

Our Descent into Madness

Modern Diets and
the Global Mental
Health Crisis

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DiagnosisDiet.com

Nothing to Disclose

There is no health without mental health.

—Dr. Brock Chisholm, psychiatrist
First Director General of the WHO, 1954



SCIENTIFIC
AMERICAN®

STAT

MENTAL HEALTH

Surging Demand for Mental Health Care Jams College Services

Students may wait weeks for a basic consultation; sometimes even longer to see a psychiatrist

By Megan Thielking, STAT on February 8, 2017

Global Mental Health Decline

Depression

322M people

(18.4% increase from 2005-2015)

#1 cause of **disability**
in the world

Suicide

~800K people die from
suicide per year

#2 cause of **death** among
young people (age 15-29)
worldwide

Global population: 7.6 billion; US population: 326 million

Global Mental Health Decline

Anxiety Disorders

264M people

(15% increase from 2005-2015)

Bipolar Disorder: 60 million

Schizophrenia: 21 million

Dementia

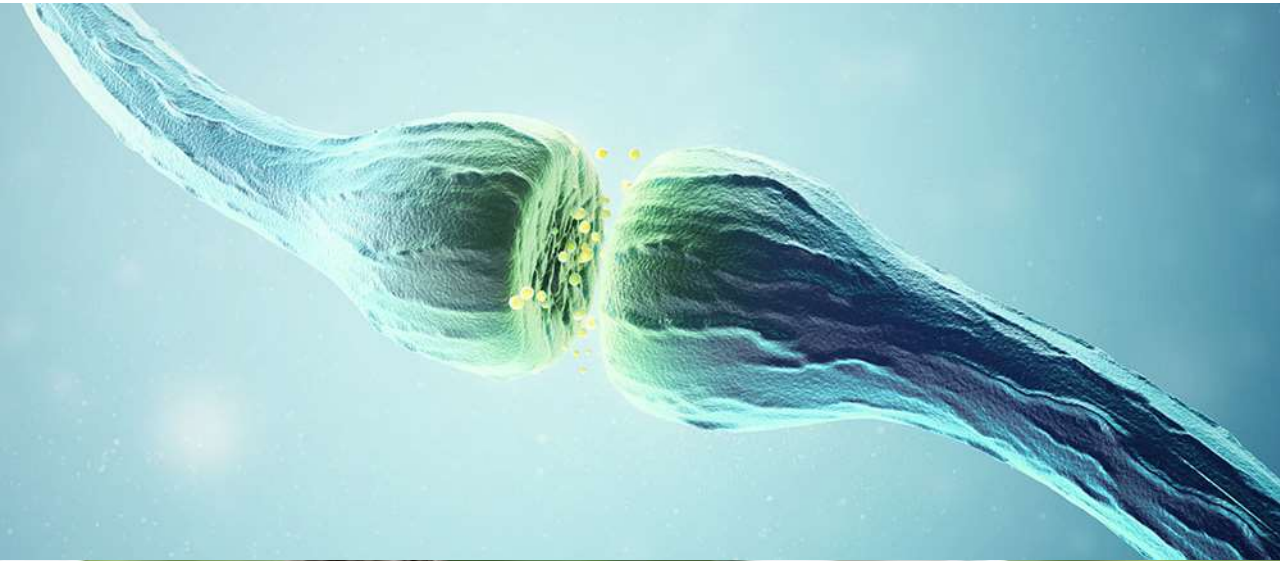
50M people

(estimated to triple by 2050—
10M new cases each year)

#7 cause of **death**
worldwide

Global population: 7.6 billion; US population: 326 million

Usual theories to explain mental illness





LOVE GROWN.
Inspired by Love. Powered by Nutrition.

Gluten FREE!

7g Sugar

Navy Lentil & Garbanzo Beans

CHOCOLATE COMET CRISPIERS
Fly Through the Milky Way with a Cosmic Chocolate Cereal

STARBUCKS

Shur Fine
Avocado Oil

No Preservatives
0g Trans Fat
per serving
See nutritional
information for
fat content.

As goes the body, so goes the brain...



Inflammation

Oxidation

Insulin resistance

Hormonal dysregulation

Micronutrient deficiencies

Mental Illness: Disease of Civilization?

“... it is remarkable that studies of truly **indigenous populations** are virtually unanimous in reporting **very low rates of schizophrenia.**”

—Prof Malcolm Peet, 2003

NHS Psychiatrist, University of Sheffield

[0 TO 0.003% of non-westernized Pacific Islanders in 1950s]

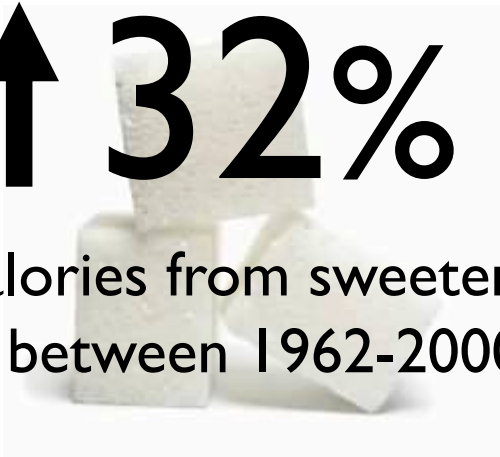
Maddening Modern Diet #1 = “SAD”

Standard American diet / Western diet—
now exported ‘round the world

Refined/processed carbs

↑ 32%

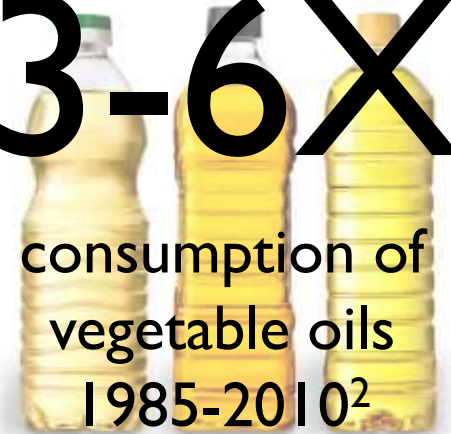
calories from sweeteners
between 1962-2000¹



Refined/processed fats

3-6X

consumption of
vegetable oils
1985-2010²



¹ Popkin BM, Nielsen SJ. The sweetening of the world's diet. *Obes Res.* 2003 Nov;11(11):1325-32.

² Popkin BM et al. Now and then: the global nutrition transition: the pandemic of obesity in developing countries. *Nutr Rev.* 2012 Jan;70(1):3-21.

SAD Western Diet Associated with:

Depression¹

ADHD²

Bipolar Disorder³

Schizophrenia⁴



¹Li Y et al. Dietary patterns and depression risk: A meta-analysis. *Psychiatry Res.* 2017 Jul;253:373-382.

²Howard AL et al. ADHD is associated with a “Western” dietary pattern in adolescents. *J Attention Disorders* 2011;15(5):403-411.

³Lopresti AL, Jacka FN. Diet and bipolar disorder. *J Altern Complement Med.* 2015 Dec;;21(12):733-739.

⁴Peet M. Nutrition and schizophrenia: an epidemiological and clinical perspective. *Nutr Health.* 2003;17(3):211-219.; Logan AC, Jacka FN. Nutritional psychiatry research: an emerging discipline and its intersection with global urbanization, environmental challenges and the evolutionary mismatch. *J Physiol Anthropol.* 2014;33:22.

RCTs of Diet and Psychiatric Disorders

1. **SMILES** (Mediterranean + nuts/olive oil)

2. **HELFIMED** (Mediterranean + fish oil)

Mediterranean Diet (modestly)
improves symptoms of depression
(when added to pre-existing treatments)

Jacka F et al. A randomised controlled trial of dietary improvement for adults with major depression (the 'SMILES' trial). *BMC Medicine*. 2017;5:23.

Parletta N et al. A Mediterranean-style dietary intervention supplemented with fish oil improves diet quality and mental health in people with depression: a randomized controlled trial (HELFIMED). *Nutr Neuro* 2017 Dec;7:1-14.

Image Credit: julijadm / 123RF Stock Photo



I. Inflammation / Oxidation

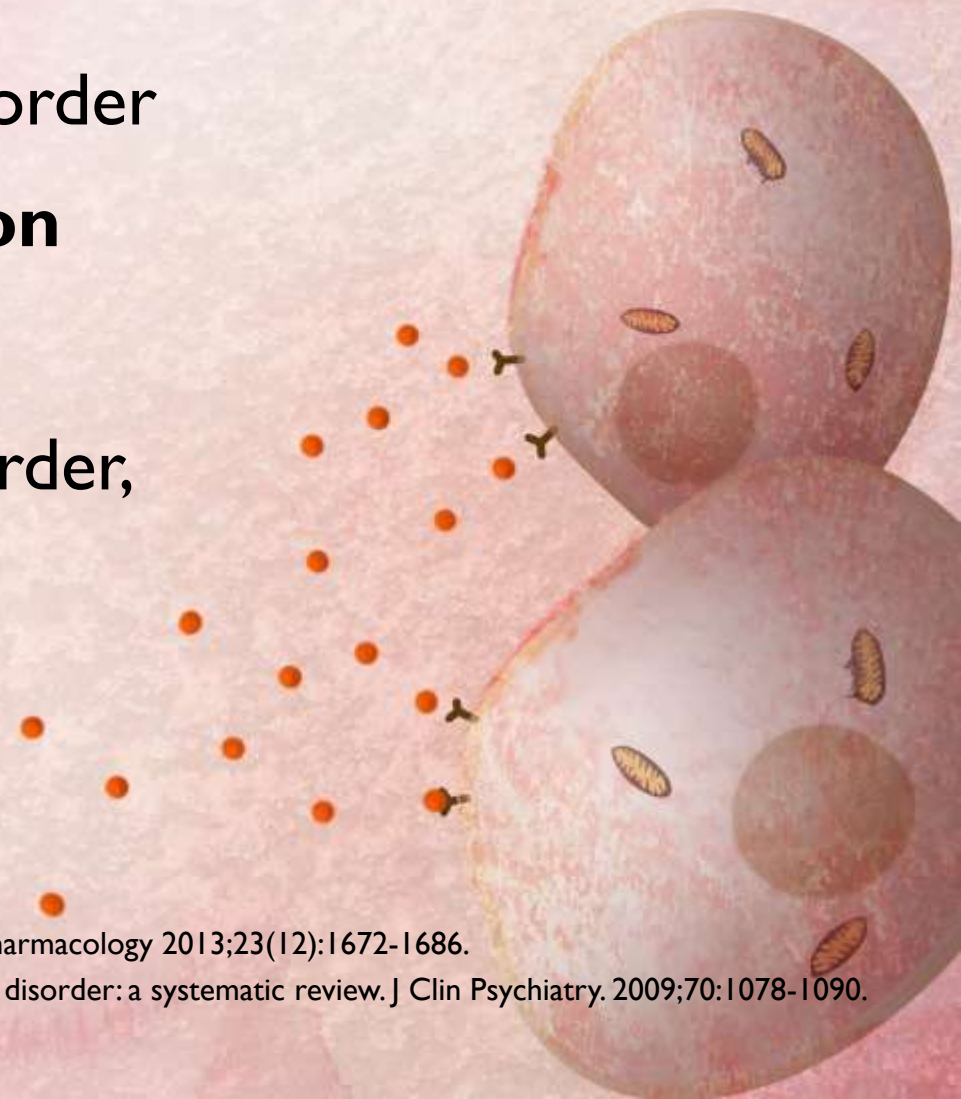
Depression & Bipolar Disorder
linked to **inflammation**

Depression, Bipolar Disorder,
Schizophrenia, OCD
linked to **oxidation**

Serafini G et al. The role of inflammatory cytokines in suicidal behavior: a systematic review. *Eur Neuropsychopharmacology* 2013;23(12):1672-1686.

Goldstein BI et al. Inflammation and the phenomenology, pathophysiology, comorbidity, and treatment of bipolar disorder: a systematic review. *J Clin Psychiatry*. 2009;70:1078-1090.

Najjar S et al. Neuroinflammation and psychiatric illness. *Journal of Neuroinflammation*. 2013;10:43.



Omega 3

Anti-Inflammation

EPA

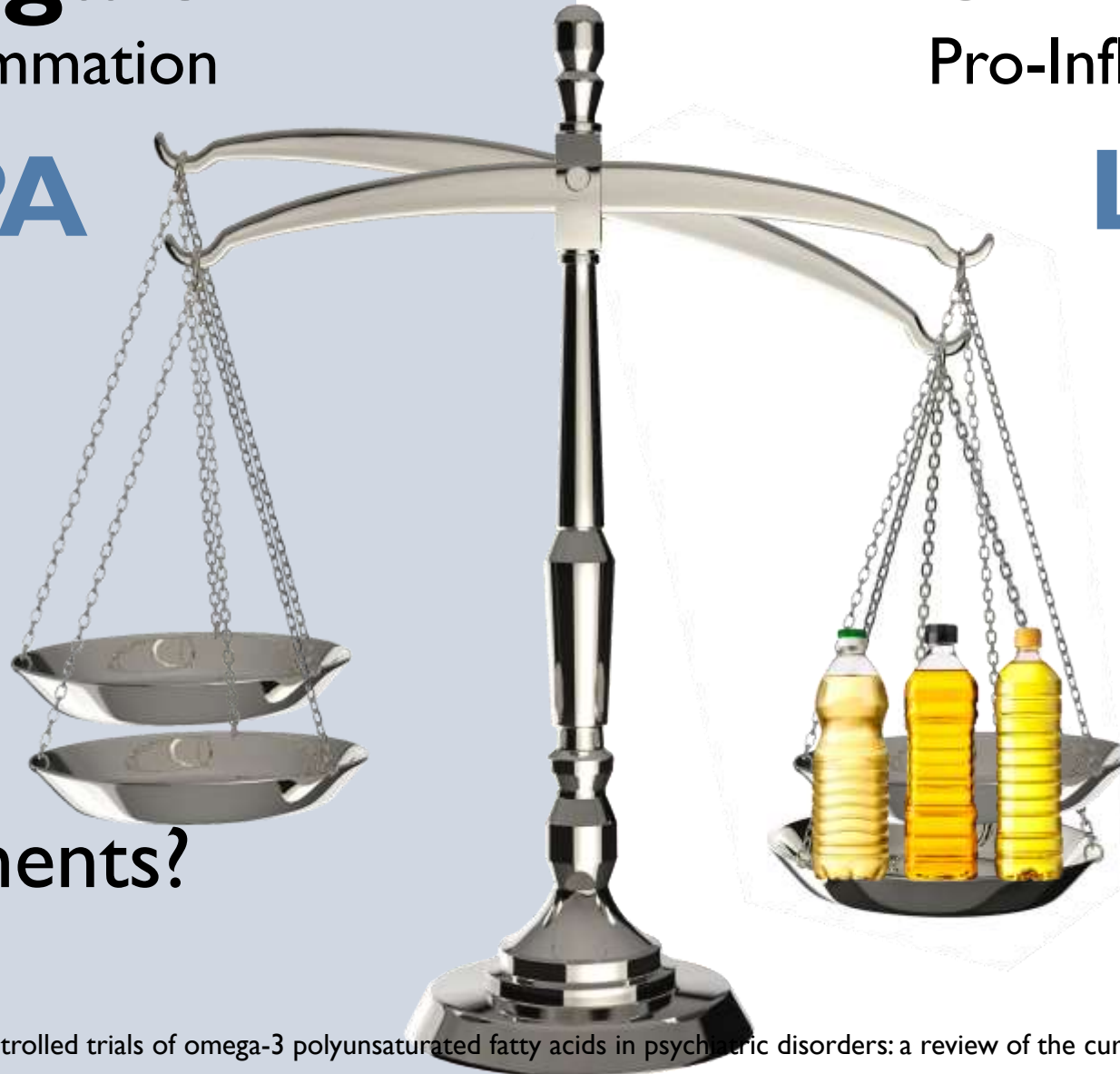
EPA Supplements?

Omega 6

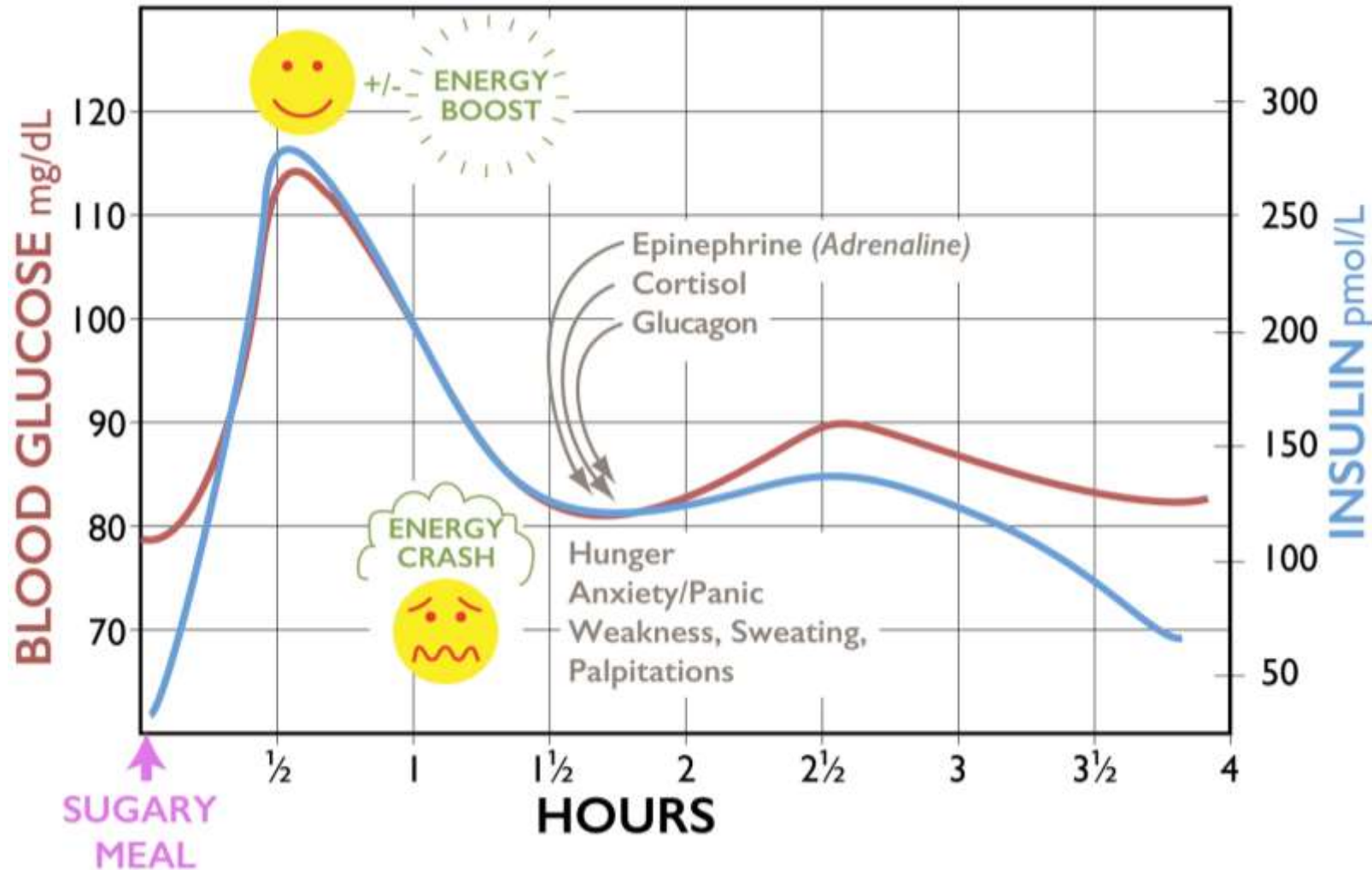
Pro-Inflammation

LA

Excessive intake
of refined seed oils

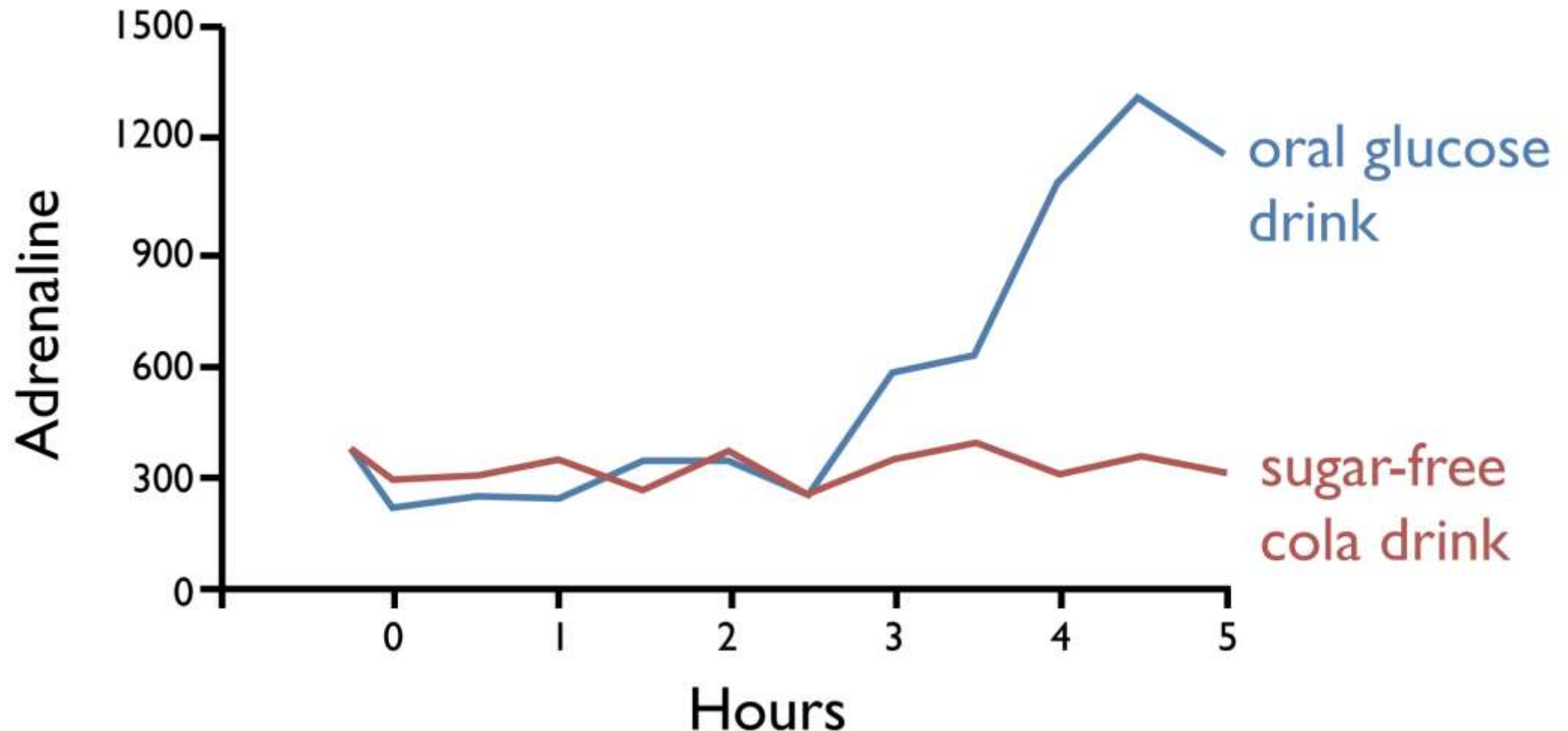


2. Hormonal Roller Coaster



Data sources: Benton D. Carbohydrate ingestion, blood glucose and mood. *Neurosci Biobehav Rev* 2002;26:293-308.; Daly ME et al. Acute effects on insulin sensitivity and diurnal metabolic profiles of a high-sucrose compared with a high-starch diet. *Am J Clin Nutr*. 1998; 67:1186-96.

Sugar + Teenaged Boys = STRESS



Adapted from Jones TW. Enhanced adrenomedullary response and increased susceptibility to neuroglycopenia: mechanisms underlying the adverse effects of sugar ingestion in healthy children. *J Pediatr.* 1995;126(2):171-7.

3. Insulin Resistance

Chronic Depression¹

37%

increased risk of **DMII**

Bipolar Disorder²
& Schizophrenia

300%

increased risk of **DMII**

Alzheimer's Disease³

80%

have **IR** or **DMII**

¹Pearson S et al. Depression and insulin resistance: cross-sectional associations in young adults. Diabetes Care 2010;33:1128–1133.

²Hajek T et al. Type 2 diabetes mellitus: a potentially modifiable risk factor for neurochemical brain changes in bipolar disorders. Biological Psychiatry. 2015;77:295–303.

³Kim B, Feldman EL. Insulin resistance as a key link for the increased risk of cognitive impairment in the metabolic syndrome. Exp Mol Med. 2015;47(3):e149

Bipolar Disorder & IR

Bipolar I/II patients

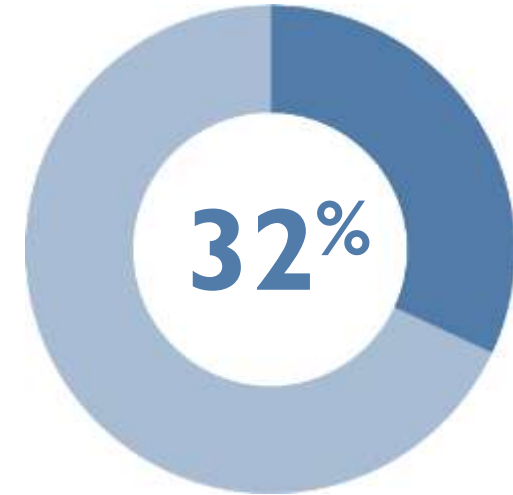
121 participants, age 30's–50's

More likely:

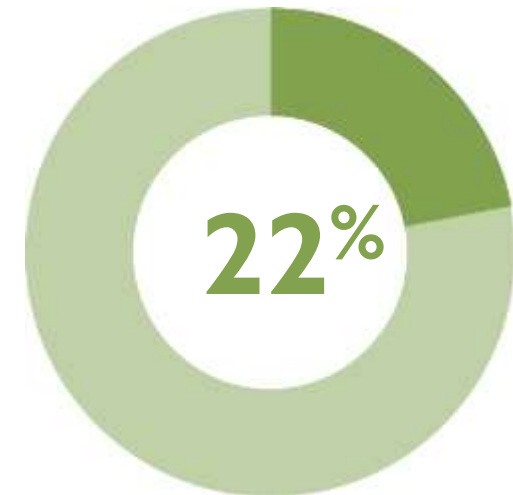
Chronically symptomatic

Rapid-cycling

Lithium-refractory (BMI predictive)

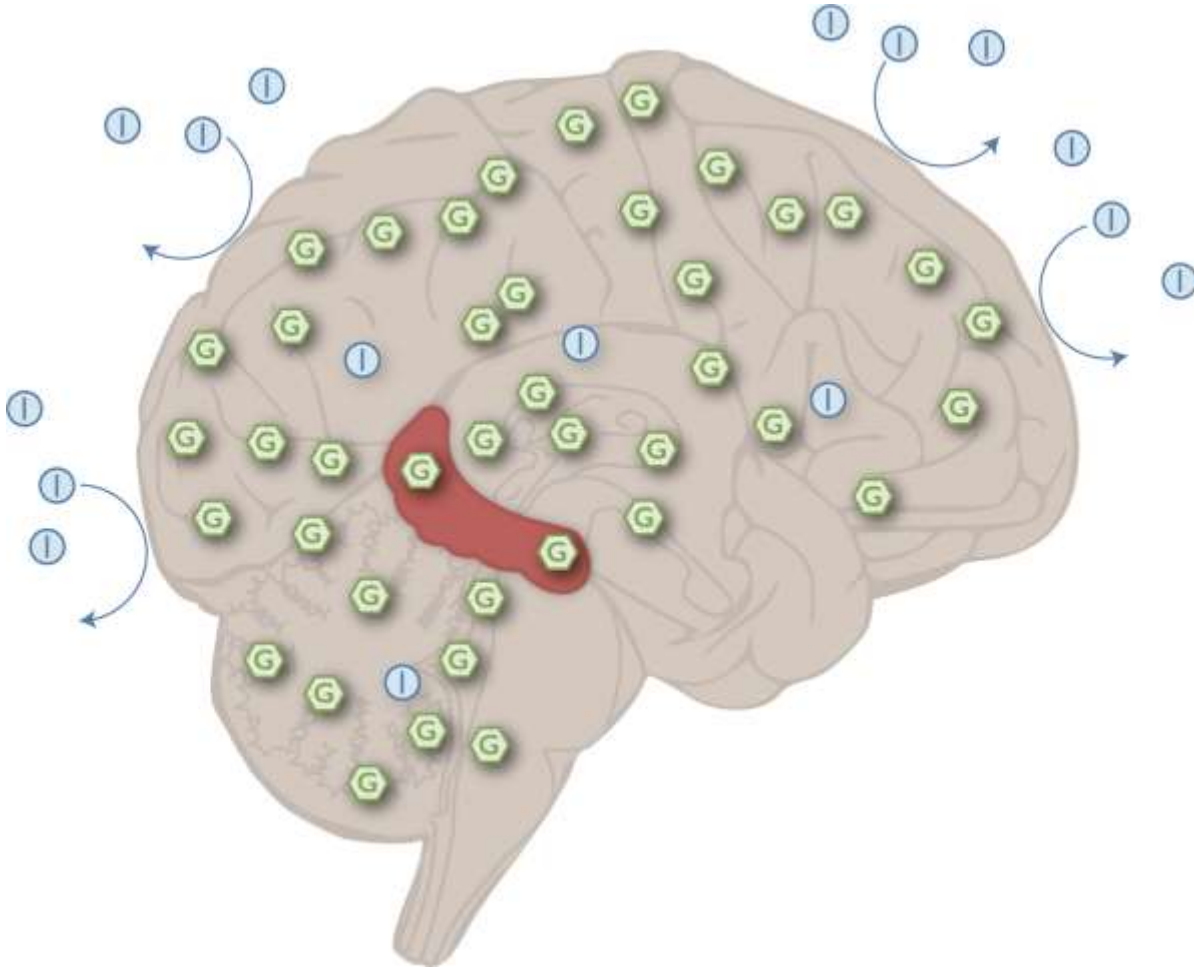


IR



DMII

Alzheimer's Disease = Type III Diabetes



“Disturbances in brain insulin and IGF signaling mechanisms could account for the majority of molecular, biochemical and histopathological lesions in Alzheimer’s Disease”

—Dr. Suzanne de la Monte
Brown University, 2008

PPAR- γ Agonists:

Insulin-sensitizing anti-inflammatory

- Improved depression symptoms in 7 out of 8 studies¹
- Pioglitazone (Actos) added to Risperdal for 8 weeks (n=20+20cntrls) improved negative symptoms on PANSS more than Risperdal + placebo²
- Insulin sensitizers significantly improve cognition in MCI and early Alzheimer's (but not late-stage AD)³

¹Colle R et al. PPAR- γ agonists for the treatment of major depression: a review. *Pharmacopsychiatry*. 2017 Mar;50(2):49-55.

²Iranpour N et al. The effects of pioglitazone adjuvant therapy on negative symptoms of patients with chronic schizophrenia: a double-blind and placebo-controlled trial. *Hum Psychopharmacol*. 2016 Mar;31(2):103-12.

³de la Monte SM, Wands JR. Alzheimer's disease is type 3 diabetes—evidence reviewed. *Journal of Diabetes Science and Technology*. 2008;2(6):1101-1113.

Could Ketosis Hold the Key?

Parkinson's Disease

ALS

Traumatic Brain Injury

Multiple Sclerosis

Epilepsy

Autism

Bipolar Disorder

Psychosis

Alzheimer's Disease

Psychology Today Find a Therapist ▾ Topics ▾ Get Help ▾ Magazine

Ketogenic Diets for Psychiatric Disorders: A New 2017 Review



Where the science stands, and what it means for you.

Posted Jun 30, 2017

Maddening Modern Diet #2: Plant-Based Diet

In Germany, low-meat diets increased from 26% to 44% in past 3 yrs²

~ 50% increase in vegetarians and vegans in U.S. in past 10 yrs¹

Veganism in U.S. increased to 6% of Americans (500% rise in past 3 yrs)²

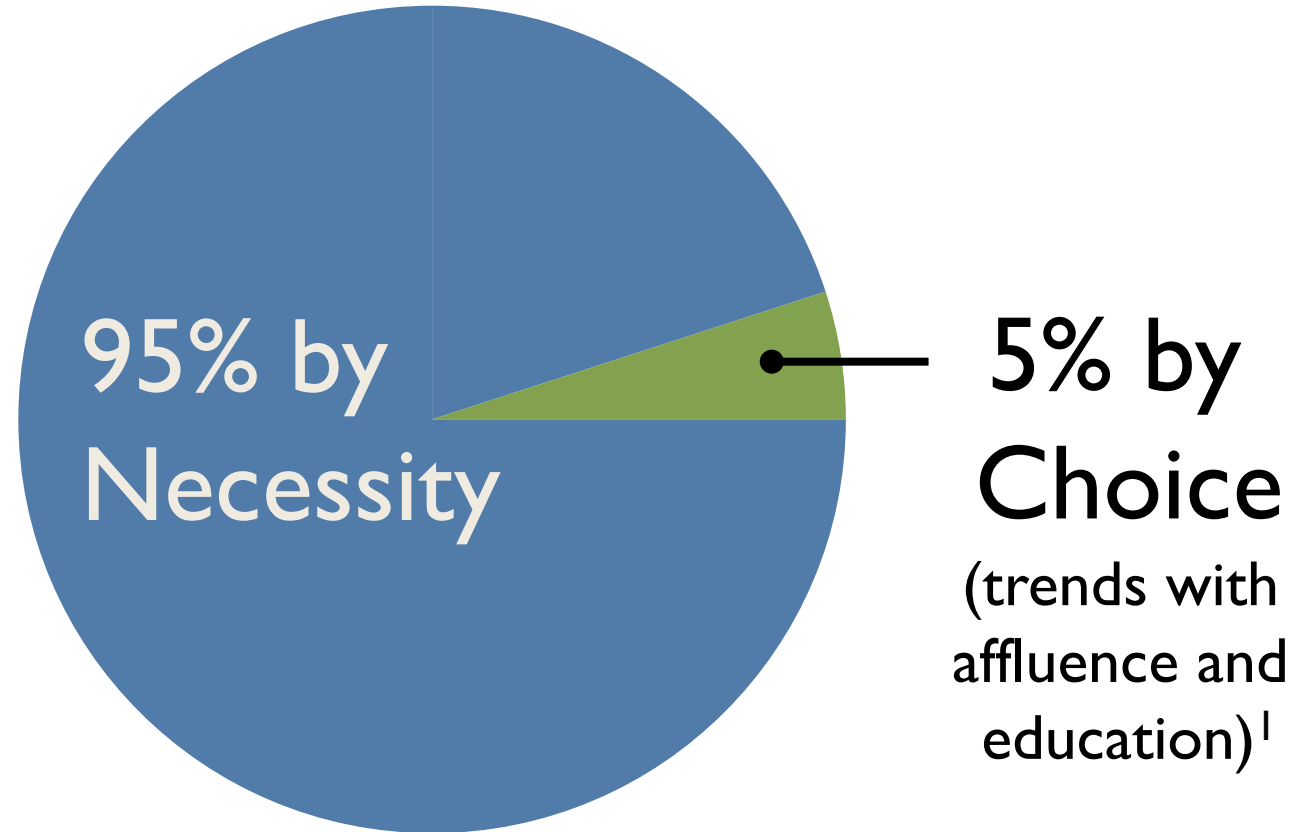


¹Gleiser M. Is a no-meat world really better? NPR website. 2017 June 28.

²Veganism has grown 500% since 2014 in the US. Rise of the Vegan website. 2017 June 25.

Plant-based Diet Movement

USDA, WHO
insinuate that
plant-based diets
are the solution



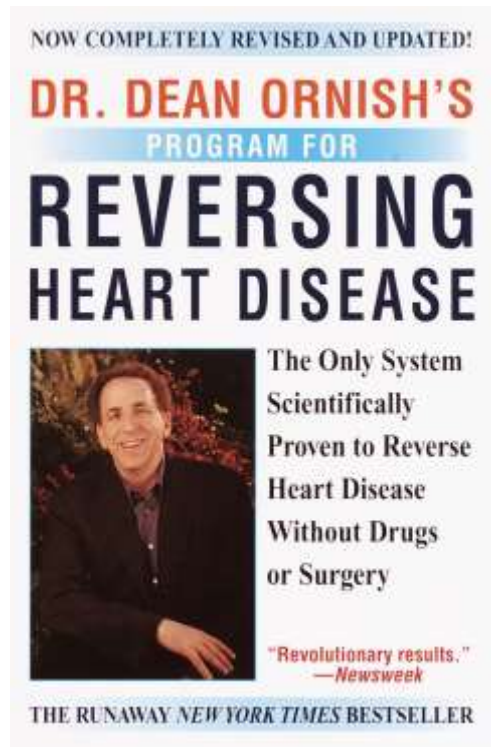
Estimated **1.5 billion** vegetarians in the world²

Alles B et al. Comparison of sociodemographic and nutritional characteristics between self-reported vegetarians, vegans, and meat-eaters from the NutriNet-Santé study. *Nutrients*. 2017 Sep 15;9(9).

Leahy E et al. *An estimate of the number of vegetarians in the world*. ESRI Working Paper No. 340. Dublin: Economic and Social Research Institute; 2010

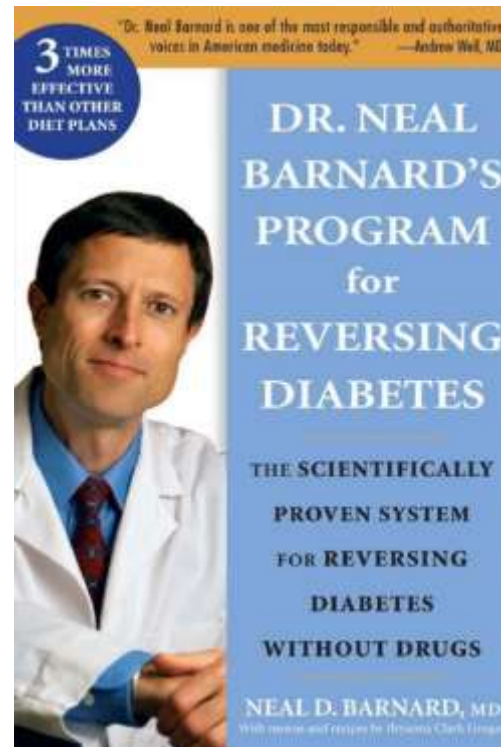
Vegan Diet Clinical Trials

Dean Ornish MD



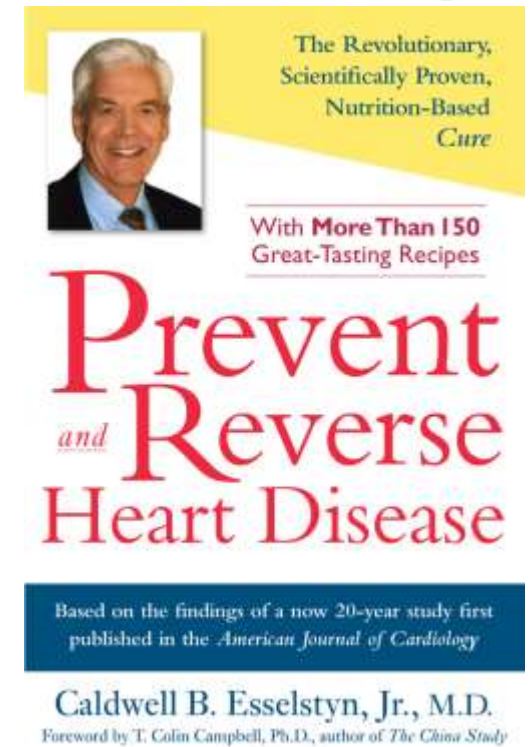
“avoid simple sugars, emphasize whole foods”

Neal Barnard MD



“low glycemic index”

Caldwell Esselstyn MD



“avoid sugary foods and refined carbohydrates”

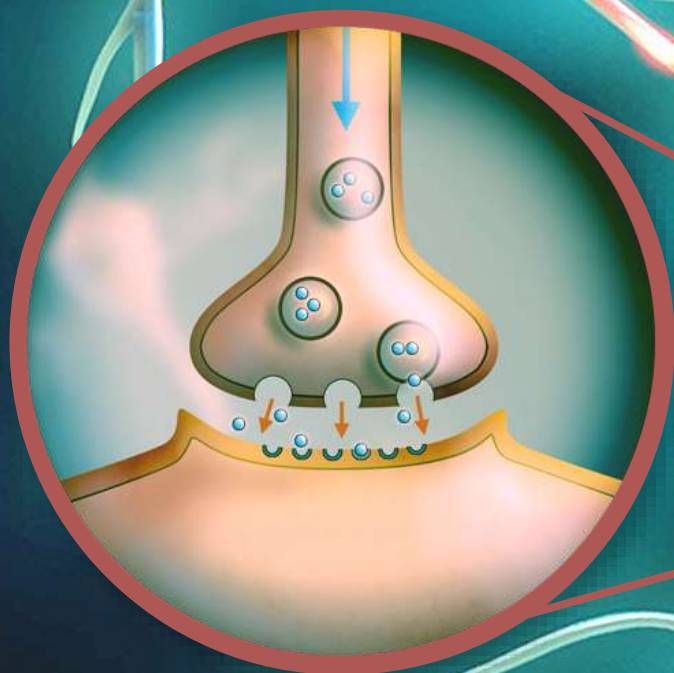
What about Mental Health?

Epidemiology weak, mixed

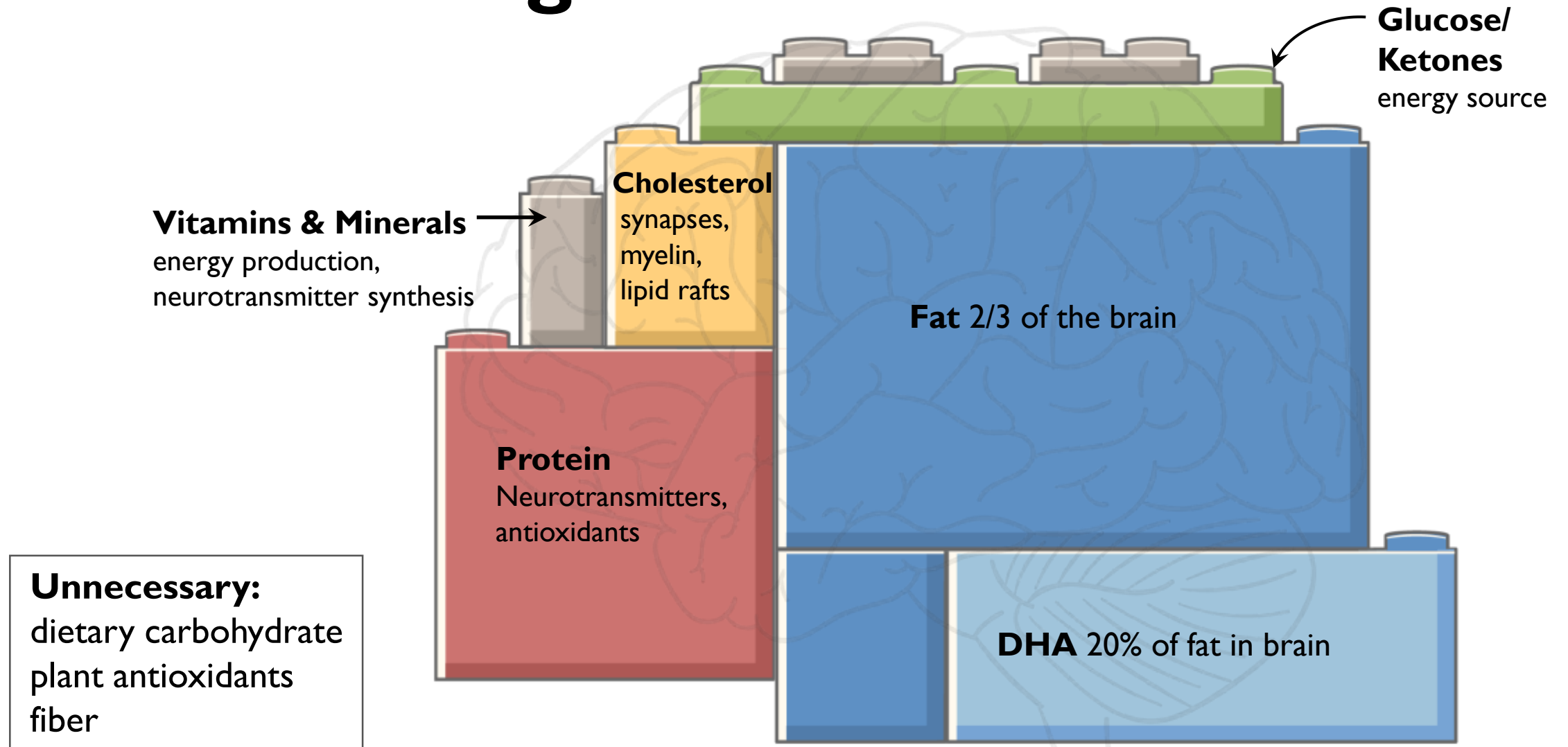
No clinical trials that aren't confounded by refined carbs, fat, and other variables



Brain Chemistry



Brain Building Blocks



DHA: Ancient Precision Signaling Molecule

Blood-brain barrier integrity

Mitochondrial membranes

Myelination

Synapses/Neurotransmission

Neural connectivity

Retinal photoreceptors

Cortical development

DHA in the retina turns sunlight into *electricity*.

DHA in synapses, mitochondria, and cardiac cells acts as a **semiconductor**.

—Prof. Michael Crawford, Director
Institute of Brain Chemistry and Human
Nutrition, Imperial College, London



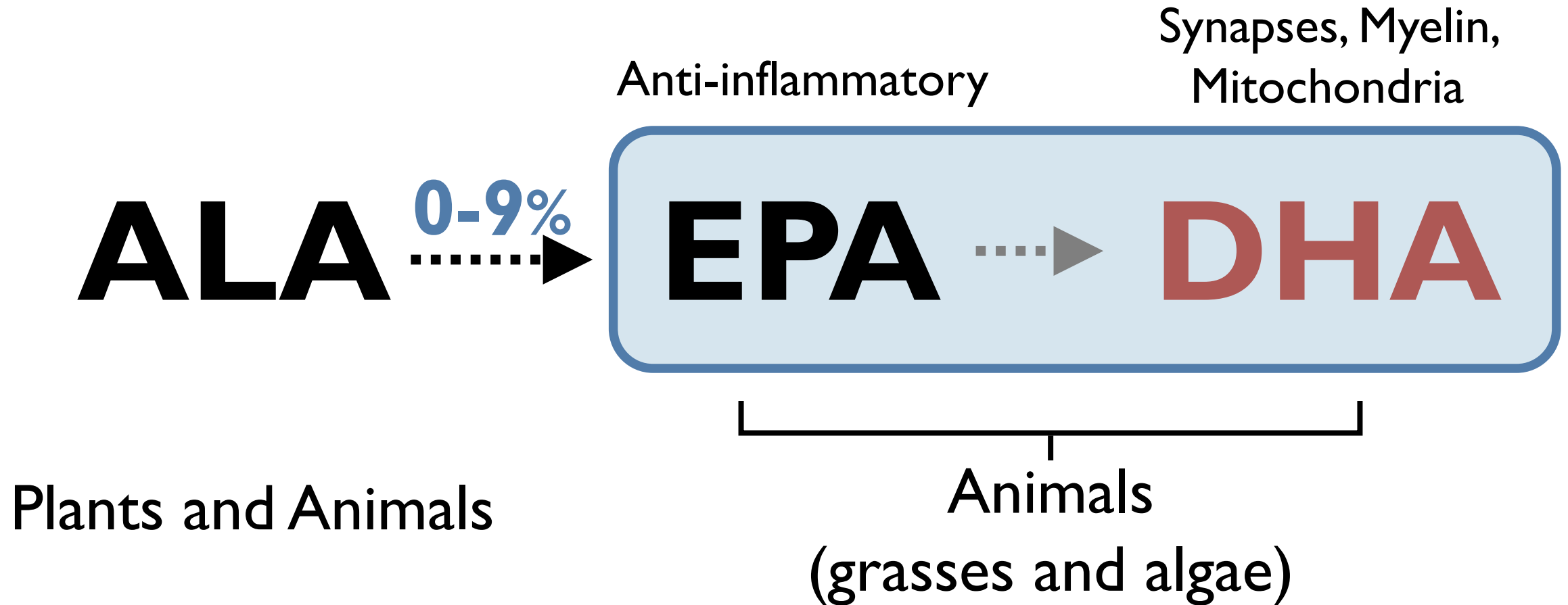
**DHA plays a “unique and indispensable role” in the
“neural signaling essential for higher intelligence.”**

—Simon Dyall PhD, Lipid Research Scientist
Bournemouth University, UK

Dyall SC. Long-chain omega-3 fatty acids and the brain: a review of the independent and shared effects of EPA, DPA and DHA. *Frontiers in Aging Neuroscience*. 2015;7(52).

Image credit: nexusplexus / 123RF Stock Photo

3 Types of Omega-3



Compared to Meat-Eaters

EPA levels:

28% lower in vegetarians

53% lower in vegans

DHA levels:

31% lower in vegetarians

59% lower in vegans

Nutrient	Plants	Animals
Folate (B9)	✓	✓
Vitamin C	✓	✓
Vitamin E	✓	✓
Vitamin K1	✓	✓
Iron	non-heme	✓ ≥3x more bioavailable
Vitamin A	carotenoids	✓ 12-24x more bioavailable
Vitamin D	D2	✓ D3—easier to use/store
Full complement of amino acids	quinoa, soy, buckwheat	✓
B12	X	✓
Vitamin K2 (MK-4)	X	✓
EPA & DHA	X	✓



(PI)anti-nutrients

Protease Inhibitors: ↓ Protein

Oxalates: ↓ Iron

Tannins: ↓ Iron

Goitrogens: ↓ Iodine

Phytate: ↓ Iron, Zinc, Calcium, Magnesium

grains, beans, nuts & seeds

soy



Mind Minerals



Dopamine synthesis, infant brain development, neurotransmitter synthesis, hippocampal function, energy production, cell signaling¹



Converts B6 to active form, serotonin synthesis, dopamine transport¹

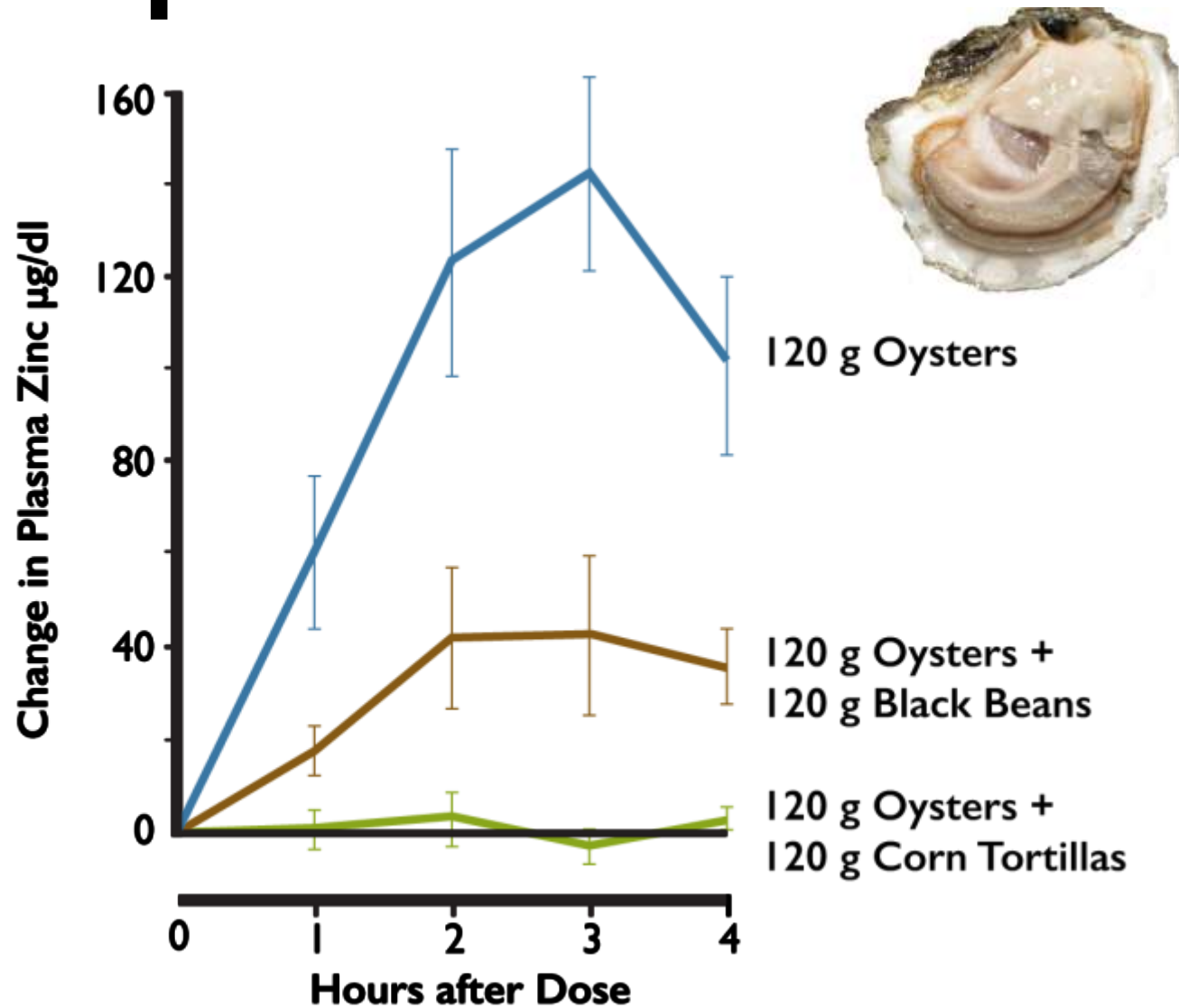


Brain growth and development, proper functioning of the thyroid (Iodine deficiency is the main cause of brain damage in childhood)²

¹Villagomez A, Ramtekkar U. Iron, magnesium, vitamin d, and zinc deficiencies in children presenting with symptoms of Attention-Deficit/Hyperactivity Disorder. Children. 2014;1:261-279.

²WHO. Is it true that lack of iodine really causes brain damage? WHO website. Updated May 2013.

Zinc Absorption



Zinc Inadequacy¹

47%
vegans

10%
omnivores

Iron Deficiency²

10-20%
women of
reproductive age

¹Schuepbach R et al. Micronutrient status and intake in omnivores, vegetarians and vegans in Switzerland. Eur J Nutr. 2015. doi:10.1007/s00394-015-1079-7.

²Centers for Disease Control and Prevention. Iron deficiency: United States, 1999-2000.

It Doesn't Have to Be Red Meat

	Beef, sirloin	Pork, chop	Chicken, breast	Duck, breast	Chicken Liver	Salmon	Shrimp	Oysters
Vitamin B12 (µg)	1.67	.94	.58	.42	28.19	5.41	1.89	14.88
Iron (mg)	2.57	1.12	1.26	4.08	15.28	1.36	.36	7.84
Zinc (mg)	6.02	4.35	1.36	2.31	4.54	1.09	1.86	66.81
DHA (g)	0	.003	.034	0	0	1.895	.119	.231

*Nutrient information for 6oz (170g) servings of meat

Women, Meat, Fat, and the Future of the Human Race

Meat/fat aversion

74% of U.S. vegans

Weight/appearance over health

Animal/planet health over personal health

DHA critical for infant brain development;
can early life deficits be undone?



Diet and Autistic Spectrum Disorders

Children with autism more likely to have

- Lower EPA, DHA / Higher LA (omega-6)¹

Little evidence to support dietary interventions²

- Omega-3 supplements
- B12 supplements
- Carnitine supplements
- Gluten-free/casein-free
- Camel's milk substitution

¹Mazahery H et al. Relationship between Long chain n-3 polyunsaturated fatty acids and Autism Spectrum Disorder: systematic review and meta-analysis of case-control and randomised controlled trials. *Nutrients*. 2017 Feb;9(2).

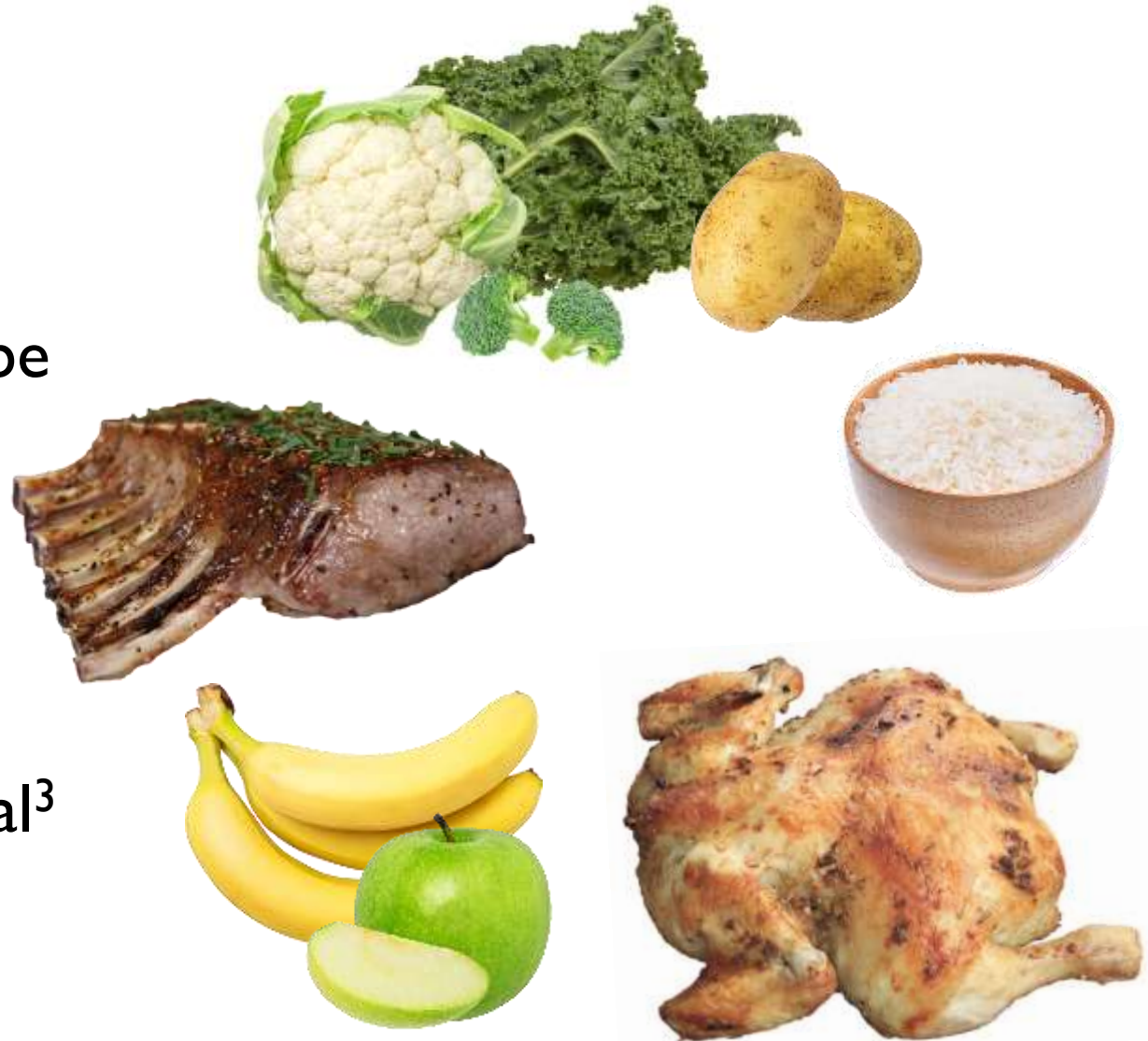
²Sathe N et al. Nutritional and dietary interventions for autism spectrum disorder: a systematic review. *Pediatrics*. 2017 Jun;139(6).

Diet and ADHD

Children w ADHD twice as likely to be overweight/obese and vice versa¹

Children w ADHD more likely to be lower in **EPA/DHA, Zinc, Iron**²

Elimination diets have real potential³



¹Erhart M et al. Examining the relationship between ADHD and overweight in children and adolescents. Eur Child Adolesc Psychiatry 2012; 21:39–49.

²Lange, KW et al. The role of nutritional supplements in the treatment of ADHD: what the evidence says. Curr Psychiatry Rep 2017;19: 8.

³Pelsser LM et al. Diet and ADHD; reviewing the evidence: a systematic review. PLoS One. 2017 Jan 25;12(1):e0169277.

62% to 82% Responded to Elimination Diets



What Diet Offers the Most Hope?



The Psychology of Subtraction



We Need a Revolution

Revolutionize the way women feed themselves

The way parents feed their children

The way schools feed their students

The way hospitals feed their patients

The way senior care centers feed their residents



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Special thanks to **Suzi Smith** for presentation design and graphics