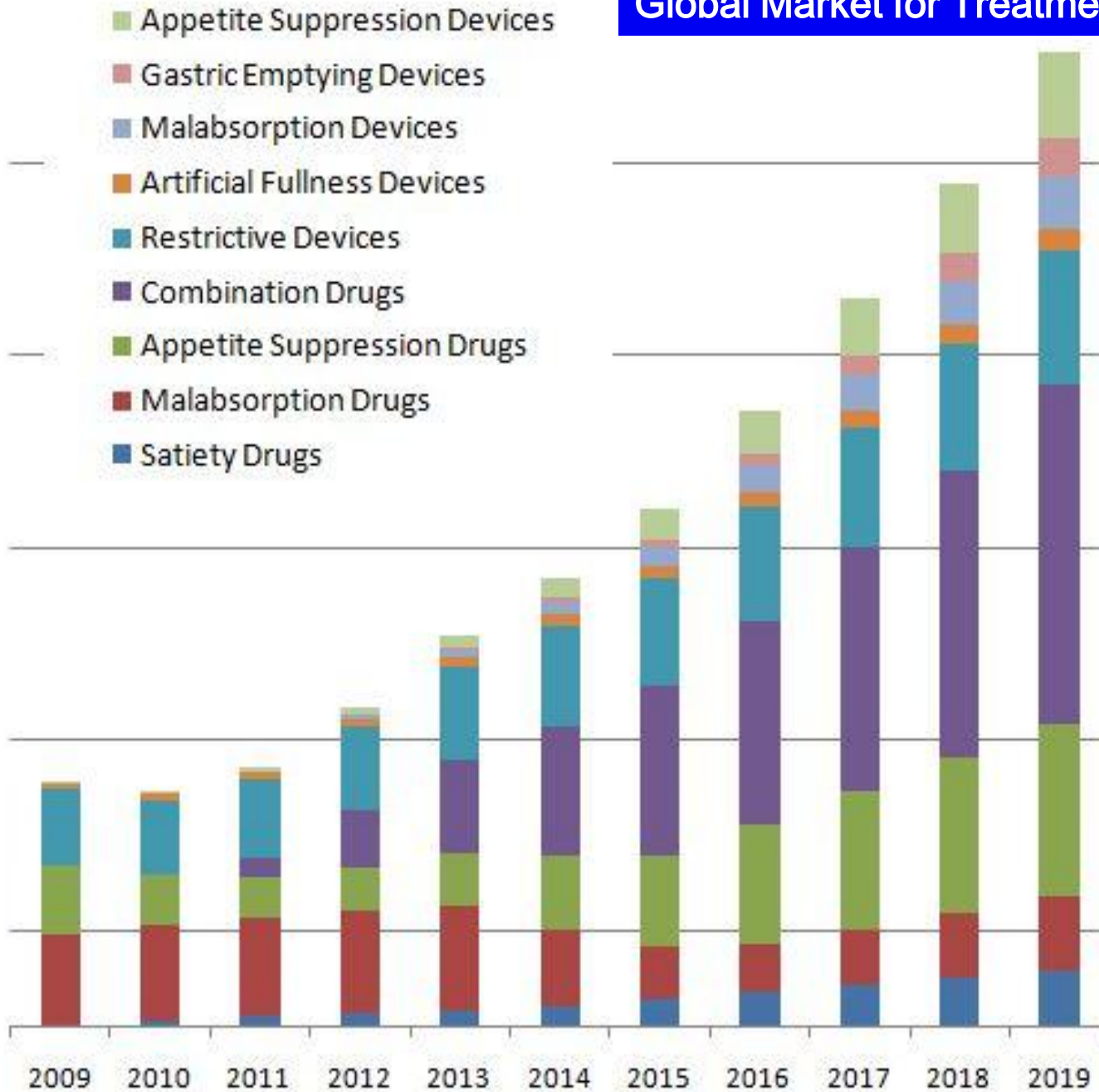
CDC 2008 Age-Adjusted Estimates of the Percentage of Adults (>18 yrs) Who Are Physically Inactive



Medical Treatment for Obesity



Global Market for Treatment of Obesity, 2009-2019



Source: MedMarket Diligence, LLC, [Report #S835](#), "Products, Technologies and Markets Worldwide for the Clinical Management of Obesity, 2011-2019."

Selected Pharmacological Aids

- Nutrient blockers
 - Orlistat (Xenical, Alli)
 - Starch blockers
- Central satiety agents
 - SSRIs
 - Sibutramin (Meridia)
 - Direct satiety drugs
 - phentermine
- Herbal
 - Stimulants
 - Hoodia
 - Others: vitamin D, chromium picolinate

Biotherapies

- Incretins
 - GLP-1 (liraglutide, exenatide)
 - DDP4 antagonists (sitigliptin, saxigliptin)
 - Amylin
- E-cannabanoid receptor blockers (no FDA approval—yet?)
 - Rimonabant (Acomplia)
 - Taranabant

Anti-obesity Drugs in Research

- Serotonin 2c receptor agonists (lorcaserin) (?)
- Leptin sensitizers
- New metreleptin and pramlintide combo
- Ghrelin blockers
- Empatic (zonisamide and bupropion combo)
- Sirtuins (obesity gene manipulators)
- Most focused on CNS!!! We want to lose weight and feel good about it!

Kishore M; Bupropion Plus *Zonisamide* for *Obesity*. J Clin Psychiatry 68:8, August 2007

Thomsen, W. J.; Grottick, A. J.; Menzaghi, F.; Reyes-Saldana, H.; Espitia, S.; Yuskin, D.; Whelan, K.; Martin, M. et al. (2008). "Lorcaserin, a Novel Selective Human 5-Hydroxytryptamine_{2C} Agonist: in Vitro and in Vivo Pharmacological Characterization". *Journal of Pharmacology and Experimental Therapeutics* **325** (2): 577. 2009

<http://scienceinthetriangle.org/2009/07/getting-a-ghrelin-drug-to-market-2/>

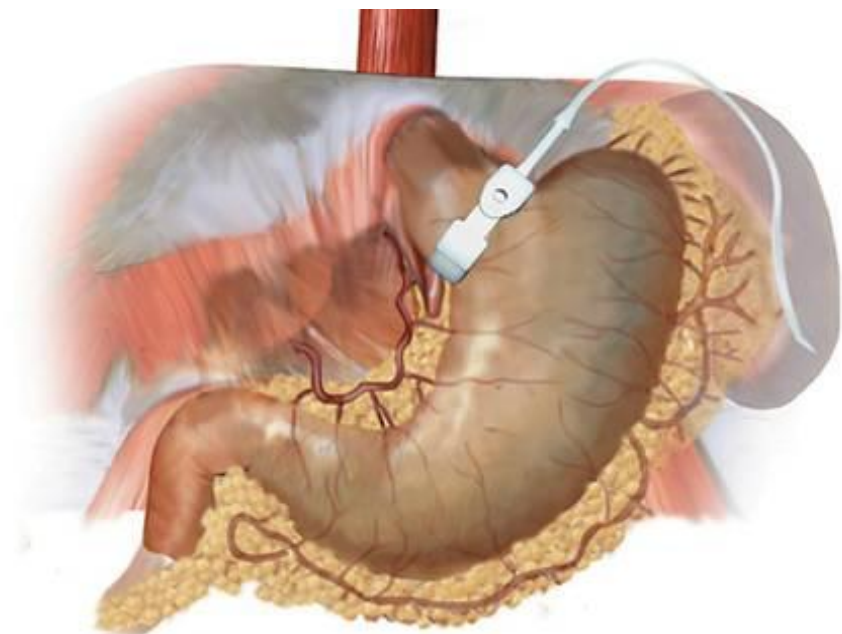
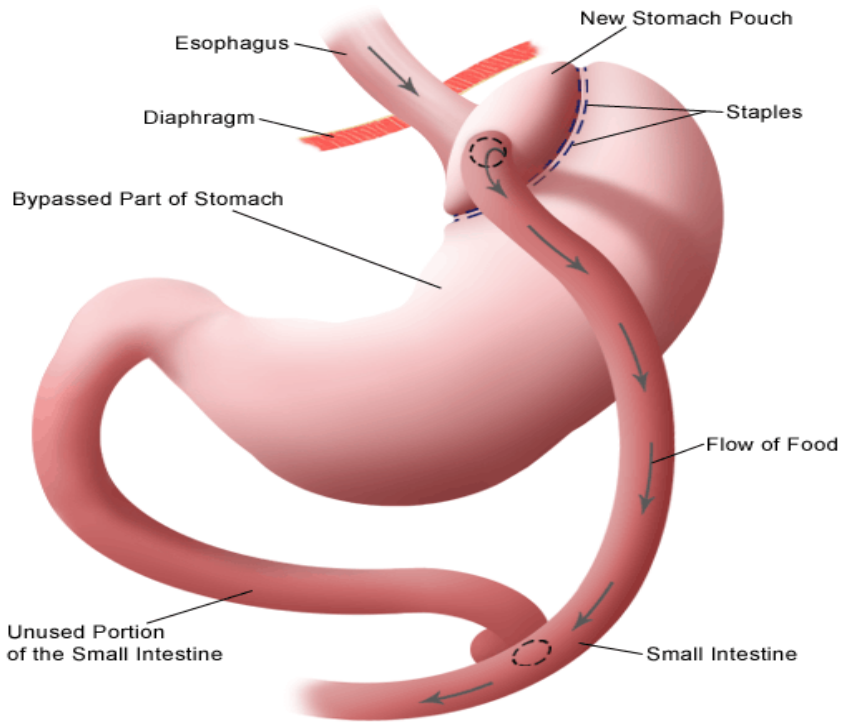


Fat Apps

Invasive Intervention

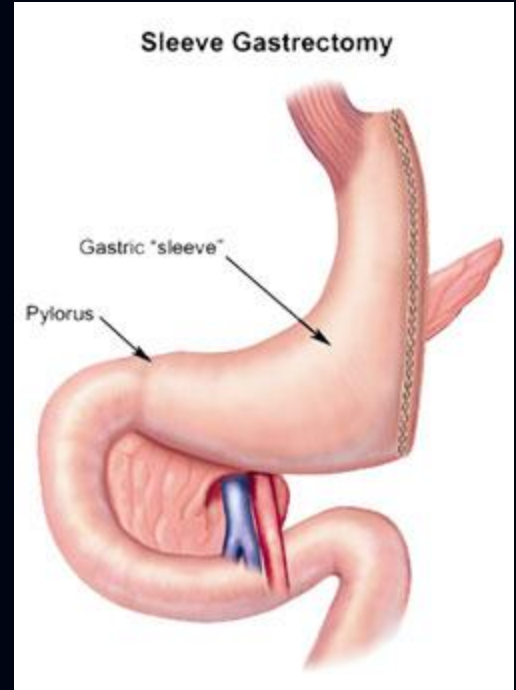


Roux-en-Y Type of Gastric Bypass Procedure



BARIATRIC SURGERY

Roux-en-Y Gastric Bypass



Gastric Sleeve

Gastric Banding

AHA Statement on Potential Bariatric Surgery Benefits

March 17, 2011

The benefits of bariatric surgery outweigh the risks for some severely obese, says the AHA (American Heart Association).

“Specifically, bariatric surgery can lead to improvements in weight-related problems such as diabetes, high cholesterol, high blood pressure, obstructive sleep apnea and cardiovascular dysfunction.”

And some risks

Source: Poirier P, Cornier MA, Mazzone T, et al of the American Heart Association Obesity Committee of the Council on Nutrition, Physical Activity, and Metabolism. **Bariatric Surgery and Cardiovascular Risk Factors: A Scientific Statement From the American Heart Association.** *Circulation*, March 14, 2011 DOI: [10.1161/CIR.0b013e3182149099](https://doi.org/10.1161/CIR.0b013e3182149099)

Questions?



For references: ckessler@maranatha.net