

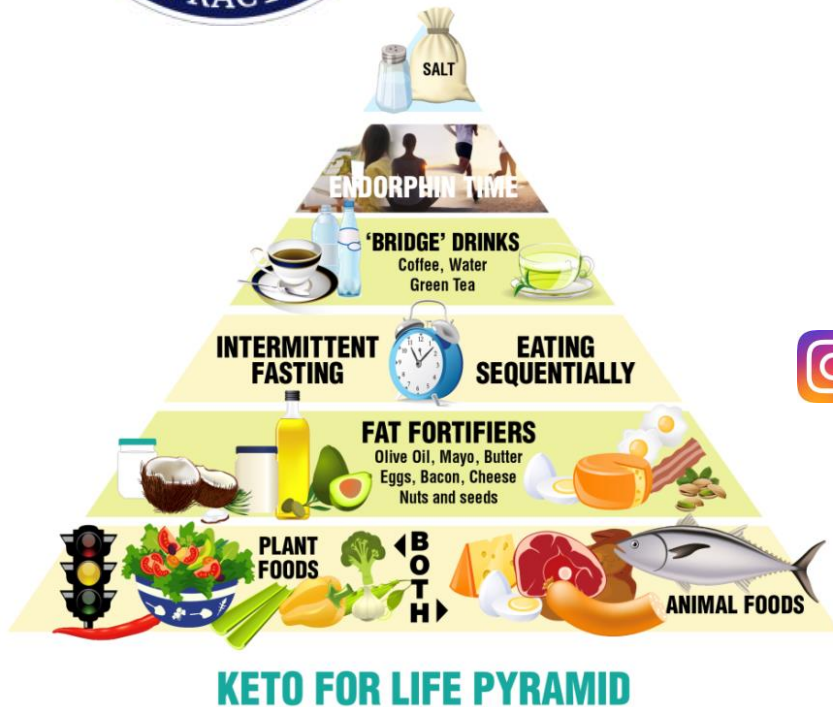
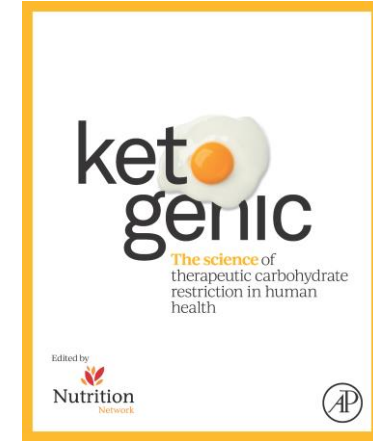
FIXING METABOLIC HEALTH – need to understand how we cause metabolic harm NON-NUTRITIONAL INTERVENTIONS FOR OBESITY AND DIABETES

ZURICH, SWITZERLAND 2023

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Journal of Metabolic Health (JMH)
The official journal for the
Society of Metabolic Health Practitioners



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Fiscal Conflicts: NEDS 501(c)3 **Dexcom**

SMHP Founding Board Member

Director Clinical Operations GHC

Lecturer Nutrition Network

Co-Author Ketogenic Textbook

Spatz 3 IntraGastric Balloon FDA Trial



Weight Loss versus Obesity Management

“SCIENCE” has shifted from causal **PHYSIOLOGY** to “outcomes” **EPIDEMIOLOGY**
OBSERVATIONAL ASSOCIATIONS

EPI: any form of **CALORIC REDUCTION = WEIGHT LOSS** associated with **DM IMPROVEMENT**

EPI: treats CONSEQUENCES:

From cookie diet to carnivore - all diets result in transient weight loss

Appetite suppression: phentermine – GLP-1 – GGG – transient weight loss

Bariatric surgery is overwhelmingly most effective intervention for (transient) weight loss^{1,2}

Therefore should improve diabetes³

Physiol: WHY did they become **OBESE** and **METABOLICALLY UNHEALTHY?**

Physiol: treats CAUSE:

Insulin Resistance: may be obesogenic or diabetesogenic

most bariatric surgeons have no idea - we blame calories and lack of exercise - CICO³



¹Sacks FM, et al.. Comparison of weight-loss diets with different compositions of fat, protein, and carbohydrates. *N Engl J Med*. 2009;360(9):859-873

²Tsai AG, Wadden TA. The evolution of very-low-calorie diets: an update and meta-analysis. *Obesity (Silver Spring)*. 2006;14(8):1283-1293

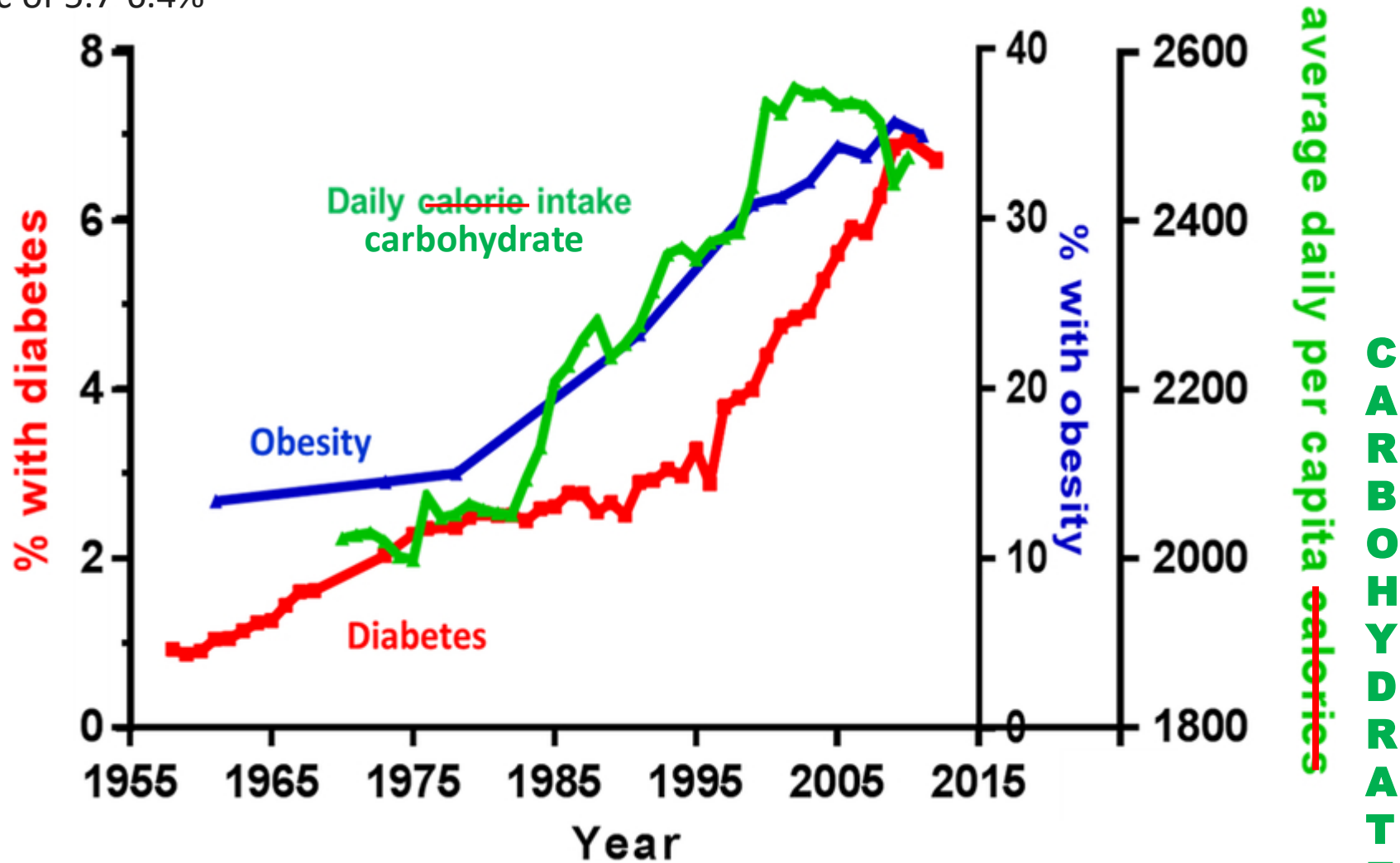
³Schauer PR; STAMPEDE. Bariatric Surgery versus Intensive Medical Therapy for Diabetes - 5-Year Outcomes. *N Engl J Med*. 2017 Feb 16;376(7):641-651



THE EPI OBSERVATION: CALORIC INCREASE RESULTS IN OBESITY AND DIABETES

THE SCIENCE: CARBOHYDRATE INCREASE RESULTS IN OBESITY OR DM

'Prediabetes' = HbA1c of 5.7-6.4%



CARBOHYDRATES



Chia CW, Egan JM, Ferrucci L. Age-Related **Changes in Glucose Metabolism, Hyperglycemia, and Cardiovascular Risk**. *Circ Res*. 2018 Sep 14;123(7):886-904. doi: 10.1161/CIRCRESAHA.118.312806. PMID: 30355075; PMCID: PMC6205735.



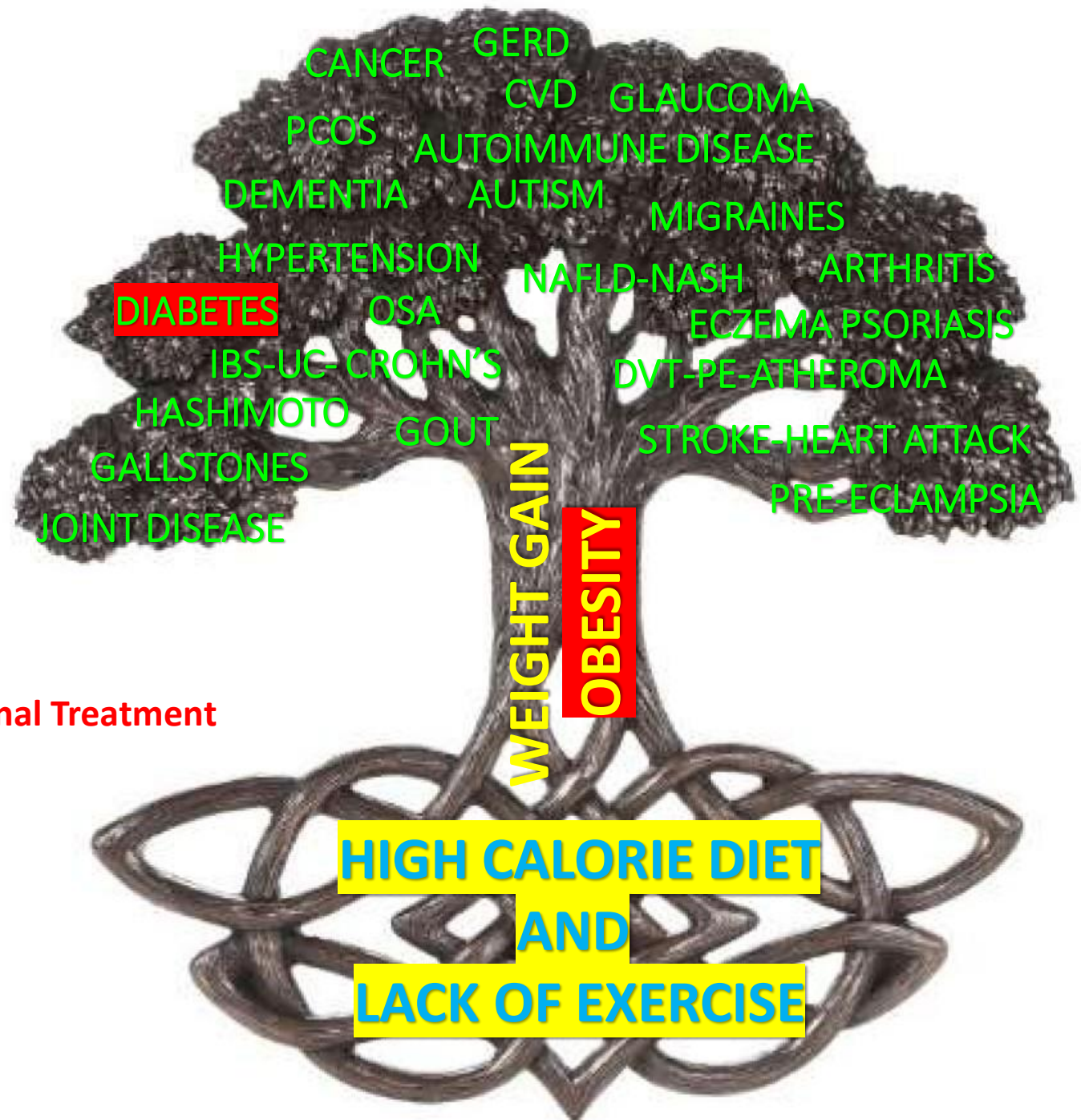
Traditional Epidemiologic Thinking:

EPIDEMIOLOGY:

Caloric excess causes weight gain

Obesity causes T2DM

Weight loss resolves T2DM



“CICO”

Diet and Exercise

Incretin Medications

Bariatric Surgery as a Final Treatment

FALSE THINKING



GENETICS AND EPIGENETICS OF METABOLIC DISEASE

HYPERGLYCEMIA

primary medications
primary lifestyle intervention
secondary **bariatric surgery** effect

HYPERINSULINEMIA

primary **bariatric surgery** effect
primary medications
secondary lifestyle intervention

Insulin
Resistance

LOW

HIGH

INSULIN

“TOFI” DIABESOGENIC IR

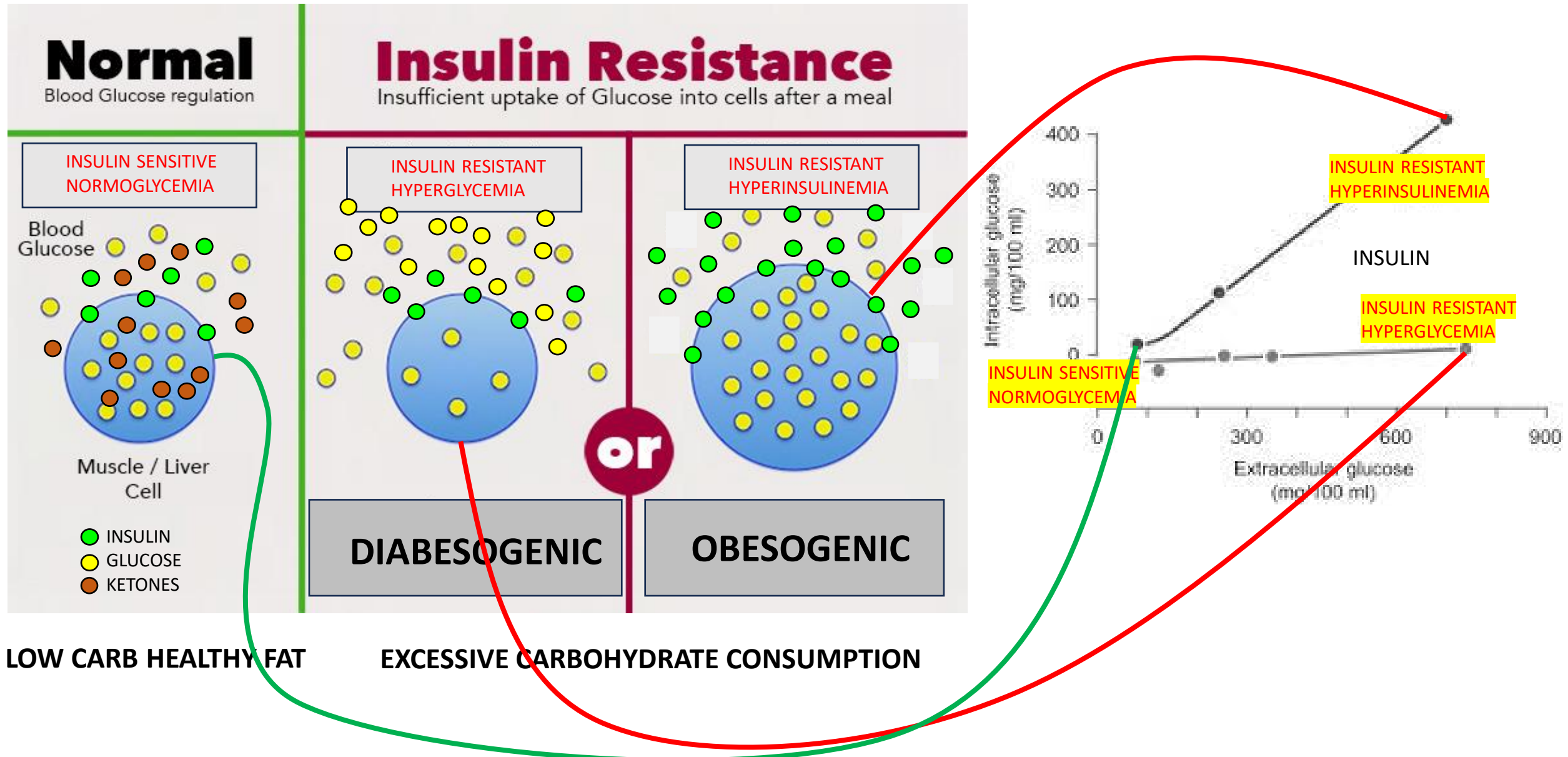
OBESOGENIC “FAT” IR

XS SUGAR + STARCH
SNACKING
BINGE EATING

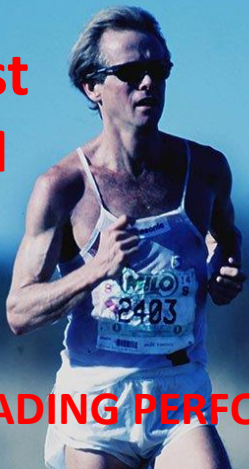
- T2 DIABETES
- CARDIOVASCULAR DISEASE - CAC
- STROKE
- NEUROPATHY + NEURAL METAPLASIA
- FIBROMYALGIA + INFLAMMATORY JOINT DISEASE
- BLOOD CLOTS

- OBESITY
- DEMENTIA ALZHEIMER'S
- CANCER
- PCOS/Low T
- AUTO-IMMUNE DISEASE
- JOINT DISEASE

GENETICS OF INSULIN RESISTANCE DETERMINES CARDIAC DISEASE



**Sickest
T2DM**



CARB LOADING PERFORMANCE



**Sickest
CVD**



**IS FITNESS
THE OPPOSITE OF
FATNESS?**

**The disease is
INSULIN RESISTANCE**

healthier



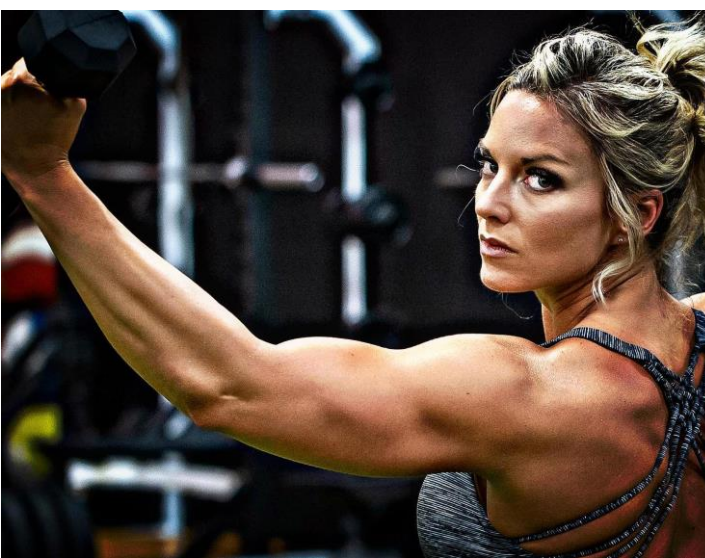
CARB ADDICTION



“healthy” FAT

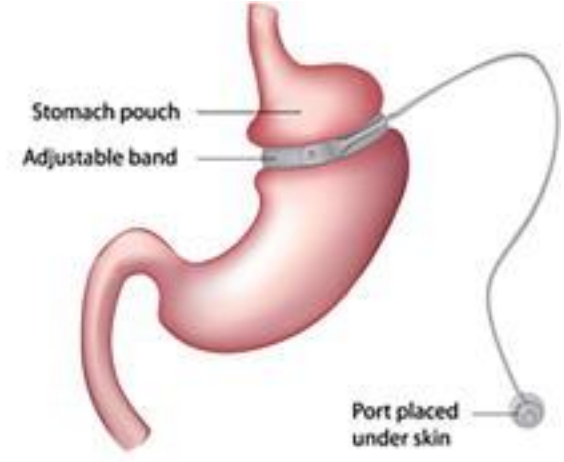
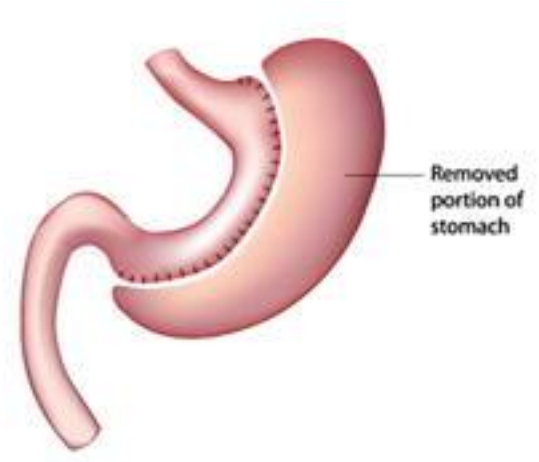
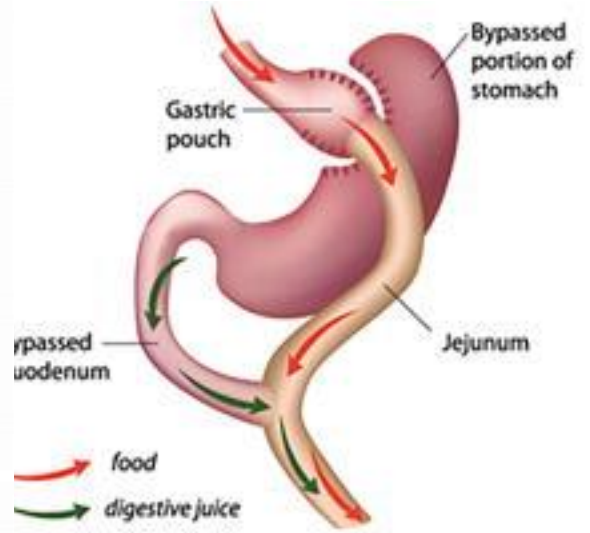
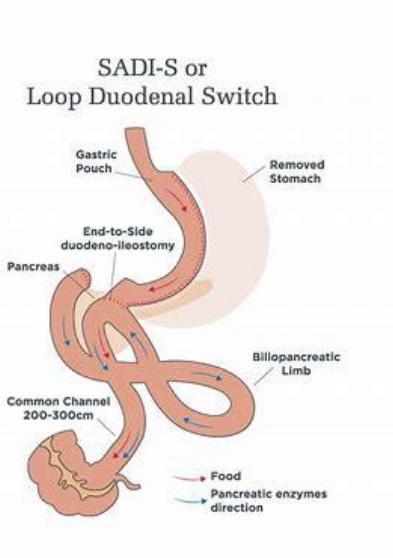
**BARIATRIC SURGERY
CANDIDATES**

healthiest



Weight Loss Surgeries

Less than 1.1% of “eligible” obese patients have bariatric surgery¹



**MALABSORPTION
RESTRICTION**

**RESTRICTION
MALABSORPTION**

RESTRICTION

RESTRICTION

RESTRICTION



¹English W, et al.. American society for metabolic and bariatric surgery 2018 estimate of metabolic and bariatric procedures performed in the United States. *Surg Obes Relat Dis.* 2020;16(4):457-463



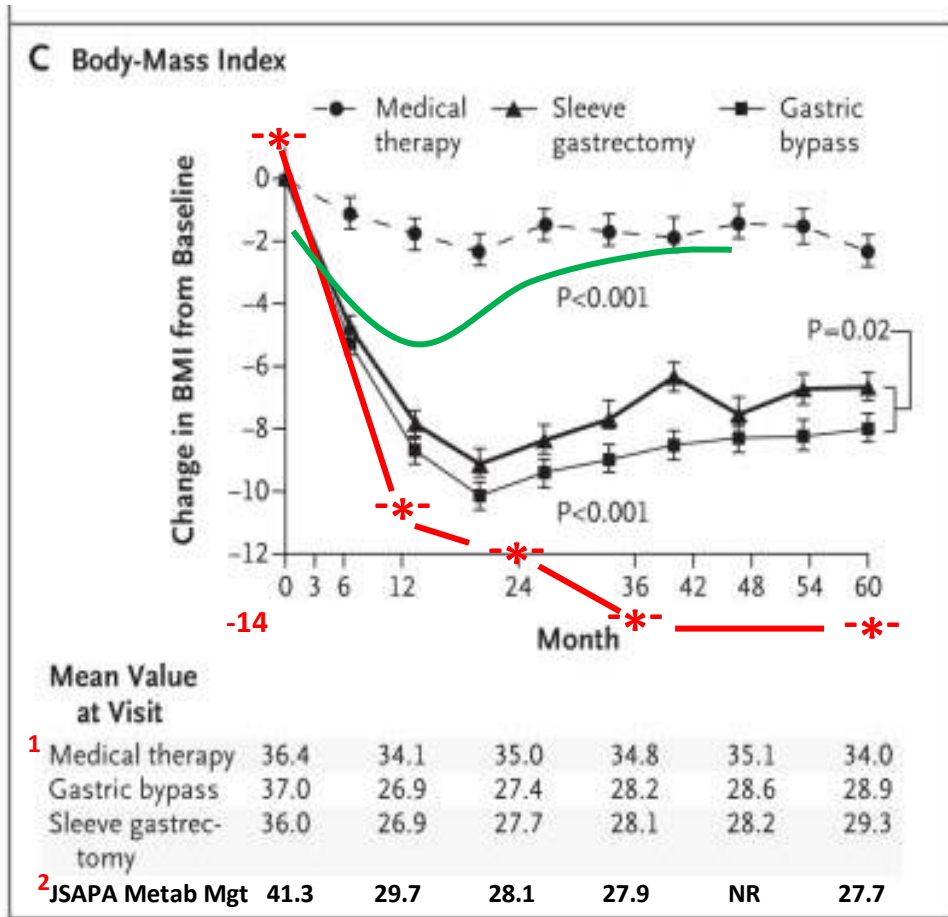
Physiologic and behavioral measures affected by three major forms of bariatric surgery.

EARLY TRANSIENT EFFECTS	RYGB or SADI	Sleeve Gastrectomy	LapBand or Balloon
Agouti-related protein (AgRP) signaling		↑	
Central anorexic leptin signaling		↑	
Hedonistic response to high calorie food	↓	↓↔	↔
Afferent vagal nerve density	↓		
ENERGY BALANCE			
Calories consumed	↓	↓	↓
TCR Diet content	↑ Protein ↓carbs fat↔	Animal products easier	Non-red meat and veg
Food aversions	Sugar and high carb beverages	Sugar and high carb beverages	Chunky Foods
Food preference (carbaddiction)	↑ Starchy Carbs	↑ Starchy Carbs	↑ All Carbs
Meal Frequency (carbaddiction)	Frequent small “meals”	2-3 MAD	grazing
Perceived change in smell of food	↑↑	↑	↔
Sour taste detection	↓	↑	↔
Sweet & bitter taste detection acuity	↑	↔	↔
Malabsorption (CHO + micronutrients)	↑	(B12)	↔
Intestinal glucose uptake	DUMPING	DUMPING	NO DUMPING
Bile acids	↑↑ Fasting. ↑↑ Post-prandial	↑Fasting. ↑ post-prandial	↔
Change in gut microbiome	Yes - SIBO	No	No
FGF-19	↑↑	↑	
GLP-1 and INCRETINS	↑Fasting. ↑↑ Post-prandial	↔Fasting. ↑ post-prandial	↔
GIP	↔ or ↓ Fasting. ↓ post-prandial	↔ Fasting	↔ Fasting & post-prandial
Ghrelin	↓↔	↓↔	↑↔
Amylin	↑ Post Prandial	↑ Post Prandial	↔
PYY	↑Fasting. ↑↑ Post-prandial	↑Fasting. ↑↑ post-prandial	↑↔

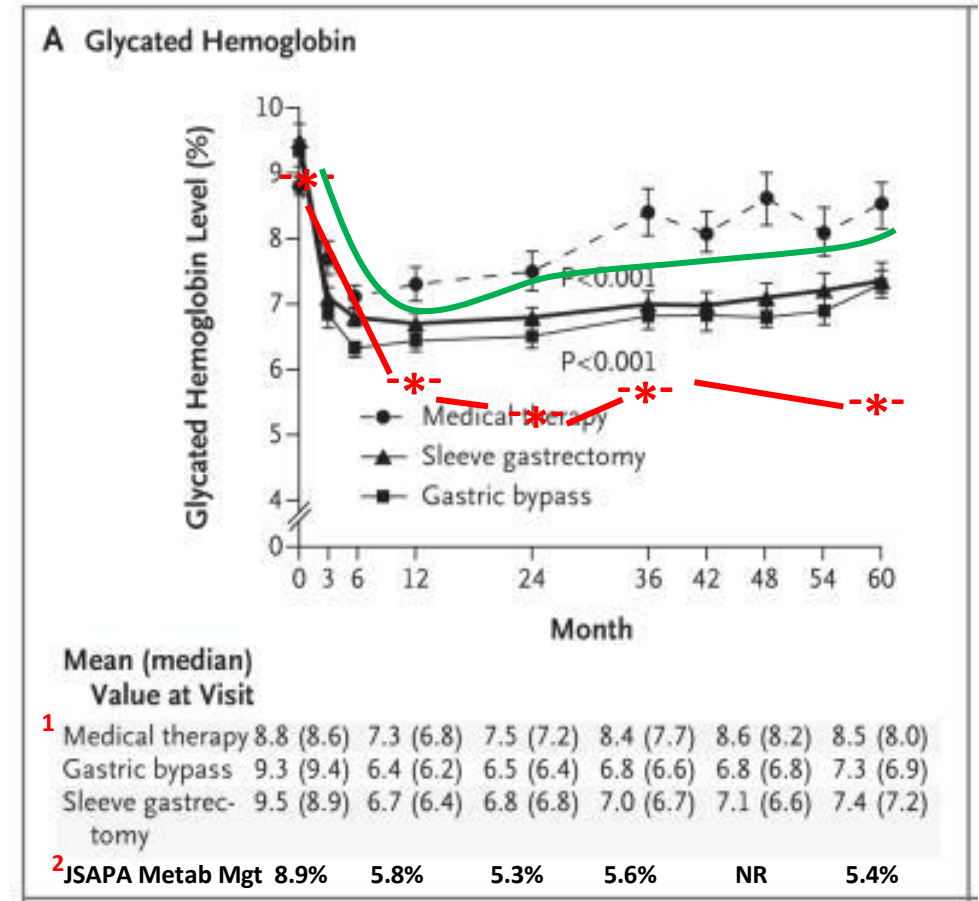


Weight Loss and Diabetes Outcomes

CICO Medical Rx, GLP1 Ag, Bariatric Surgery, Multimodal Metabolic Management



¹ 6 ft man (lbs/kg) 285/130 202/92 216/98 (-69/31)
² 6 ft man (lbs/kg) 310/141 222/101 205/98 (-105/48)



¹ Schauer PR, et al; STAMPEDE Investigators. Bariatric Surgery versus Intensive Medical Therapy for Diabetes - 5-Year Outcomes. N Engl J Med. 2017 16;376(7):641-651

² Cywes R, Smith, E, Fox, S; Retrospective analysis of weight loss and insulin resistance-diabetes outcomes over 5 years in a comprehensive metabolic management setting using a multimodal therapeutic approach. Manuscript. To be published in Journal of Metabolic Health. Supported by Dexcom Inc.

-- Not all patients in obesogenic arm had bariatric surgery – No patients in the diabetes arm had bariatric surgery



Weight Loss versus Obesity Management

FOR PATIENTS WHO ARE EXPERTS AT FAILING WEIGHT LOSS PROGRAMS

Context: Obesity is a chronic disease difficult to manage SUSTAINABLY without MULTIMODAL therapy

4 sequential therapeutic strategies:

- nutritional modification dietary change – Therapeutic Carbohydrate Reduction (TCR)
- cognitive behavioral therapy – change in primary form of Emotion Management (CHESS) - carbaddiction
 - { pharmacotherapy – Incretins that treat Insulin Resistance
 - { bariatric surgery – Sleeve gastrectomy (RYGB)

Evidence: After 2 years, lifestyle intervention weight loss ~5% body weight
STEP 4 Ozempic trial – 10.6% BW loss on Ozempic, 6.9% weight regain in 48 wks after switching to placebo
1 year weight loss >50% after bariatric surgery. By 10 years over 85% have regained some or all weight back

ALL interventions are plagued by weight regain, but do improve effects of type 2 diabetes, CVD and metabolic disease

Conclusion: Sustainable ~~Obesity~~ **INSULIN SENSITIVITY** is best managed by a multidisciplinary clinical team using a multimodal strategy that integrates nutrition, pharmacotherapy and psychologic behavioral therapy

THIS SHOULD BE COVERED BY HEALTH INSURANCE BUT IS USUALLY NOT

Bariatric surgery may be A KEY COMPONENT to manage obesity in select patients



Kheniser K, Saxon DR, Kashyap SR. Long-Term Weight Loss Strategies for Obesity. J Clin Endocrinol Metab. 2021 Jun 16;106(7):1854-1866

Rubino D, Et al; STEP 4 Investigators. Effect of Continued Weekly Subcutaneous Semaglutide vs Placebo on Weight Loss Maintenance in Adults With Overweight or Obesity: The STEP 4 Randomized Clinical Trial. JAMA. 2021 Apr 13;325(14):1414-1425



Go ahead...Demonize Bariatric Surgery....Archie is not an anecdote



16 yo



19 yo

BMI kg/m²	86.7	33.9
WBC x10 ³ /uL	12.8	3.4
HDL mg/dL	31	55
TG mg/dL	766	94
LDL mg/dL	87	212
BUN mg/dL	16	26
CREATININE mg/dL	1.01	0.77
URIC ACID mg/dL	7.9	5.5
ALP IU/L	104	54
AST IU/L	88	17
ALT IU/L	79	15
GGT IU/L	140	26
HgA1c %Hg	6.7	5.5
Fasting BG mg/dL	166	88
Fasting Insulin uIU/mL	47.2	7.9
C-Peptide ng/mL	5.34	2.1
Glucagon pg/mL (8-57)	69	18
HOMA-IR InxBG/405	19.35	1.71
TSH mIU/L	2.25	1.90
FREE T4 ng/dL	1.0	1.6
TOTAL T4 mcg/dL	5.7	6.7
FREE T3 pg/mL	2.3	3.0
TOTAL T3 ng/dL	83	104
TPA/TGA IU/mL	92/9.7	<0.1/2.2
KETONES mg/dL	0	1.1
Testosterone ng/dL	234	545
Vit D3 ng/mL	17	57
B12 pg/mL	262	802
RBC Folate	490	554
Iron mcg/dL	57	87
Ferritin ng/mL	413	56
Mg mg/dL	2.1	2.0

Insulin Resistance Physiologic Thinking:

PHYSIOLOGY:

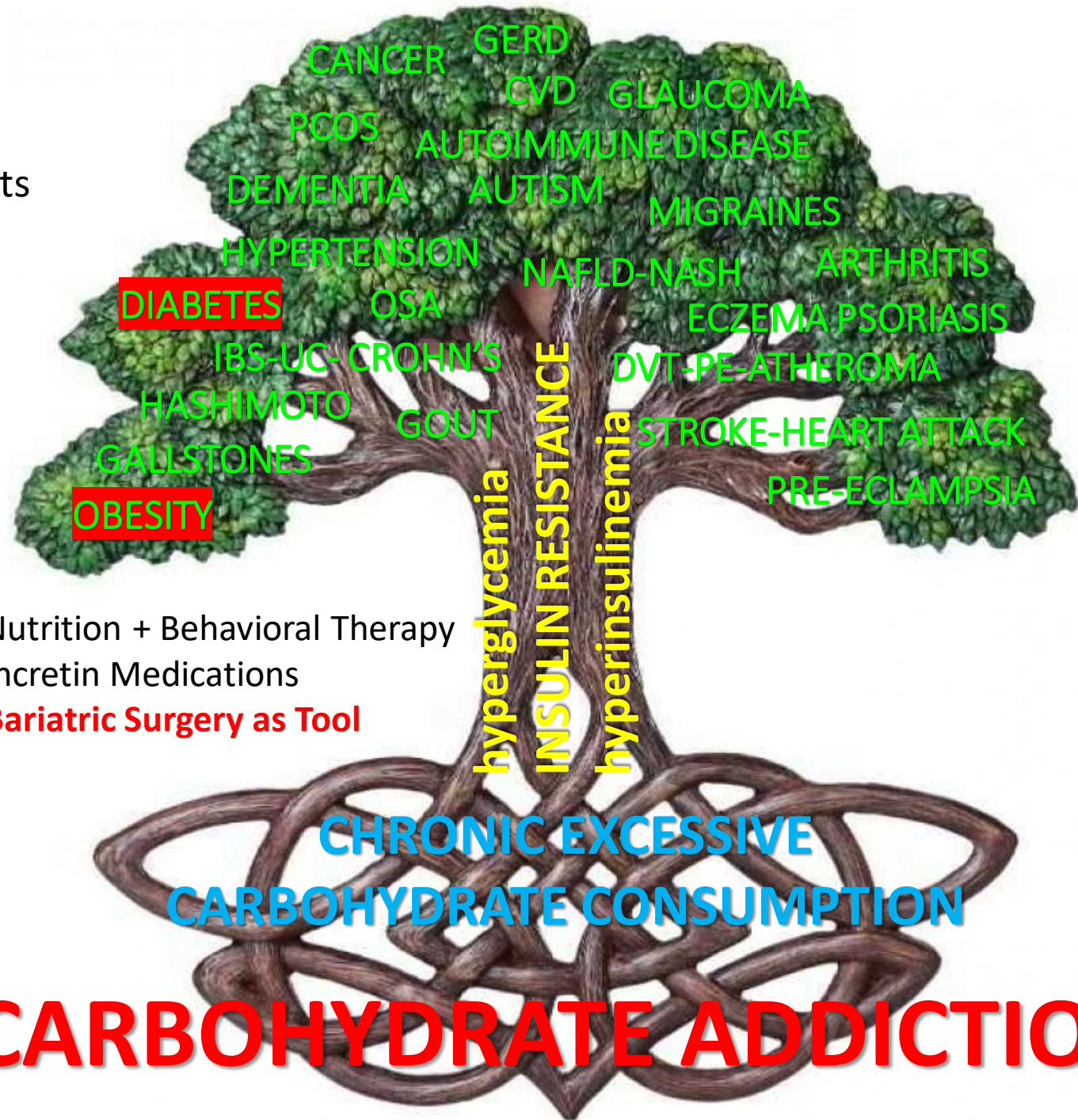
High Carb **Instant Gratification** Diets
snacking and binge eating
causes **Insulin Resistance**

Therapeutic Carbohydrate Reduction +
CHESS – **Effort-Based Selfcare**
As a Way of Life

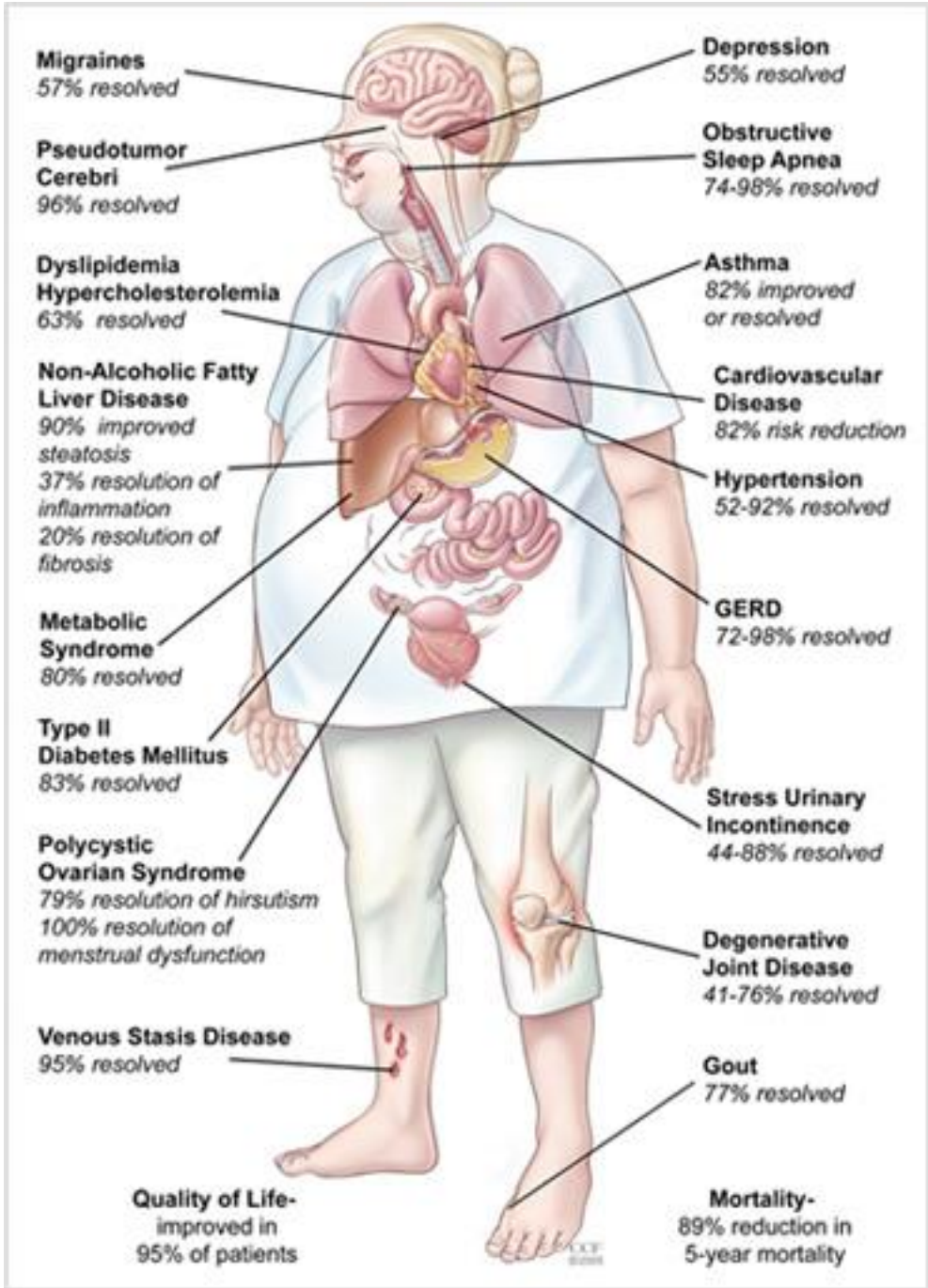
restores **Insulin Sensitivity**
Treats Obesity, T2DM
Reverses Metabolic Disease

SMART THINKING

Nutrition + Behavioral Therapy
Incretin Medications
Bariatric Surgery as Tool



BENEFITS OF BARIATRIC SURGERY



CONCLUSION:

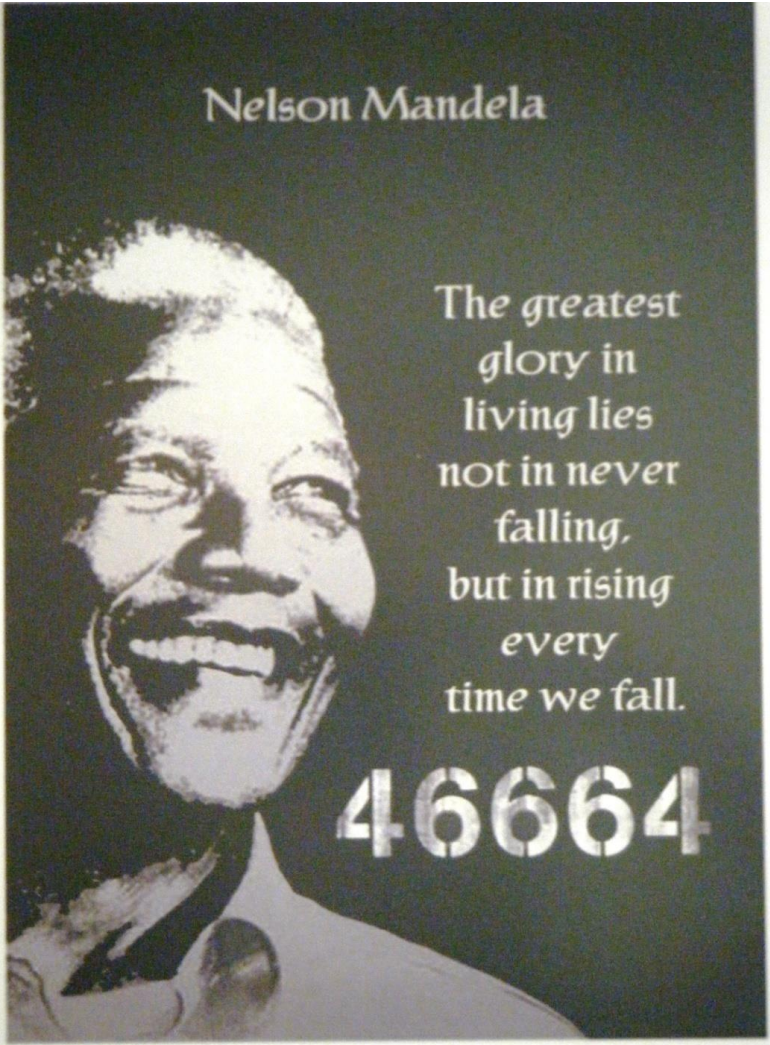
1. Human metabolism is ALWAYS physiologically driven
2. Cannot be OBESE without INSULIN RESISTANCE
3. CARBOHYDRATE ABUSE-ADDICTION not calories causes INSULIN RESISTANCE
4. Hormonal response to CECC is genetic – OBESOGENIC or DIABESOGENIC
5. Metabolic diseases depend on WHEN hyperinsulinemia peaks
6. Bariatric surgery results in weight loss but does not treat the cause of obesity
7. Treating INSULIN RESISTANCE by multimodal means treats ROOT CAUSE
8. Fat-adapted Insulin Sensitivity is the healthiest hormonal state





Let us not take ourselves too seriously.
None of us has a monopoly on wisdom.

Queen Elizabeth II



Nelson Mandela

The greatest
glory in
living lies
not in never
falling,
but in rising
every
time we fall.

46664

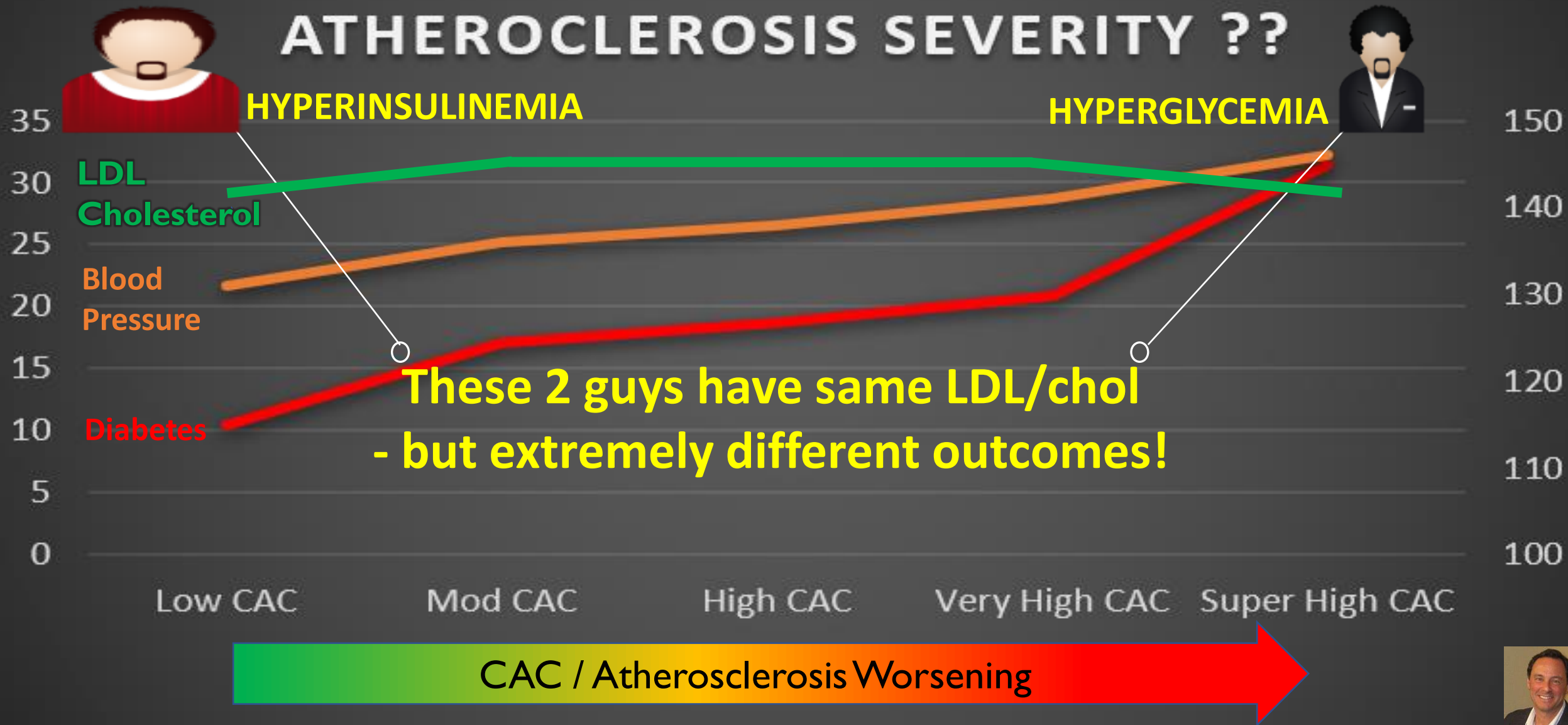
Nelson Mandela

If I've made you think,
I've done my job



THANK YOU

WHAT DOES PREDICT ATHEROSCLEROSIS SEVERITY ??



Progression of coronary artery calcification seems to be inevitable, but predictable - results of the Heinz Nixdorf Recall (HNR) study

Eur Heart J. 2014 Nov 7;35(42):2960-71

**“STATIN THERAPY AS A PRIMARY DRIVER OF
CARDIOVASCULAR CARE IS LIKELY TO BECOME
OBSOLETE WITHIN THE NEXT 1-2 DECADES”**

Dr Robert Cywes Omaha, 2023