Defeat Diabetes

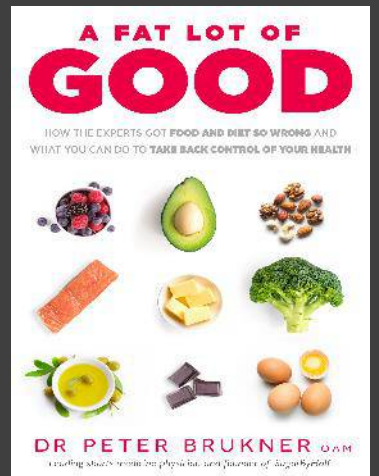
AWSA Summer School

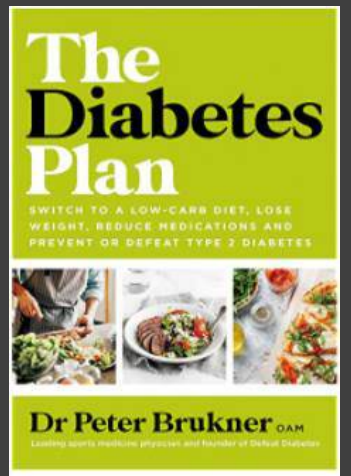
Inflamed!

Peter Brukner OAM, DSc, MBBS, FACSEP

Professor of Sports Medicine

La Trobe University



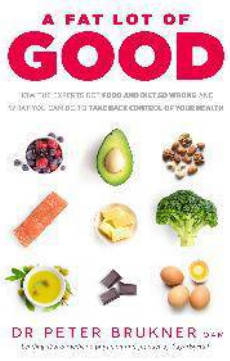


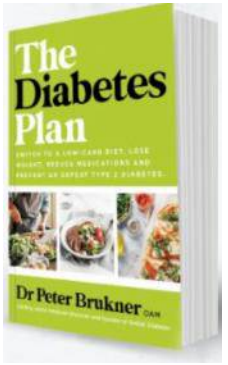
LA TROBE UNIVERSITY

Disclosures

- Founder and Chair, ***SugarByHalf***

- Author, ***A Fat Lot of Good & The Diabetes Plan***





- Founder and Chair, ***Defeat Diabetes***

Defeat Diabetes

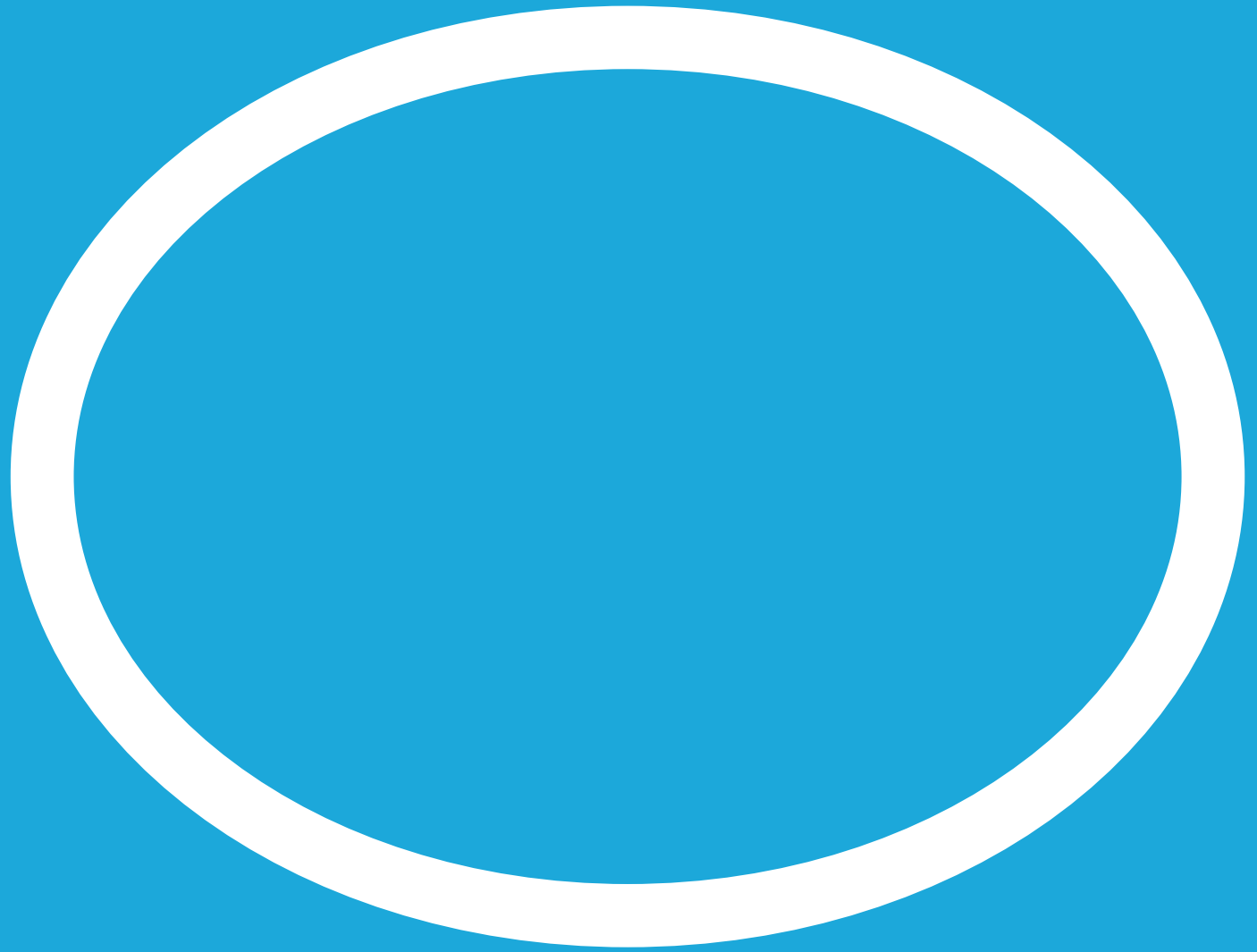
Light bulb moment No: 1

2012

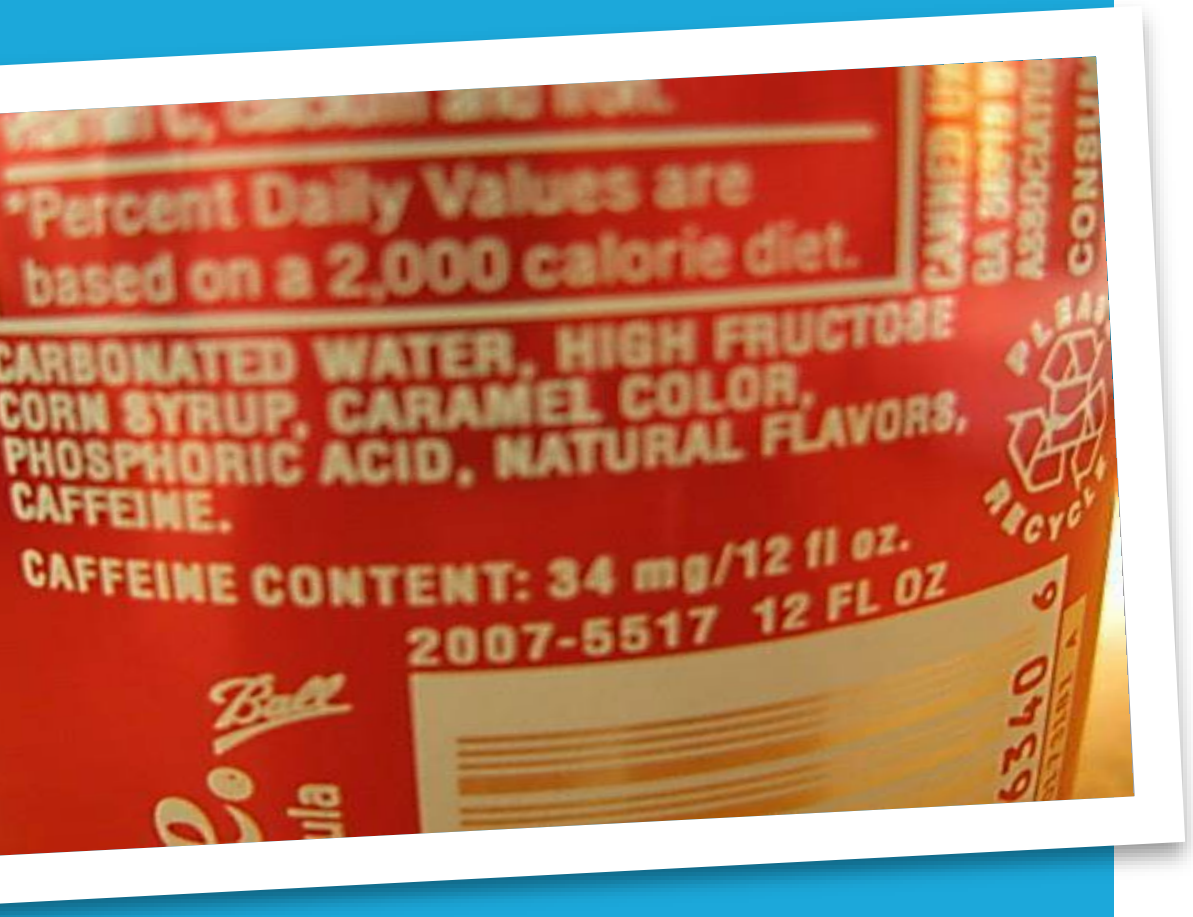
- Healthy 60 yr old
- Low fat diet
- Regular exercise
- Normal fasting blood glucose
- Family history T2D
- Overweight/obese
- Hyperinsulinemic
- Hypertriglyceridemia
- Fatty liver

2012 60 yr old, 93kg

3 months
LCHF diet



LCHF



No…

- sugar
- bread
- cereals
- pasta
- rice
- fruit juice
- starchy vegetables
- margarine
- vegetable oils
- processed foods

LCHF

Plenty of…

- non-starchy vegetables
- meat
- fish
- eggs
- butter
- cream
- olive oil
- nuts
- berries

Half the man
I used to be!
Minus 13kg

My liver results

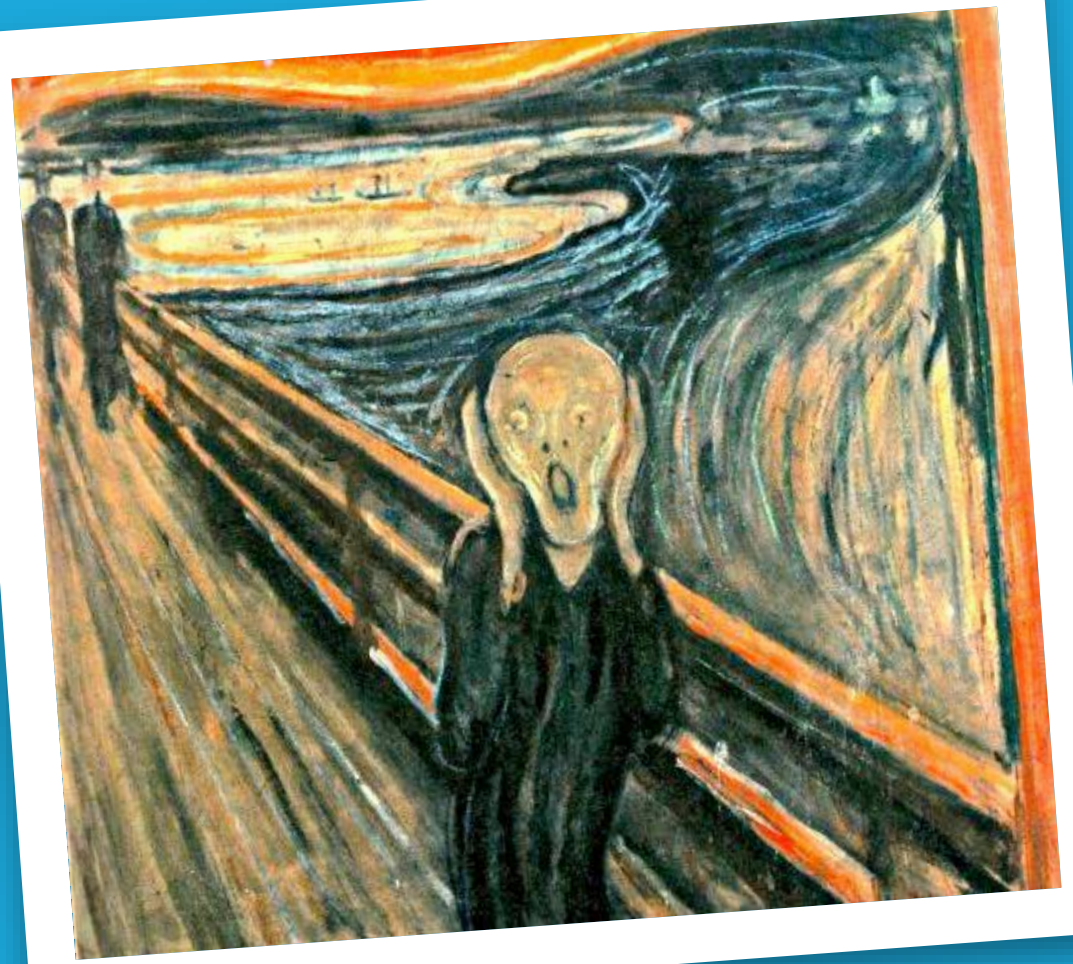
Liver Function tests	2005	2007	2011	2013
GGT (<50)	47	52	56	21
ALT (<40)	66	65	65	25
AST (<40)	33	37	36	22

Fatty liver disease: the frightening epidemic affecting one in three Australians

Julia Medew

For years, John Hatty was a senior businessman travelling the world. The former scientist's job with a mining company took him to many fine restaurants where he would consume what he now calls his "three enemies" – sugar, salt and fat.

But this all came to a halt when the 63-year-old discovered he had non-alcoholic fatty liver disease – a lesser known complication of obesity that now affects about one in three Australians.



“Before diagnosis of Type 2 diabetes, there is a long silent scream from the liver.”

Professor Roy Taylor, 2013

3 months LCHF diet

- Reduced appetite
- Lost 13 kg weight
- Increased energy
- Improved sleep
- Decreased triglycerides
- Insulin levels normalised
- Fatty liver resolved
- New wardrobe!

Light bulb moment No: 2

Cricketer

- Knee pain
- Unable to play
- Seronegative arthritis
- Powerful drugs

Feb 2013: Reduced sugar and processed food

Since then…

- No drugs
- No pain ➔ Increased training

Inflammation

- **Acute**
  - Usually associated with infection or injury
  - Increased blood flow and capillary permeability
- **Chronic**
  - Prolonged inflammatory response where the original assault has not been resolved
  - Progressive change in the type of cells present at the site of inflammation
  - Associated with simultaneous destruction and repair of the tissue involved

Inflammation and chronic disease

There is a strong association between chronic inflammatory conditions and chronic diseases.

Chronic inflammation damages the cells of the brain, heart, arterial walls, and other anatomic structures; this damage leads to various inflammatory chronic diseases.

Type 2 diabetes as an inflammatory disease

Marc Y. Donath and Steven E. Shoelson‡*

Together, these changes suggest that *inflammation participates in the pathogenesis of T2D*.

The NEW ENGLAND JOURNAL of MEDICINE

Atherosclerosis — An Inflammatory Disease

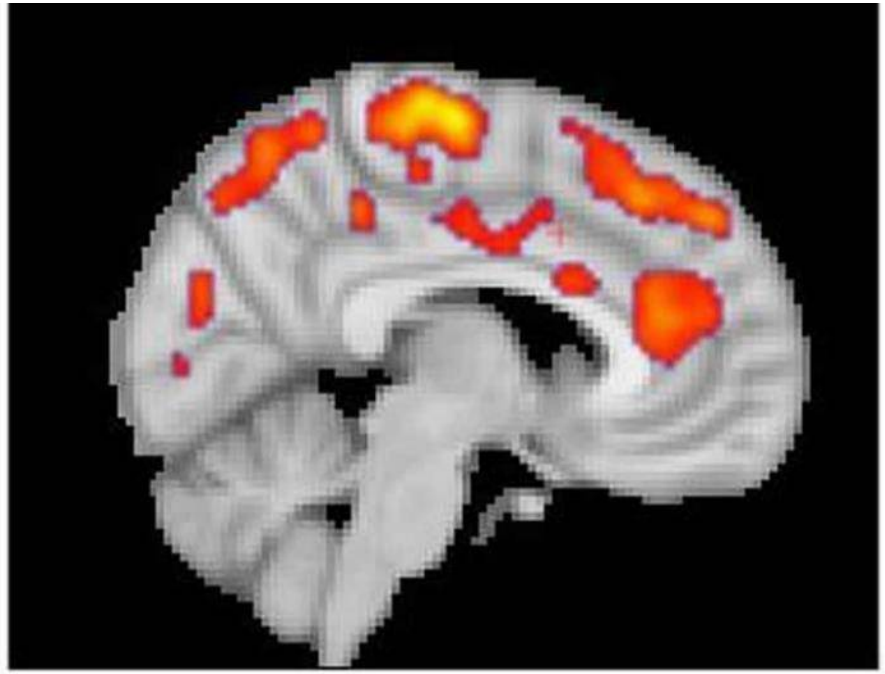
Russell Ross, Ph.D.

‘Atherosclerosis is an inflammatory disease.’

N Engl J Med 1999; 340:115-126

Widespread Inflammation in Brains of Those with Fibromyalgia

NEUROSCIENCE NEWS × SEPTEMBER 27, 2018

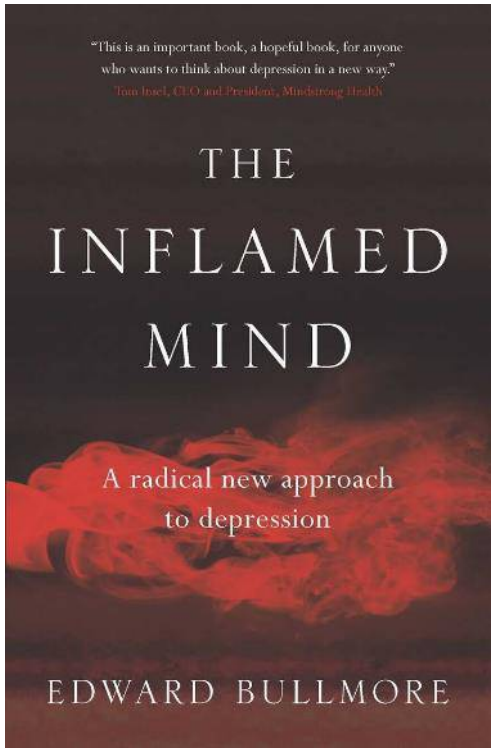


Neuroinflammation in Patients with Chronic Fatigue Syndrome/Myalgic Encephalomyelitis: An ^{11}C-(*R*)-PK11195 PET Study

Yasuhito Nakatomi[1,2], Kei Mizuno[2–4], Akira Ishii[2,3], Yasuhiro Wada[2,3], Masaaki Tanaka[2,3], Shusaku Tazawa[2,3], Kayo Onoe[2], Sanae Fukuda[2,3], Joji Kawabe[5], Kazuhiro Takahashi[2,3], Yosky Kataoka[2,3], Susumu Shiomi[5], Kouzi Yamaguti[3], Masaaki Inaba[1], Hirohiko Kuratsune[3,6,7], and Yasuyoshi Watanabe[2,3]

Our results provide evidence of **neuroinflammation in CFS/ME patients,** as well as evidence of the possible contribution of neuroinflammation to the pathophysiology of CFS/ME.

BMC Medicine



Opinion | Open Access | Open Peer Review

So depression is an inflammatory disease, but where does the inflammation come from?

Michael Berk, Lana J Williams, Felice N Jacka, Adrienne O'Neil, Julie A Pasco, Steven Moylan, Nicholas B Allen, Amanda L Stuart, Amie C Hayley, Michelle L Byrne and Michael Maes

BMC Medicine 2013 11:200

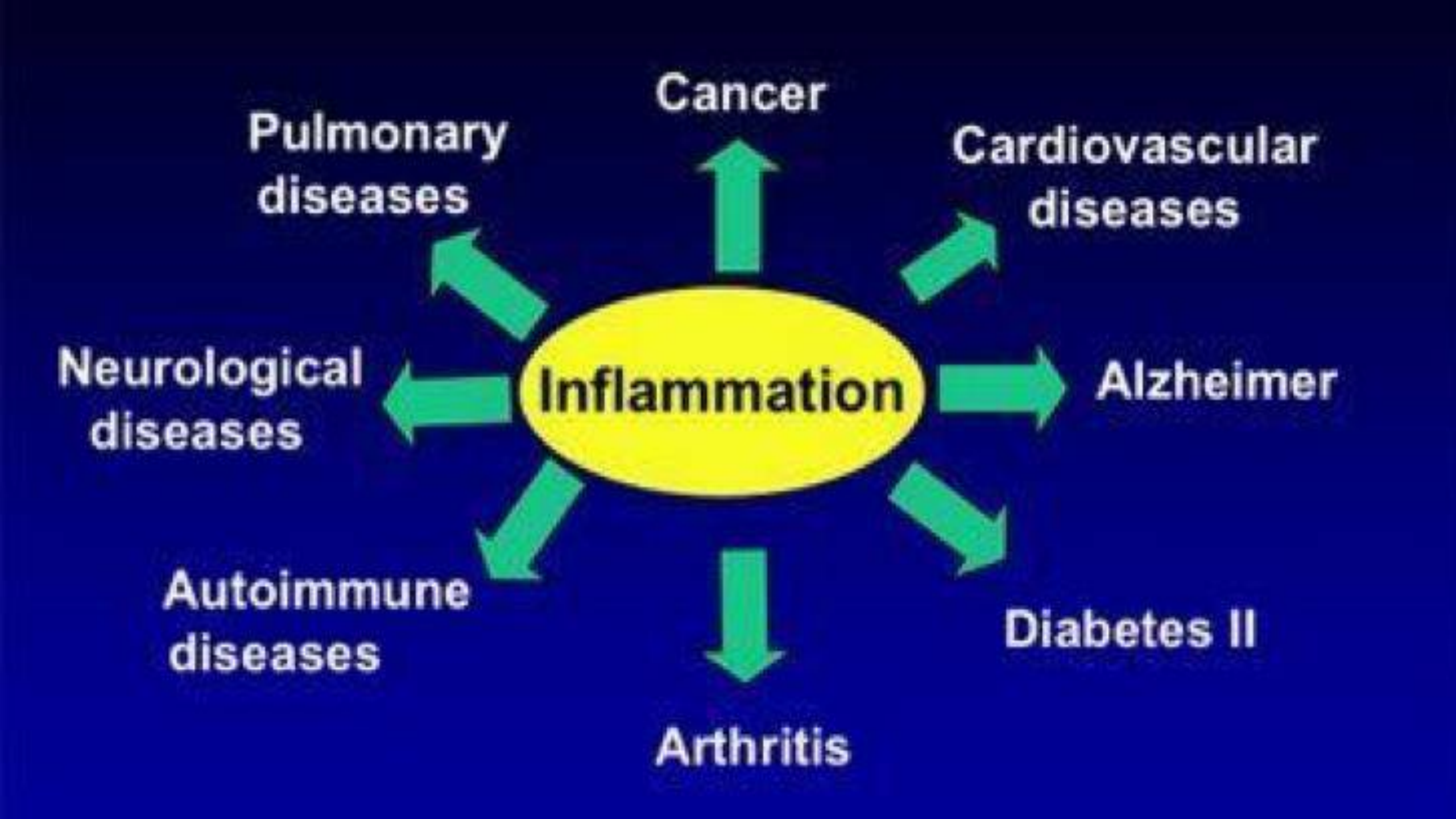
The Inflammatory Potential of the Diet Is Associated with Depressive Symptoms in Different Subgroups of the General Population[1–3]

Moufidath Adjibade,[4]* Valentina A Andreeva,[4] Cédric Lemogne,[5–7] Mathilde Touvier,[4] Nitin Shivappa,[8–10] James R Hébert,[8–10] Michael D Wirth,[8–10] Serge Hercberg,[4,11] Pilar Galan,[4] Chantal Julia,[4,11] Karen E Assmann,[4] and Emmanuelle Kesse-Guyot[4]

Non-communicable chronic diseases (NCDs)

- obesity
- diabetes
- heart disease
- stroke
- cancer
- chronic respiratory diseases
- neurological diseases
- inflammatory bowel disease (IBD)

63% of all deaths worldwide


Cancer
Pulmonary diseases
Cardiovascular diseases
Neurological diseases
Inflammation
Alzheimer
Autoimmune diseases
Diabetes II
Arthritis

What causes inflammation?

- **Poor diet**
  - Sugar
  - Processed foods
  - Vegetable oils
- **Visceral obesity**
- **Lack of exercise**
- **Poor sleep**
- **Stress**
- **Alcohol**
- **Smoking**
- **Lack of sun**

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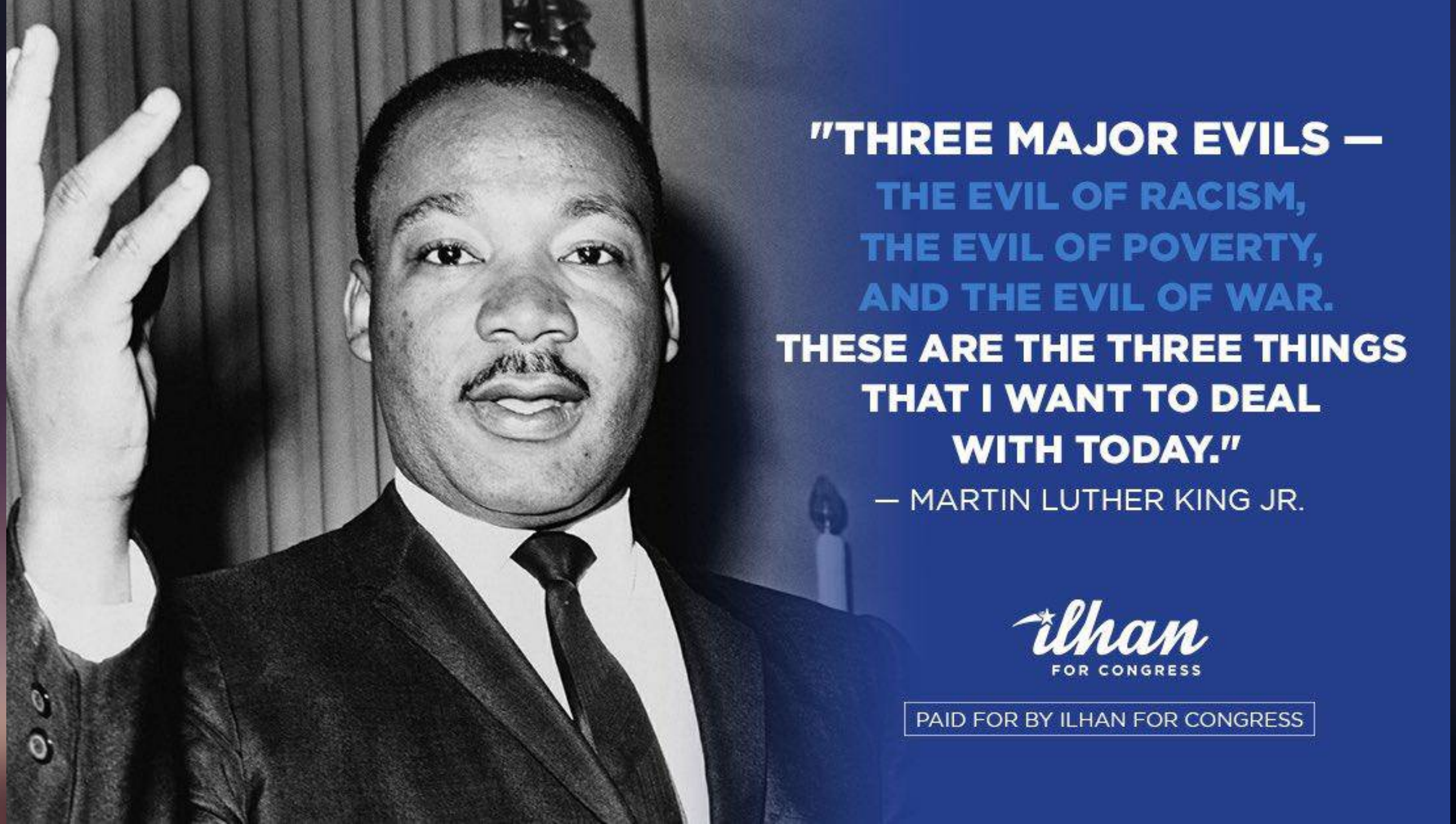
Work spares us from three
evils: boredom, vice, and need.


"THREE MAJOR EVILS —
THE EVIL OF RACISM,
THE EVIL OF POVERTY,
AND THE EVIL OF WAR.
THESE ARE THE THREE THINGS
THAT I WANT TO DEAL
WITH TODAY."
— MARTIN LUTHER KING JR.
ilhan
FOR CONGRESS
PAID FOR BY ILHAN FOR CONGRESS

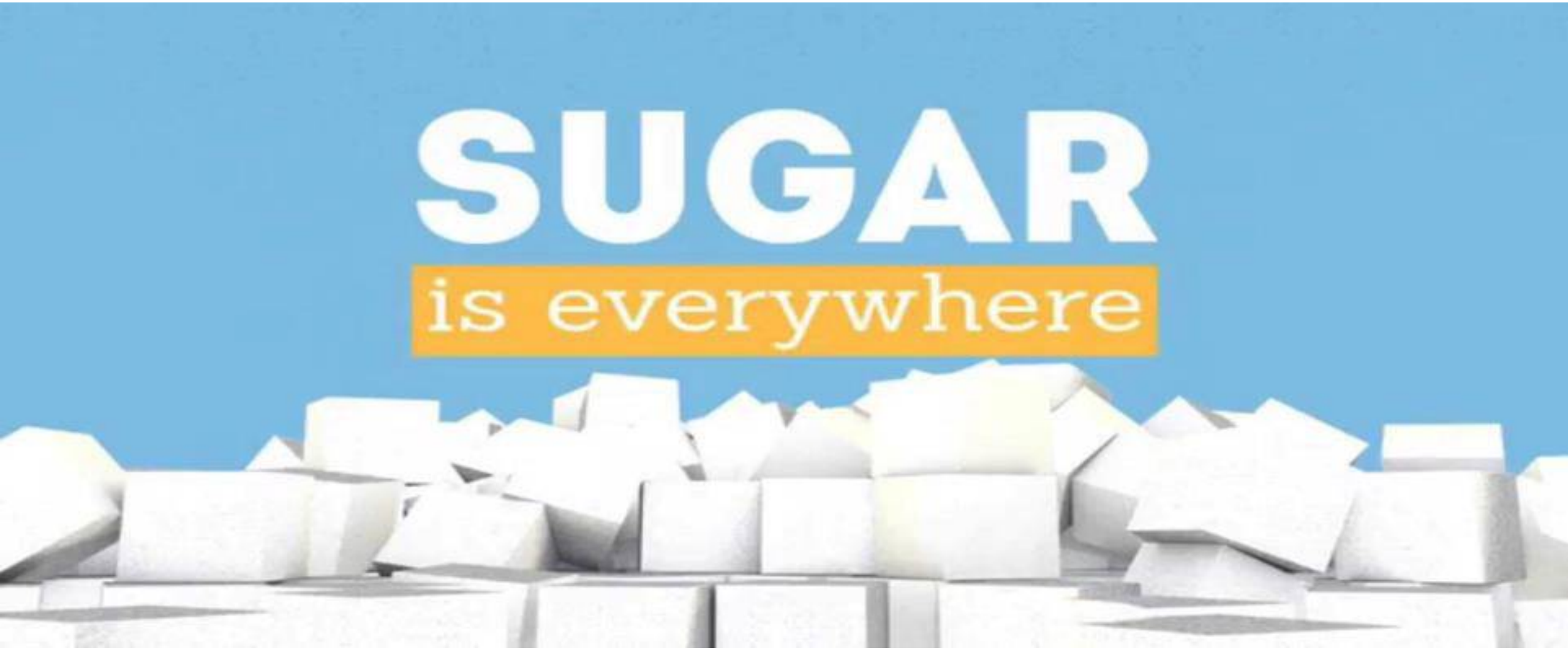
Processed foods

1. Sugar
2. Vegetable oils
3. Grains

THE THREE EVILS

1.SUGAR

We are in the midst of a **SUGARDEMIC**


SUGAR
is everywhere

The shocking truth about how much sugar you're eating

JULY 3, 2015 9:10AM

You probably should stay clear of these considering we're only allowed 6 teaspoons of sugar a day.

RIGHT NOW IN LIFEST

25 READERS Vegan restaurant Cafe G slammed for 'harvesting a

10 READERS How Instagram helped m disorder


SUGAR OVERLOAD
22tsp
BOOST JUICE BLUEBERRY BLAST LOW FAT SMOOTHIE
610ML
19tsp
MOUNTAIN DEW
600ML
16tsp
COCA COLA
600ML
13tsp
RED BULL
473ML
8.5tsp
POWERADE ISOTONIC MOUNTAIN BLAST
600ML
7tsp
GOLDEN CIRCLE SUNSHINE PUNCH JUICE DRINK
250ML
6.5tsp
LIPTON PEACH ICE TEA
500ML
5tsp
JUST JUICE APPLE
200ML
1tsp of sugar = 4g
Teaspoons per serve rounded to the nearest half teaspoon

"I DON'T EAT MUCH SUGAR"

@MAXLUGAVERE

Jam
1 tbsp = 12g sugar

Yogurt
1 cup = 17g sugar

Sweet tea
8 oz = 22g sugar

Soup
1 can = 10g sugar

Cereal
1 cup = 16g sugar

Nut butter
2 tbsp = 4g sugar

Ketchup
2 tbsp = 8g sugar

Pasta sauce
1/2 cup = 9g sugar

Instant oatmeal
1 cup = 15g sugar

Salad dressing
2 tbsp = 7g sugar

Packaged fruit
1/2 cup = 21g sugar

Coffee drinks
8 oz = 12-25g sugar

Note: Every brand/variety is different. Always check labels!

THE 56 NAMES OF

SUGAR

Q. How many teaspoons of sugar in this 930 ml bottle of Masterfoods Barbeque sauce

A. 125 tsp = 497gm

SUGAR MAKES YOU

HUNGRY

CARBOHYDRATE MAKES YOU

FAT

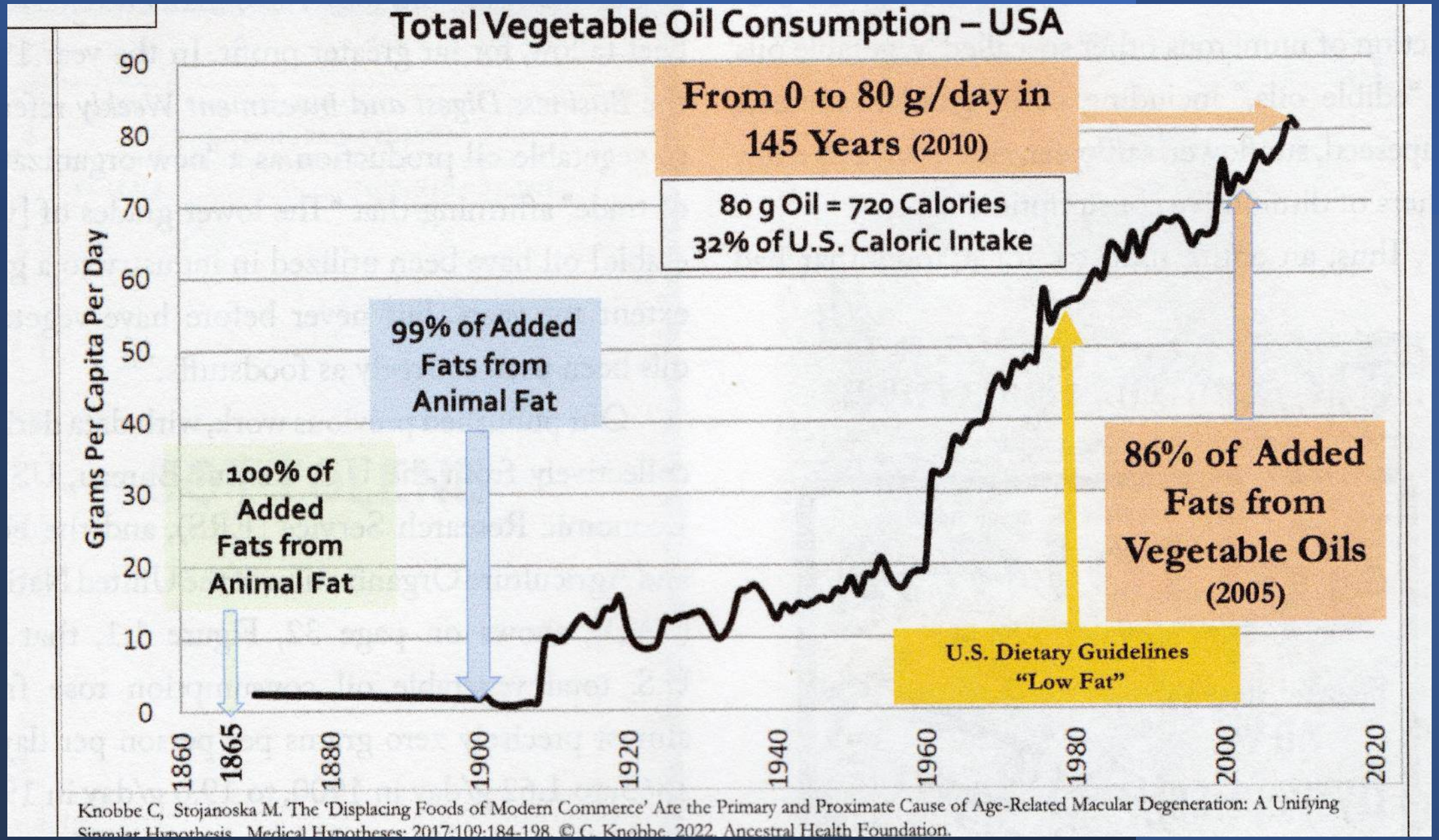
POLYUNSATURATED OILS MAKE YOU

INFLAMED & SICK

2. Vegetable oils

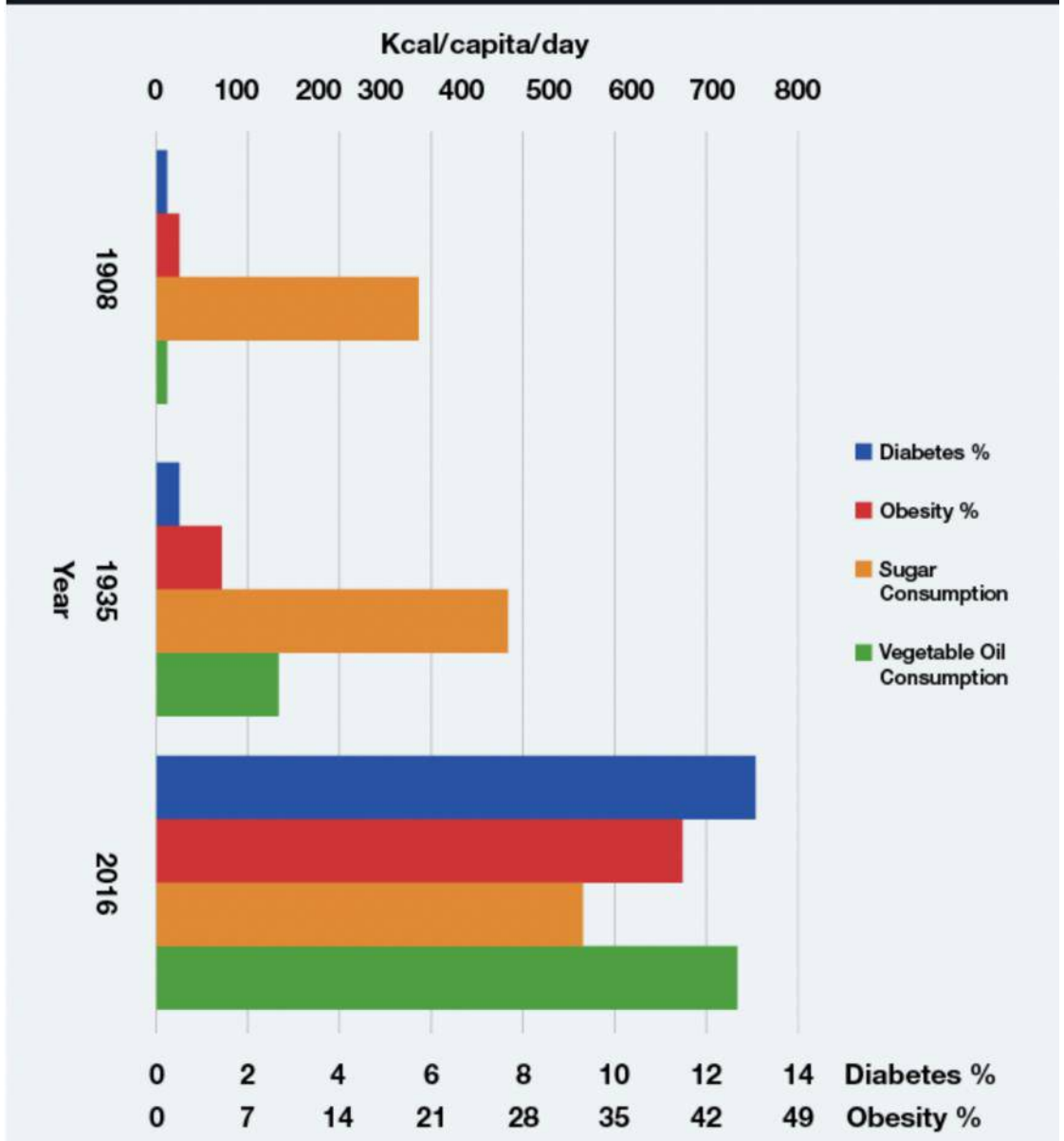
Omega-6 and Omega-3 PUFAs

- A **balance** existed between omega-6 and omega-3 fatty acids during the long evolutionary history of the genus Homo
- During evolution, **omega-3 fatty acids were found in all foods** consumed: particularly meat, fish, wild plants, nuts and berries
- **Modern agriculture**, by changing animal feeds as a result of its emphasis on production, has **decreased the omega-3 fatty** acid content in many foods: animal meats, eggs, and even fish
- **Omega-6:Omega-3 ratio used to be 1:1, now 20:1**

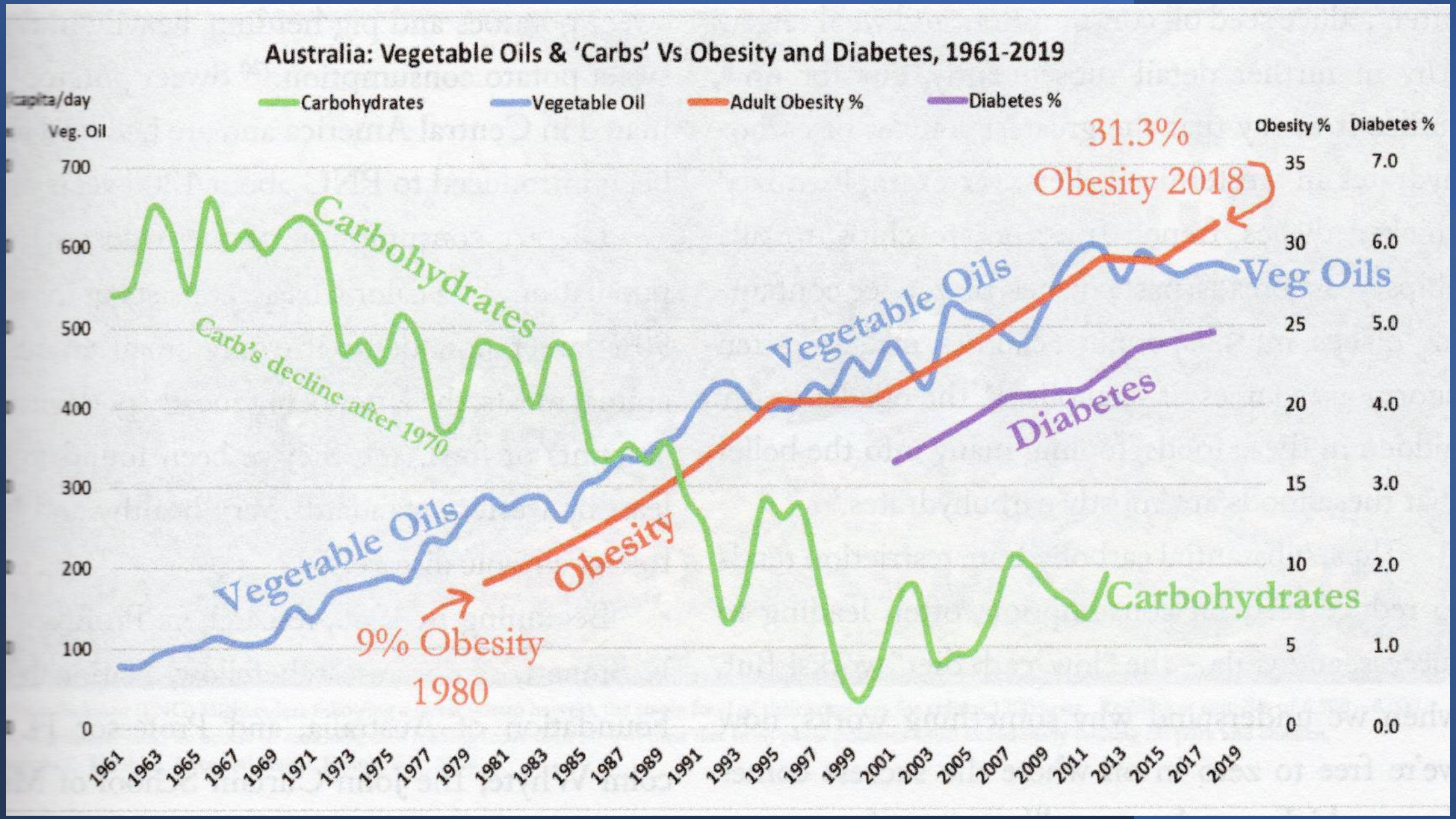


Knobbe C, Stojanoska M. The 'Displacing Foods of Modern Commerce' Are the Primary and Proximate Cause of Age-Related Macular Degeneration: A Unifying Singular Hypothesis. Medical Hypotheses: 2017;109:184-198.

U.S. SEED OILS AND SUGAR VS DIABETES AND OBESITY. 1908 - 2016



U.S. seed oil and sugar consumption vs diabetes and obesity prevalence, 1908-2016. References: 1) Vegetable Oil Data: KNobbe, Stojanoska. Medical Hypotheses: 2017;109:184-198 2) Sugar Data: Guyenet, Landen. *The Hungry Brain*. New York, Flatiron Books, 2017 3) Obesity statistics, see references herein. 4) Diabetes statistics, see references herein.


Australia: Vegetable Oils & 'Carbs' Vs Obesity and Diabetes, 1961-2019
capita/day
Veg. Oil
Carbohydrates
Vegetable Oil
Adult Obesity %
Diabetes %
Obesity %
Diabetes %
31.3%
Obesity 2018
Carbohydrates
Carb's decline after 1970
Vegetable Oils
Veg Oils
Diabetes
Vegetable Oils
Obesity
9% Obesity
1980
Carbohydrates
700
600
500
400
300
200
100
0
35
30
25
20
15
10
5
0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
1961
1963
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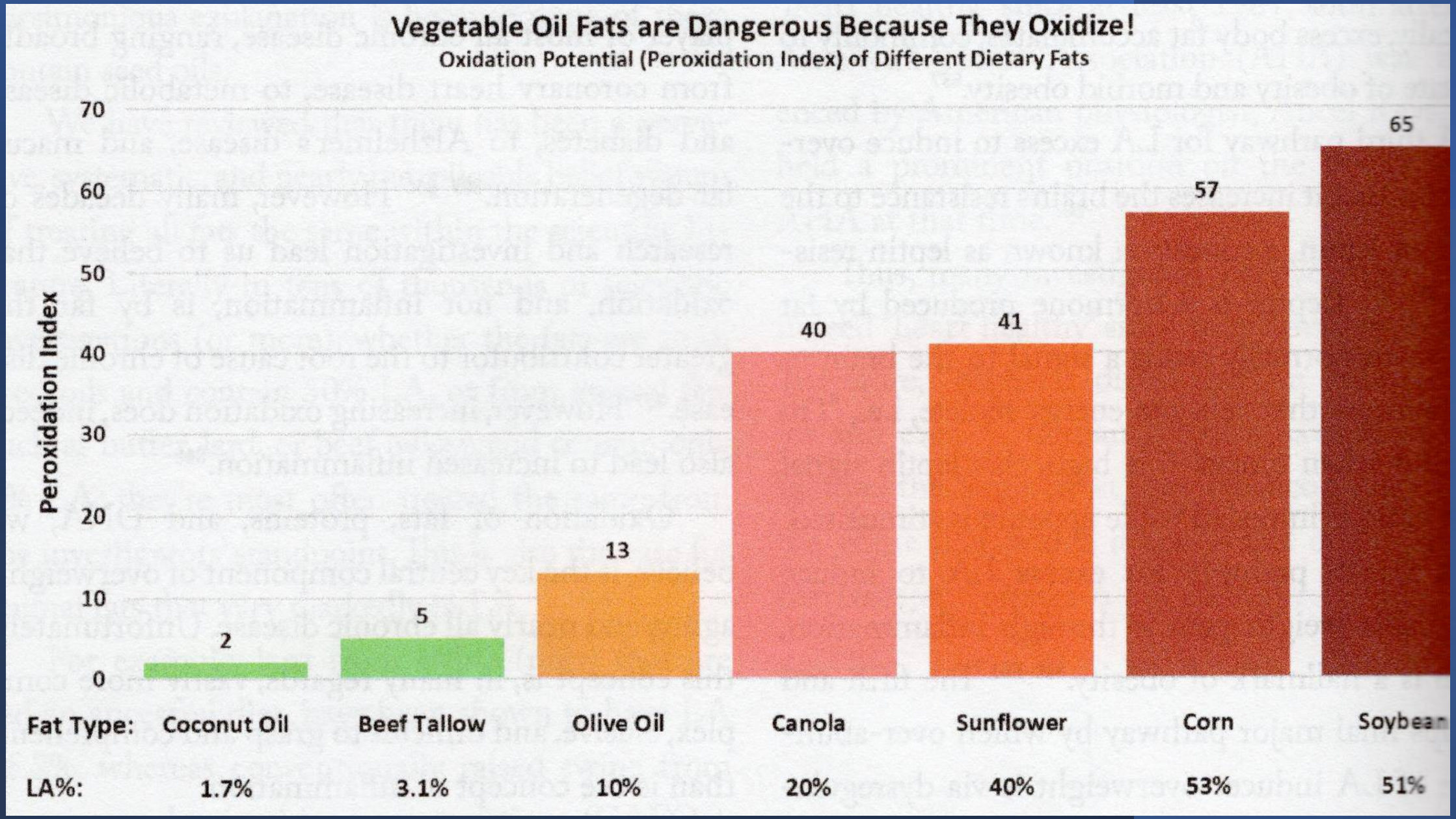

Vegetable Oil Fats are Dangerous Because They Oxidize!
Oxidation Potential (Peroxidation Index) of Different Dietary Fats
Peroxidation Index
70
60
50
40
30
20
10
0
2
5
13
40
41
57
65
Fat Type: Coconut Oil Beef Tallow Olive Oil Canola Sunflower Corn Soybean
LA%: 1.7% 3.1% 10% 20% 40% 53% 51%

COOKING FATS

WHAT PEOPLE THINK IS GOOD

- CORN OIL
- SUNFLOWER OIL
- SAFFLOWER OIL
- CANOLA OIL
- PEANUT OIL
- GRAPESEED OIL
- SESAME OIL
- WALNUT OIL

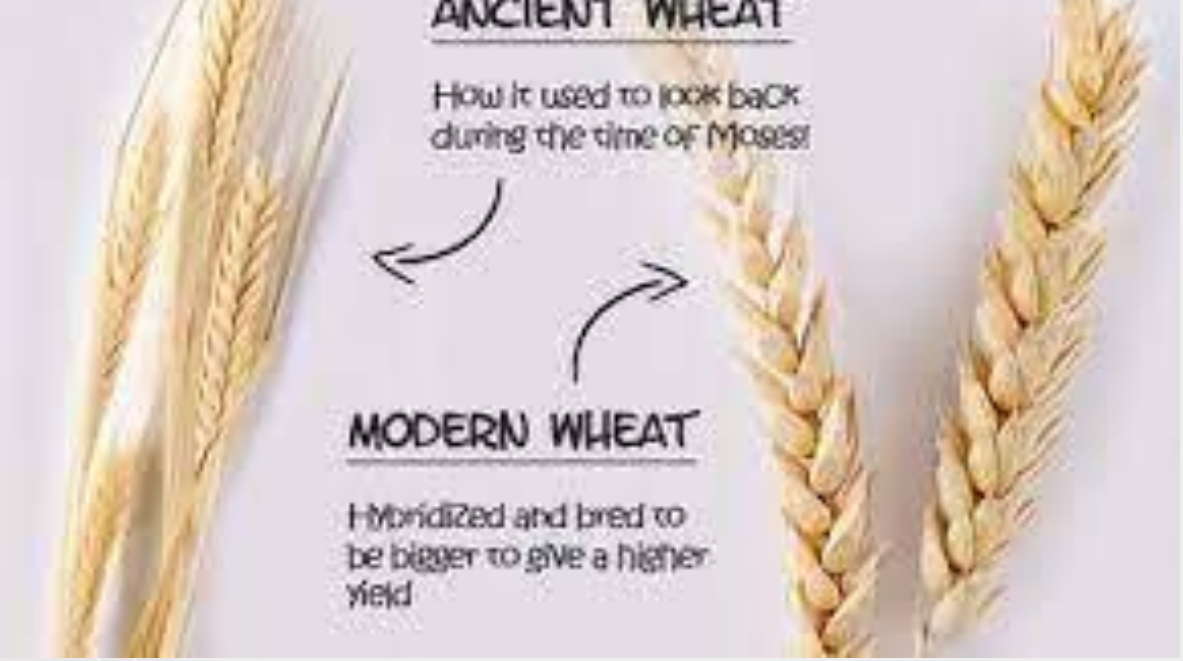
@DRJAMESDINIC

WHAT REALLY IS GOOD

- EXTRA VIRGIN OLIVE OIL
- GHEE
- TALLOW
- LARD
- COCONUT OIL
- AVOCADO OIL
- BUTTER

@SIIMLAND

3. Grains


ANCIENT WHEAT
How it used to look back during the time of Moses!
MODERN WHEAT
Hybridized and bred to be bigger to give a higher yield


Modern Wheat vs. Ancient Wheat

Wheat

Modern bread wheat (Triticum Aestivum) is a hexaploid species containing three distinct sets of chromosomes capable of producing well over 23,000 unique proteins

The best known is **gluten**

Another important wheat lectin is **WGA** – wheat germ agglutinin

Processed foods

1. Sugar
2. Vegetable oils
3. Grains

Ultraprocessed foods

Examples include:

- processed meat such as sausages and hamburgers
- breakfast cereals or cereal bars
- instant soups
- sugary fizzy drinks
- chicken nuggets
- cake
- chocolate
- ice cream
- mass-produced bread
- many "ready to heat" meals such as pies and pizza

Ultraprocessed Foods

3 Common Types

Sugary Foods


pastries


candy


cakes

Sugary Drinks


soda

energy drinks

fruit drinks

Starchy Food


bread

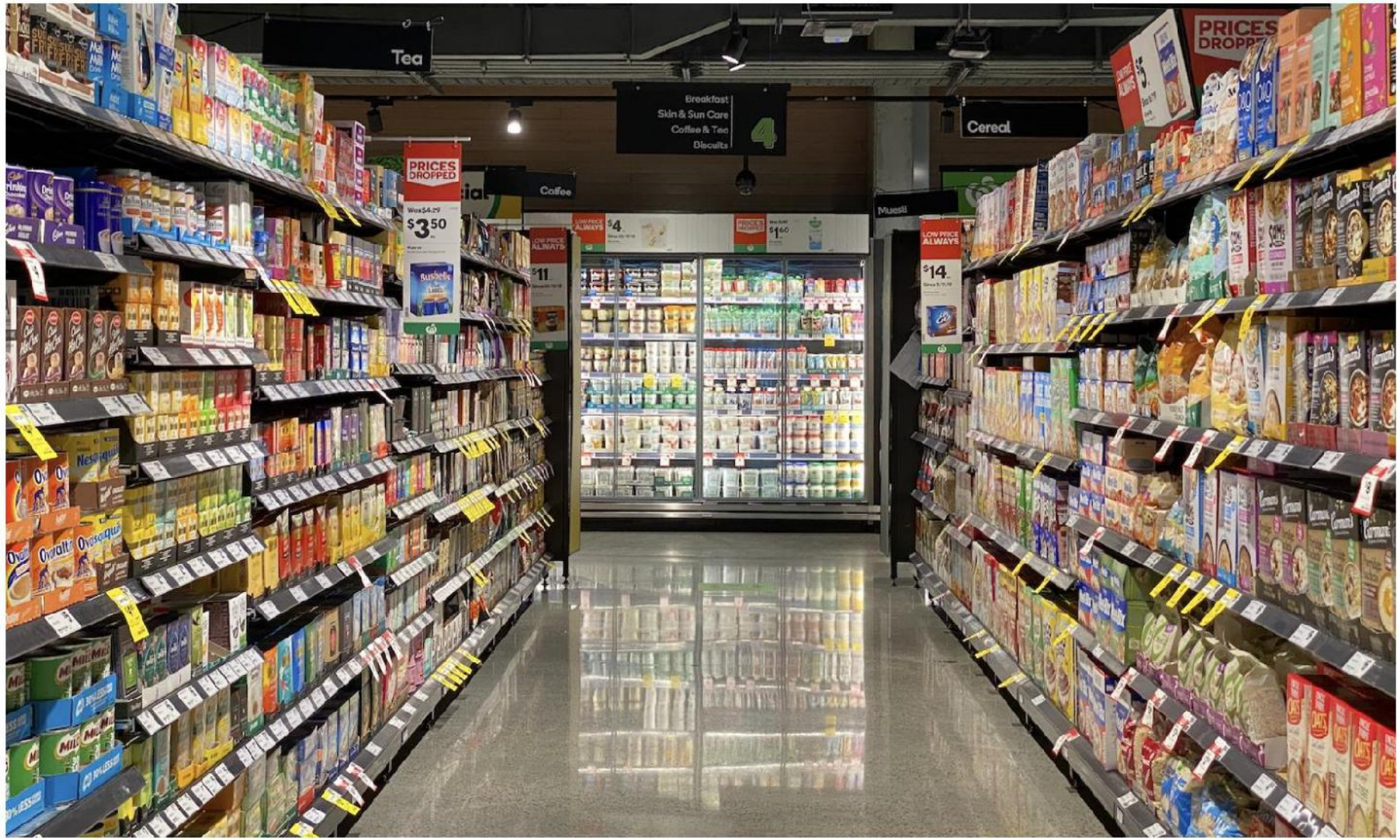

pasta


cereal

Clearvue Health

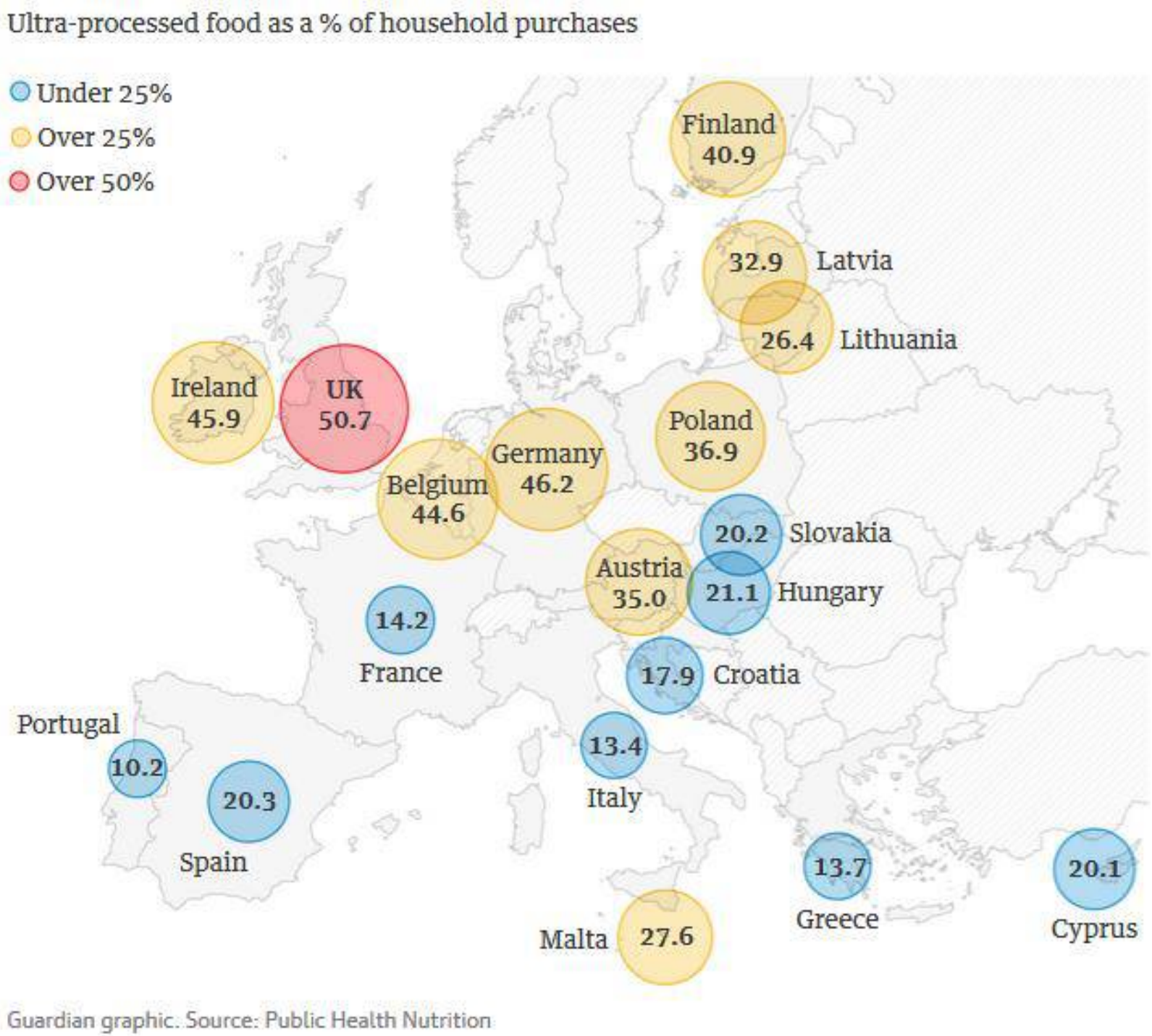
JAMA Internal Medicine

Database Indicates U.S. Food Supply Is 73 Percent Ultra-Processed



Australia 42%

USA 73%



NEWSWEEK MAGAZINE

Americans Are Addicted to 'Ultra-Processed' Foods, and It's Killing Us

BY **ADAM PIORE** ON 12/08/21 AT 5:00 AM EST

What causes inflammation?

- **Poor diet**
  - Sugar
  - Processed foods
  - Vegetable oils
- **Visceral obesity**
- **Lack of exercise**
- **Poor sleep**
- **Stress**
- **Alcohol**
- **Smoking**
- **Lack of sun**

Visceral obesity

- Belly fat
- Macrophages
- Produce abnormal cytokines such as leptin, resistin and TNF
- Also produce another cytokine adiponectin – anti-inflam
- As fat increases its capacity to produce adiponectin decreases

Obesity and inflammation

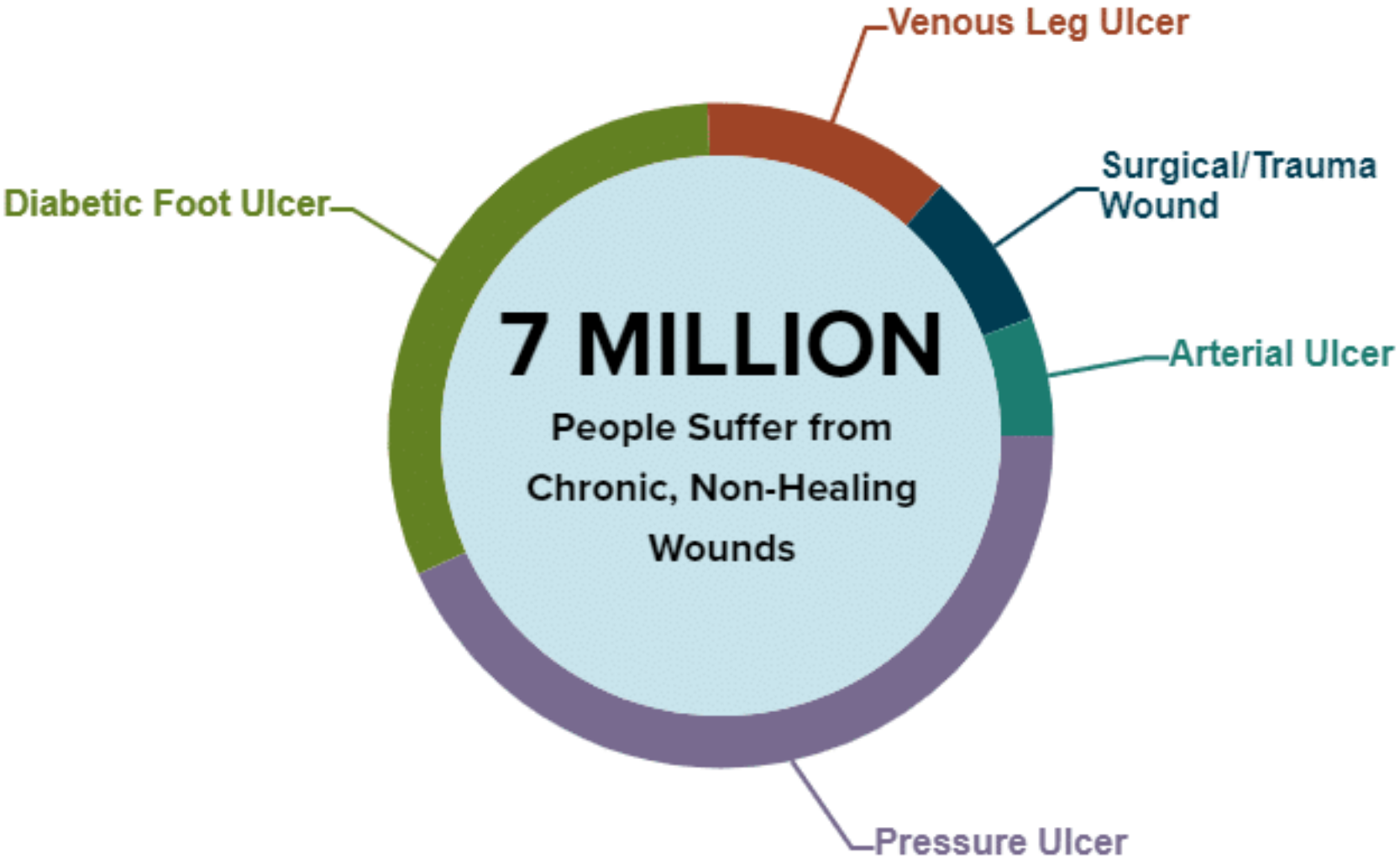
Increased pro-inflammatory

- Leptin, resistin
- Cytokines (TLF, Il-1)
- ROS (hydrogen peroxide)

Reduced anti-inflammatory

- Adinopectin, omentin
- Nitric oxide

Inflammation and wound healing



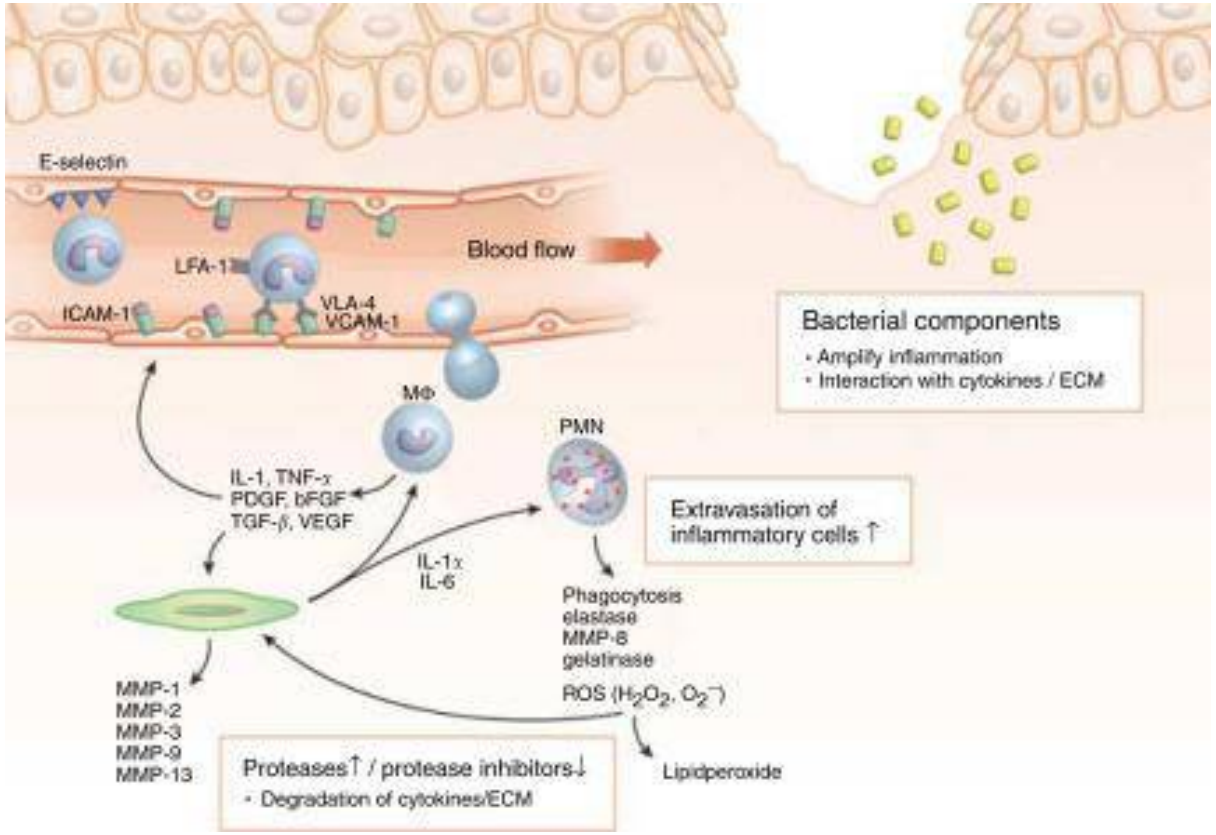
PERSPECTIVE

Inflammation in Wound Repair: Molecular and Cellular Mechanisms

Sabine A. Eming[1], Thomas Krieg[1] and Jeffrey M. Davidson[2,3]

In post-natal life the inflammatory response is an inevitable consequence of tissue injury. Experimental studies established the dogma that inflammation is essential to the establishment of cutaneous homeostasis following injury, and in recent years information about specific subsets of inflammatory cell lineages and the cytokine network orchestrating inflammation associated with tissue repair has increased. Recently, this dogma has been challenged, and reports have raised questions on the validity of the essential prerequisite of inflammation for efficient tissue repair. Indeed, in experimental models of repair, inflammation has been shown to delay healing and to result in increased scarring. Furthermore, chronic inflammation, a hallmark of the non-healing wound, predisposes tissue to cancer development. Thus, a more detailed understanding in mechanisms controlling the inflammatory response during repair and how inflammation directs the outcome of the healing process will serve as a significant milestone in the therapy of pathological tissue repair. In this paper, we review cellular and molecular mechanisms controlling inflammation in cutaneous tissue repair and provide a rationale for targeting the inflammatory phase in order to modulate the outcome of the healing response.

Journal of Investigative Dermatology (2007) **127**, 514–525. doi:10.1038/sj.jid.5700701



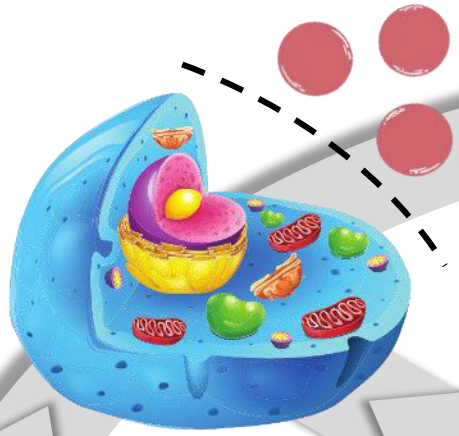
Chronic wounds fail to progress through the normal pattern of wound repair,
but instead remain in a state of chronic inflammation predominantly characterized
by abundant PMN and MF infiltration.
Persisting inflammatory cells play a major role in the generation of proinflammatory
cytokines (IL-1, TNF-a, and IL- 6) and a protease rich and pro-oxidant hostile microenvironment.

Chronic disease

Why?

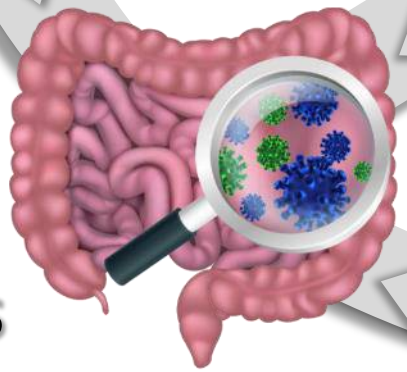
- Insulin resistance
- Inflammation
- Gut dysbiosis
- Mitochondrial dysfunction

Insulin Resistance

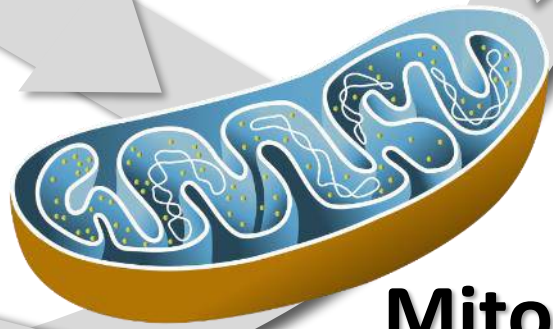


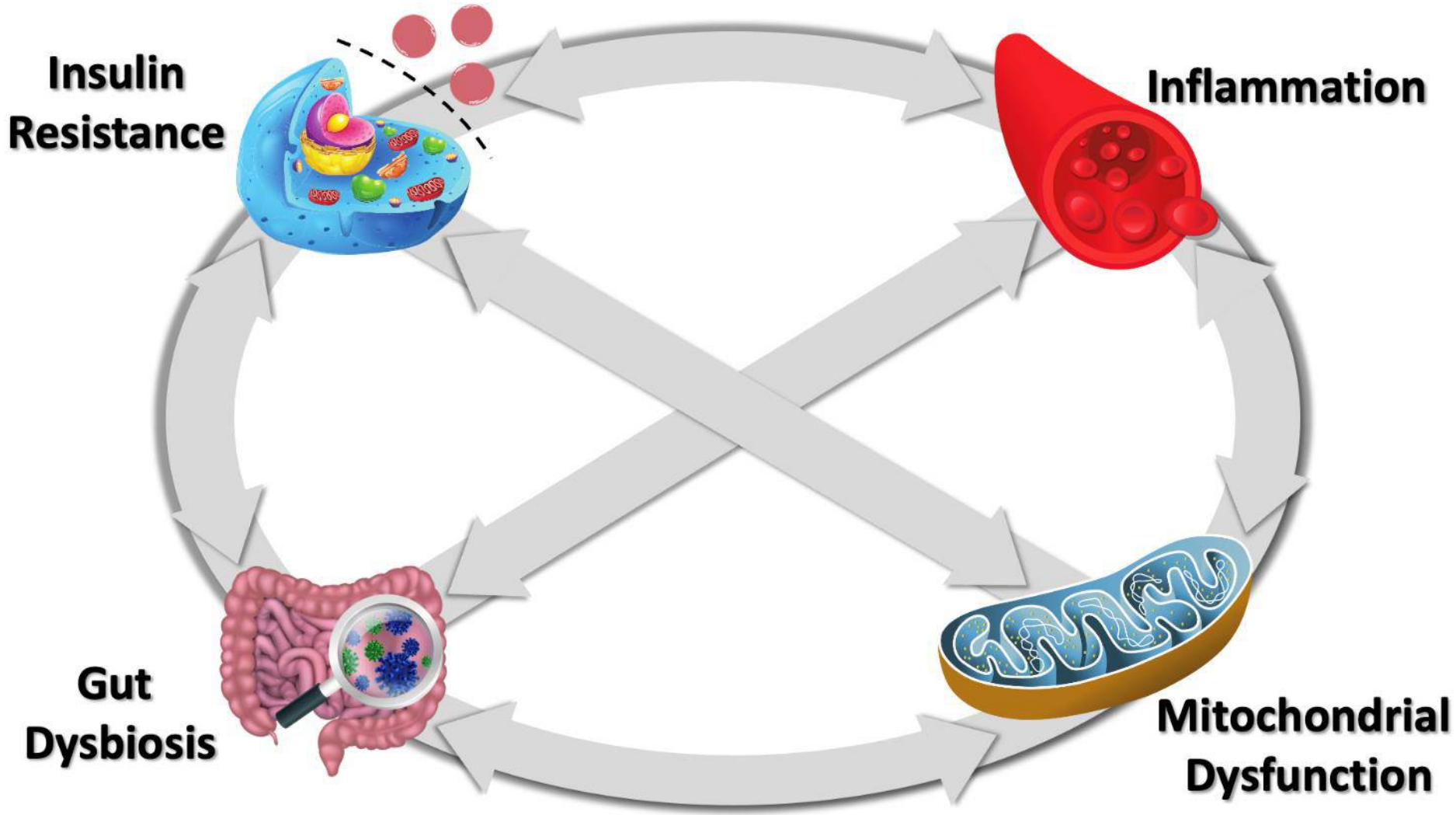
Inflammation

Gut Dysbiosis



Mitochondrial Dysfunction





Low carb/ketogenic diet

Low Carb and Chronic Disease

1. Obesity
2. Diabetes, metabolic syndrome, insulin resistance
3. Atherosclerosis, hypertension, heart failure
4. GI – NAFLD, GERD, inflam bowel disease
5. Renal – chronic kidney disease
6. Endocrine – PCOS
7. Cancer
8. Epilepsy
9. Neurodegenerative – Alzheimers, Parkinsons
10. Multiple sclerosis
11. Mental illness – autism, bipolar, schizophrenia, anxiety, depression
12. **POOR WOUND HEALING**

@DrPeterBrukner

www.sugarbyhalf.com

www.defeatdiabetes.com.au