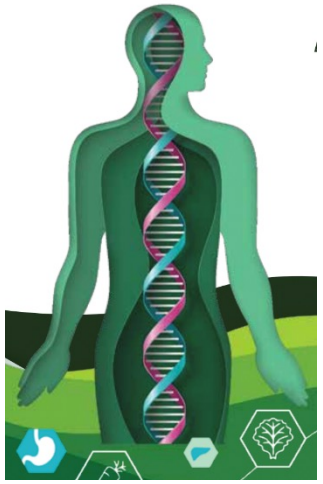
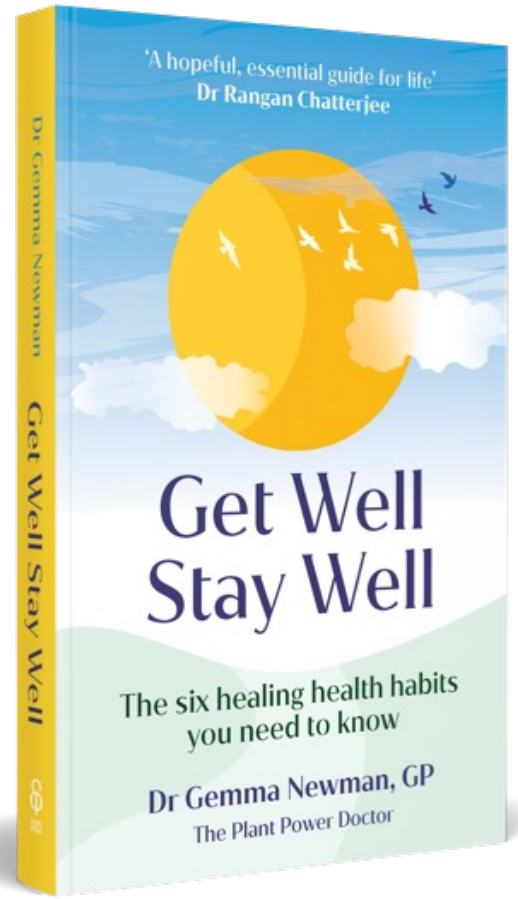
Is a plant-based diet the key to true diabetes reversal?

Dr Gemma Newman MBBCH DRCOG DFSRH MRCGP
NHS General Practitioner and Author



About Me

- GP with specialist interest in O+G, Family Planning, Lifestyle Medicine, psychology and nutrition.
- www.gemmanewman.com
- Conflicts of Interest:
- Written 'The Plant Power Doctor' in 2021, and my new book is released next month, called 'Get Well, Stay Well'.
- Honorariums for presentations and academic work. Paid contributor to The Happy Mind, Happy Skin and Menopause Courses by The Happy Pear. Previous advisory work for brands including Holland and Barratt, Blue Green Health, Phynova, Cannabotech and Eimele.



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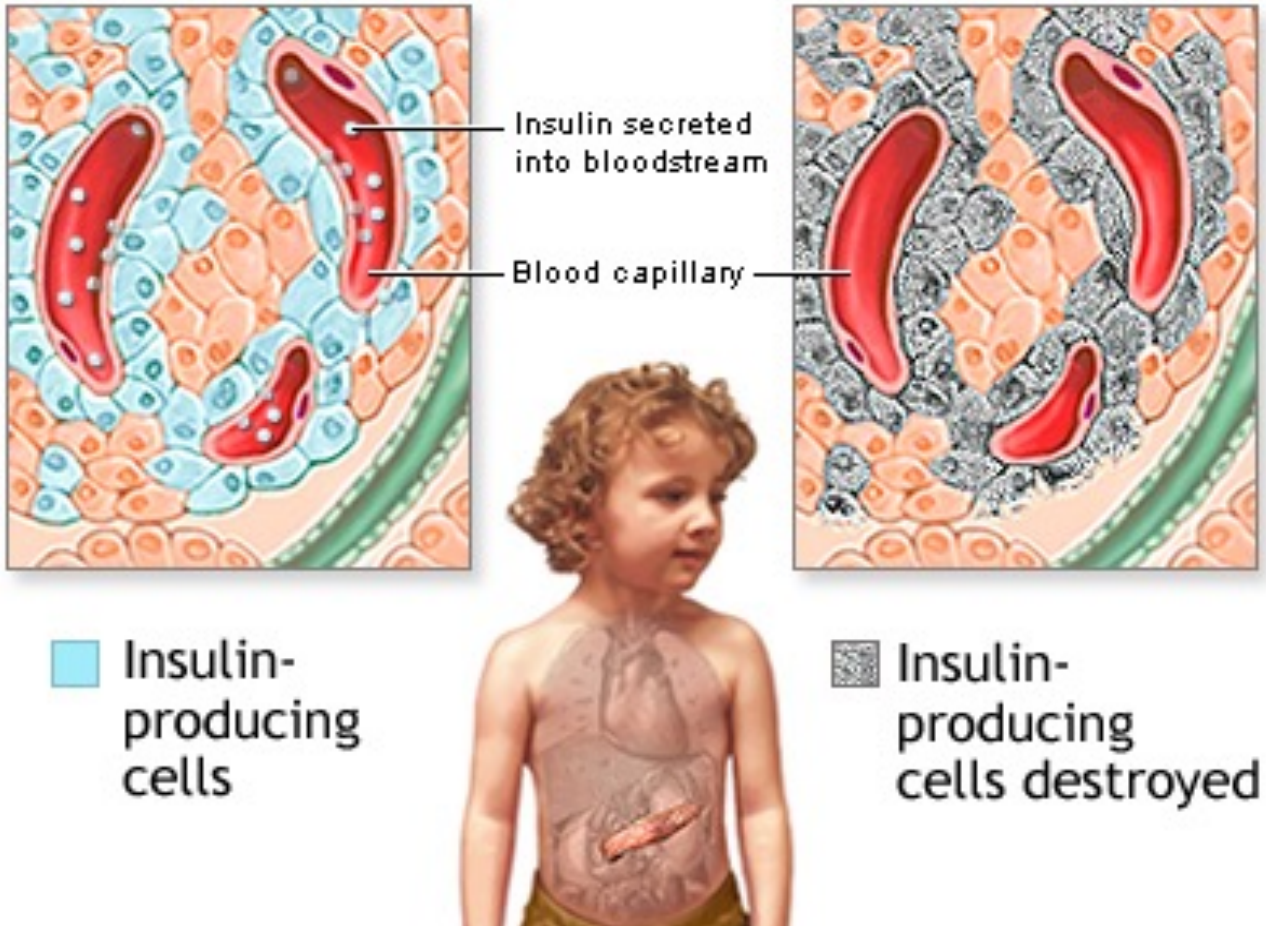
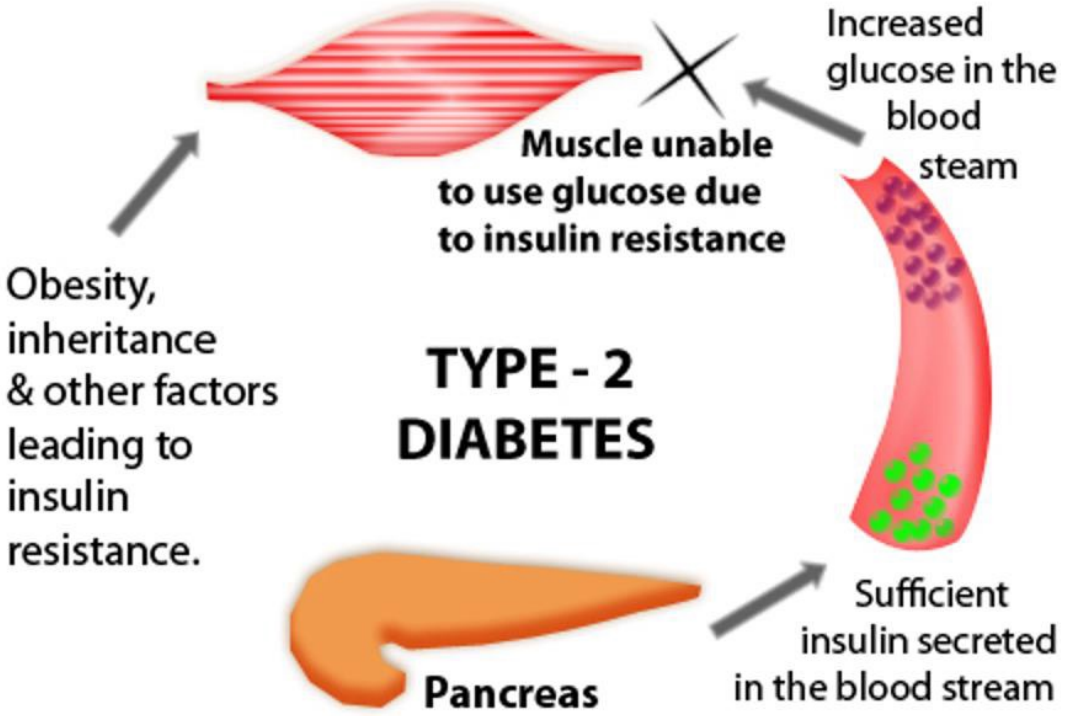
Type 1 Diabetes



Type 2 Diabetes



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Type 1.5 Diabetes?

- AKA Latent Autoimmune Diabetes in Adults (LADA).
- It is a form of type 1 diabetes that is diagnosed during adulthood (>30yrs) as are most cases of type 2 diabetes. Like Type 2, Type 1.5 diabetes also has a slow onset

- However, Type 1.5 diabetes is an autoimmune disease like type 1 diabetes and will almost certainly require insulin therapy at some point in the future.
- Around 15-20% of people diagnosed with type 2 diabetes may actually have Type 1.5 diabetes.

- Medications designed to reduce insulin resistance do not work, as people with type 1.5 have little or no resistance to insulin.
- Some oral medications may be effective at first, meaning misdiagnosis takes longer to establish.
- Amongst those with type 1.5 diabetes, insulin is required on average within four years.
- People with type 1.5 diabetes often do not have standard type 2 diabetes symptoms, including metabolic syndrome.

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Autoimmune triggers in susceptible individuals?

Cow's Milk Protein

- Nutr Diabetes. 2017 May; 7(5): e274. A1 beta-casein milk protein and other environmental pre-disposing factors for type 1 diabetes J S J Chia,[1,8] J L McRae et al
- Clin Exp Immunol. 2011 Apr; 164(1): 42–49. doi: 10.1111/j.1365-2249.2011.04324.x Insulin autoantibodies with high affinity to the bovine milk protein alpha casein K Adler,[*] D B Mueller,[*]
- Removal of Bovine Insulin From Cow's Milk Formula and Early Initiation of Beta-Cell Autoimmunity in the FINDIA Pilot Study. *Arch Pediatr Adolesc Med.* 2012;166(7):608-614. doi:10.1001/archpediatrics.2011.1559 Outo Vaarala MD, Jorma Ilonen MD et al

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Diabetes.org.uk

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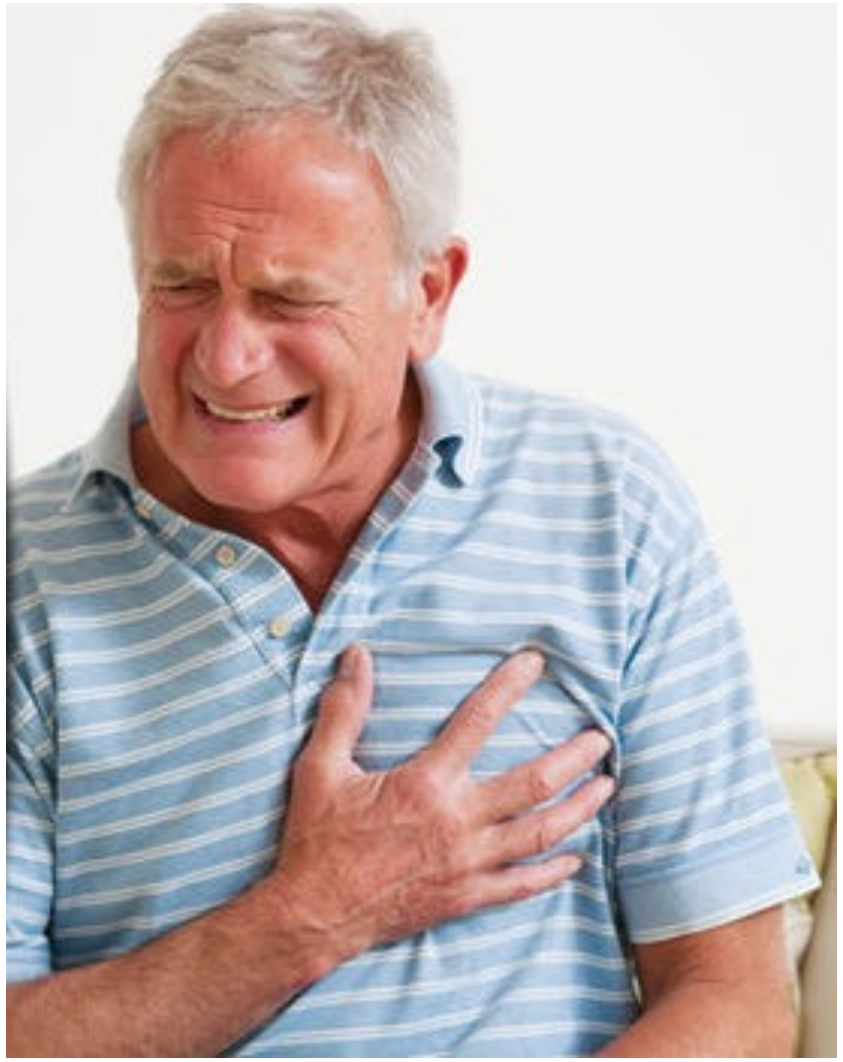

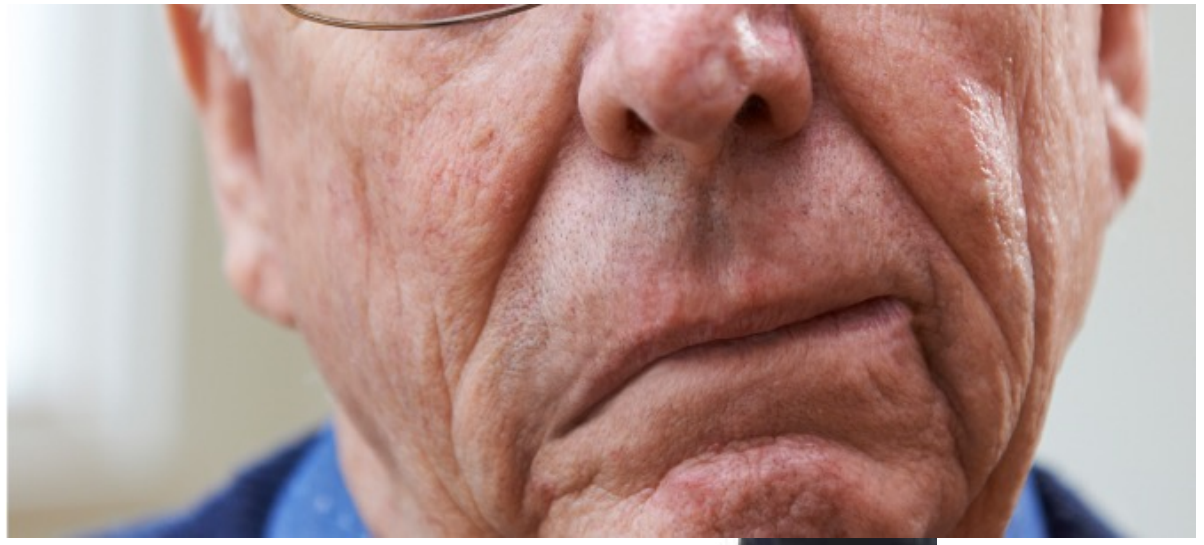

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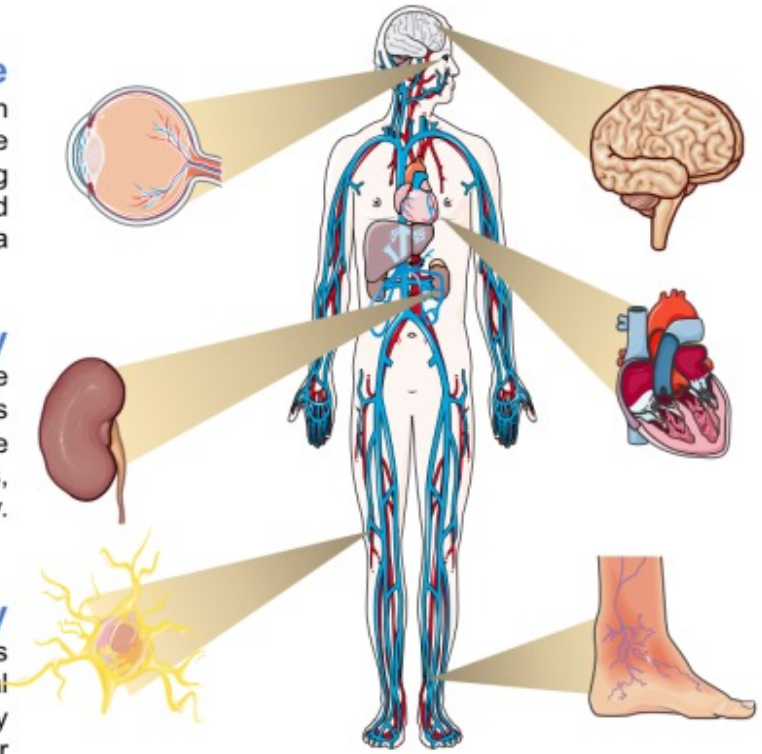
Major Complications of Diabetes

Microvascular

Eye
High blood glucose and high blood pressure can damage eye blood vessels, causing retinopathy, cataracts and glaucoma

Kidney
High blood pressure damages small blood vessels and excess blood glucose overworks the kidneys, resulting in nephropathy.

Neuropathy
Hyperglycemia damages nerves in the peripheral nervous system. This may result in pain and/or numbness. Feet wounds may go undetected, get infected and lead to gangrene.



Macrovascular

Brain
Increased risk of stroke and cerebrovascular disease, including transient ischemic attack, cognitive impairment, etc.

Heart
High blood pressure and insulin resistance increase risk of coronary heart disease

Extremities
Peripheral vascular disease results from narrowing of blood vessels increasing the risk for reduced or lack of blood flow in legs. Feet wounds are likely to heal slowly contributing to g complications.

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You may hear these comments…

- ‘I can’t eat carbs because I have diabetes’
- ‘Fruit is bad for me because I’m diabetic’
- ‘This is genetic and there’s nothing I can do about it’
- ‘I just need willpower to eat less junk’
- ‘I need more protein from chicken and fish to fill me up’
- ‘I’ve heard keto can reverse diabetes’

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Aims of this lecture

- To help unpick the underlying causes of diabetes
- To apply the evidence base to this understanding in terms of nutrition
- To boost your confidence in beginning to guide someone through the process of understanding disease pathogenesis

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What do some guidelines say?

ADA

- Fruits and vegetables
- Lean protein foods
- Less added sugar
- No Trans Fat
- Emphasise plant proteins
- Twice weekly fish
- Skinless Chicken

Diabetes.org

- Eat healthier carbohydrates
- Eat less salt
- Eat less red and processed meat
- Eat more fruit and veg
- Choose healthier fats
- Cut down added sugar
- Smart snacks
- Sensible alcohol consumption
- Vitamins and minerals from food not supplements
- Keep moving

ADA=American Diabetes Association

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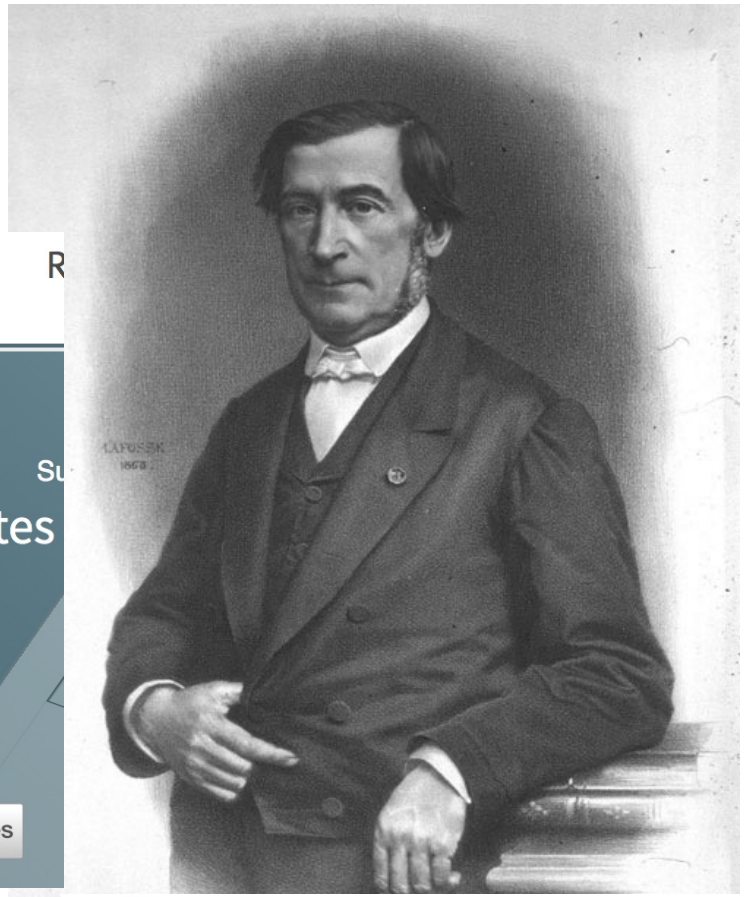
How to control Diabetes? Method 1: Caloric Restriction



THE LANCET

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ARTICLES | VOLUME 391, ISSUE 10120, P541-551, FEBRUARY 10, 2018

Purchase Su

Primary care-led weight management for remission of type 2 diabetes (DiRECT): an open-label, cluster-randomised trial

Prof Michael EJ Lean, MD • Wilma S Leslie, PhD • Alison C Barnes, PGDip • Naomi Brosnahan, PGDip • George Thom, MSc • Louise McCombie, BSc • et al. Show all authors •

Published: December 05, 2017 • DOI: https://doi.org/10.1016/S0140-6736(17)33102-1 • Check for updates

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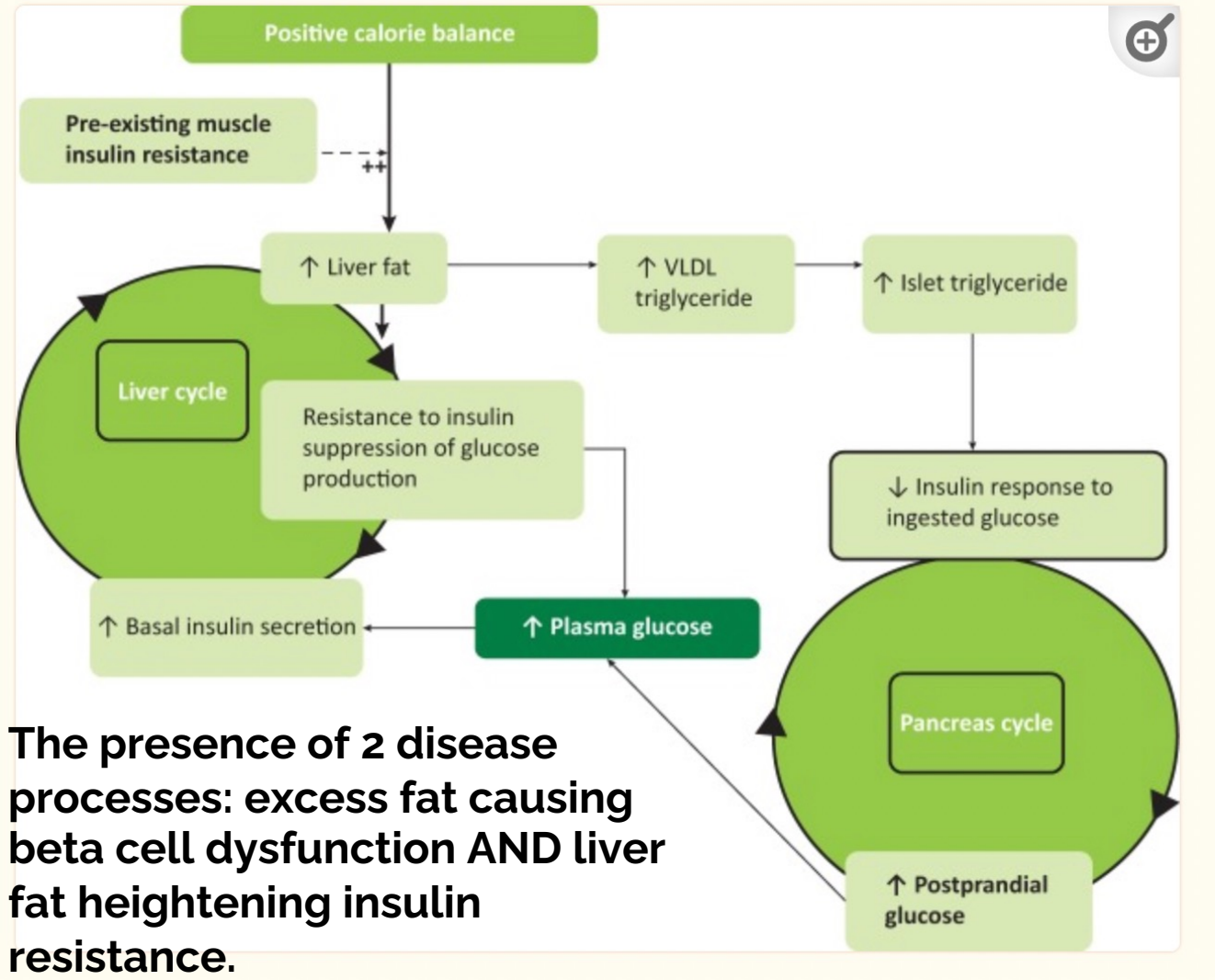
Lean MEJ, Leslie W et al Primary care-led weight management for remission of type 2 diabetes (DiRECT): an open-label, cluster-randomised trial
The Lancet December 05, 2017

Twin-Cycle Hypothesis



The presence of 2 disease processes: excess fat causing beta cell dysfunction AND liver fat heightening insulin resistance.

Very low-calorie diets (VLCDs)

- Provide <800 kcal (3,300 kJ) per day.
- Require use of meal replacement products for most, if not all meals.

Breakfast
175 kcal
Protein: 17.5 g
Dietary fibre: 0.3 g

Lunch
230 kcal
Protein: 18.8 g
Dietary fibre: <0.1 g

Dinner
220 kcal
Protein: 17.7 g
Dietary fibre: 0.9 g

+ 2 cups green veg
20 kcal
Protein 1.7 g
Dietary fibre: 2.2 g

At least 2 litres / day

645 kcal

Protein: 55.7 g

35% total energy
AMDR = 15-25%

Dietary fibre: 3.5 g

AI = 25-30 g/d
SDT = 28-38 g/d

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Very low-calorie diets (VLCDs)

- Not easy for patients to follow.
- Dairy, soy and gluten content of products for those with allergies or intolerances.
- Access and affordability.
- Long-term sustainability is limited; frequently followed by progressive weight gain.
- Side effects: intense hunger, low energy, dry mouth, constipation or diarrhoea, headaches, dizziness, cramps, hair thinning.

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How to Control Diabetes? Method 2: Low Carb Diets

Many short term studies showing benefit to a carbohydrate restricted approach to weight loss and diabetes control.

None last more than 2 years

The benefit is simple – less glucose in the blood stream means less insulin is needed.

With caloric restriction as well, weight loss can be achieved.

[1] A Randomized Trial Comparing a Very Low Carbohydrate Diet and a Calorie-Restricted Low Fat Diet on Body Weight and Cardiovascular Risk Factors in Healthy Women. Brehm et al. http://press.endocrine.org/doi/full/10.1210/jc.2002-021480

[2] A Randomized Trial of a Low-Carbohydrate Diet for Obesity. Foster et al. http://www.nejm.org/doi/full/10.1056/NEJMoa022207

[3] A Low-Carbohydrate as Compared with a Low-Fat Diet in Severe Obesity. Samaha et al. http://www.nejm.org/doi/full/10.1056/NEJMoa022637

[4] Effects of a low-carbohydrate diet on weight loss and cardiovascular risk factor in overweight adolescents. Sondike et al. http://www.sciencedirect.com/science/article/pii/S0022347602402065

[5] The National Cholesterol Education Program Diet vs a Diet Lower in Carbohydrates and Higher in Protein and Monounsaturated Fat A Randomized Trial. Aude et al. http://archinte.jamanetwork.com/article.aspx?articleid=217514

[6] A Low-Carbohydrate, Ketogenic Diet versus a Low-Fat Diet To Treat Obesity and Hyperlipidemia: A Randomized, Controlled Trial. Yancy et al. http://annals.org/article.aspx?articleid=717451

[7] Comparison of energy-restricted very low-carbohydrate and low-fat diets on weight loss and body composition in overweight men and women. Volek et al. http://www.ncbi.nlm.nih.gov/pmc/articles/PMC538279/

Pathogenesis of T2DM and fructose metabolism

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Low-carbohydrate diet

Breakfast
108 kcal
CHO: 1.5 g
Saturated fat: 1.6 g
Dietary fibre: 1.5 g

\+ **low-carb bread**
124 kcal
CHO: 2.5 g
Saturated fat: 0.8 g
Dietary fibre: 5.3 g

Snack
171 kcal
CHO: 1.6 g
Saturated fat: 1.1 g
Dietary fibre: 3.3 g

Snack
204 kcal
CHO: 18.0 g
Saturated fat: 6.1 g
Dietary fibre: 0 g

Lunch
218 kcal
CHO: 0.9 g
Saturated fat: 2.2 g
Dietary fibre: 0.5 g

Snack
480 kcal
CHO: 11.4 g
Saturated fat: 6.8 g
Dietary fibre: 4.8 g

Dinner
277 kcal
CHO: 3.0 g
Saturated fat: 4.3 g
Dietary fibre: 1.2 g

Dessert
216 kcal
CHO: 24.4 g
Saturated fat: 12.7 g
Dietary fibre: 1.8 g

1798 kcal

CHO: 63.1 g

14% total energy
AMDR = 45-65%

Saturated: 35.6 g

18% total energy
SDT = < 10%

Dietary fibre: 18.4 g

AI = 25-30 g/d
SDT = 28-38 g/d

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Low-carbohydrate diet

- Achieving AMDR for protein (<25%) and fat (<35%), particularly SFA (<10%) difficult.
- Impact on bowel function - high fat (GI stimulant), low fibre (constipation, gut microbiota).
- Dichotomous thinking - Blanket decisions around whole group of foods.
- Contraindicated in pregnant or lactating women, children, people with or at risk for eating disorders, people with renal disease, liver failure, pancreatic insufficient and malnourished patients.

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SACN Review 2021

Lower carbohydrate diets for adults with type 2 diabetes

7 Recommendations

7.1 The recommendations are applicable to adults living with T2D and overweight or obesity. There was insufficient evidence to make recommendations for adults living with T2D without overweight or obesity. This report did not assess evidence on the effect of lower carbohydrate diets in the general population without T2D.

7.2 For adults living with T2D and overweight or obesity, a lower carbohydrate diet can be recommended by clinicians as an effective short-term option (up to 6 months) for improving glycaemic control and serum triacylglycerol concentrations.

7.3 Individuals living with T2D and overweight or obesity, who choose a lower carbohydrate diet, should include wholegrain or higher fibre foods, a variety of fruits and vegetables and limit intakes of saturated fats, reflecting current dietary advice for the general population.

7.4 Since the majority of individuals living with T2D have overweight or obesity, weight management remains the primary goal for improving glycaemic control and reducing CVD risk. Health professionals should support any evidence-based dietary approach that helps individuals with T2D to achieve long-term weight reduction.

7.5 Adults living with T2D and overweight or obesity who change to a lower carbohydrate diet and are taking diabetes medication may be at risk of hypoglycaemia. It is recommended that they receive advice and support from their health care team to manage this risk and to make adjustments to their medication as required.

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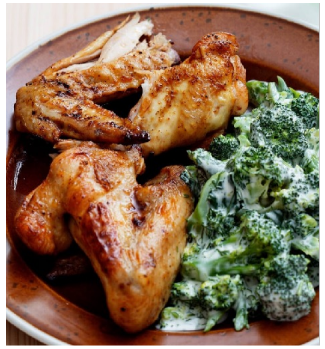
Ketogenic diet

- Limit carbohydrate intake to 20 - 50 g per day.
- Macronutrient distribution: 70% fat, 20% protein, 10% carbohydrate.

Breakfast
455 kcal
Fat: 26 g
Saturated fat: 9 g
Dietary fibre: 0 g

Snack
408 kcal
Fat: 28.9 g
Saturated fat: 5.8 g
Dietary fibre: 5.4 g



Lunch
697 kcal
Fat: 61.5 g
Saturated fat: 24.1 g
Dietary fibre: 5.2 g

Snack
144 kcal
Fat: 11.6 g
Saturated fat: 6.6 g
Dietary fibre: 0 g

Dinner
676 kcal
Fat: 51.4
Saturated fat: 9.9 g
Dietary fibre: 5.6 g

2380 kcal

Fat: 179.4 g

68% total energy
AMDR = 20-35%

Saturated: 55.4 g

21% total energy
SDT = < 10%

Dietary fibre: 16.2 g

AI = 25-30 g/d
SDT = 28-38 g/d

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Metabolic ward studies: Keto diets loose lean body mass and no more weight calorie for calorie than the high carb diets

- This result was not able to support the carbohydrate –insulin hypothesis.
- Fat metabolism adaptation occurred within the first week.
- Two months of tightly controlled KD saw slowing of body fat loss compared to higher carbohydrate diet.

Am J Clin Nutr. 2016 Aug; 104(2): 324–333.
Energy expenditure and body composition changes after an isocaloric ketogenic diet in overweight and obese men[1,2] Kevin D Hall,[3,*] Kong Y Chen,[3] Juen Guo,[3] Yan Y Lam,[4]

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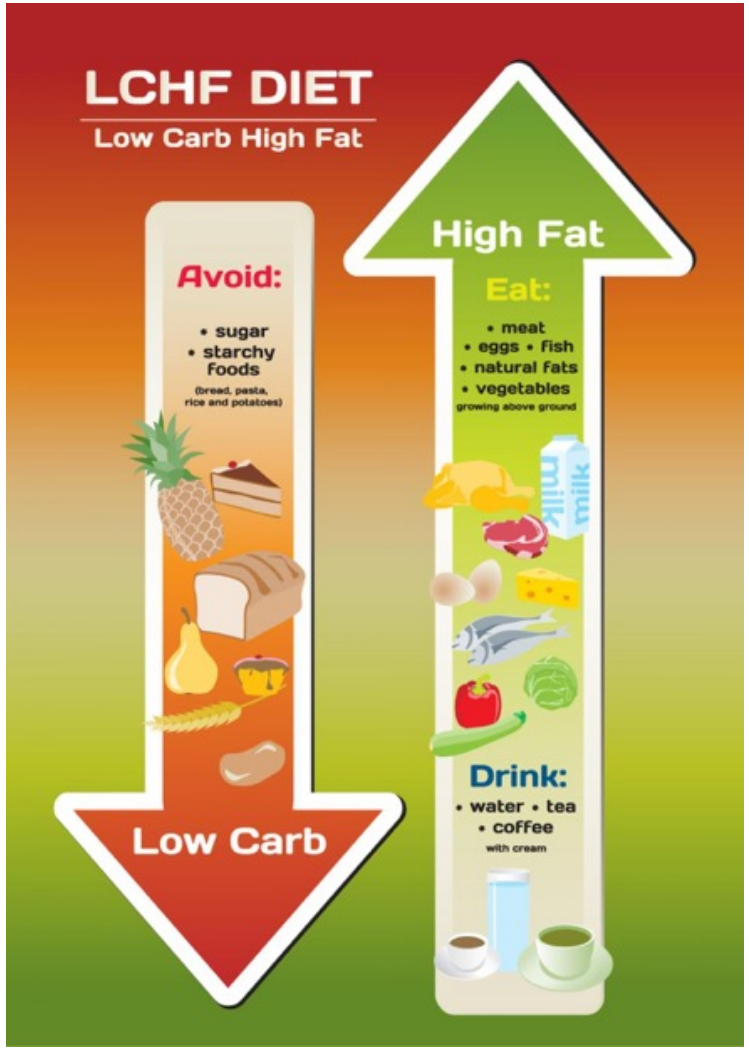

Why might animal protein heavy low-carb approaches cause harm?

- Stiffens arteries (1)
- Reduces blood flow to the heart (2)
- Increases Insulin Resistance (3,4,5,6)
- Increases oxidative stress through LPS from gram neg bacteria entering blood stream (enhanced by saturated fats)

Merino J et al Negative effects of a low carbohydrate high protein high fat diet on small peripheral artery reactivity in patients with increased cardiovascular risk. BJCN 2012
Fleming RM October 2000 The Effect of High Protein Diets on Coronary Blood Flow. The Journal of Vascular Diseases October 2000
Roden M, Price TB et al Mechanism of three fatty acid induced insulin resistance in humans. Journal of clinical investigation 1996; 97 (12): 2859–65.
Roden M, Krssak M et al. Rapid impairment of skeletal muscle glucose transport/phosphorylation by free fatty acids in humans. Diabetes 1999;48(2):358-64
Santomauro AT, Boden G et al. Overnight lowering of free fatty acids with Acipimox improves insulin resistance and glucose tolerance in obese diabetic and non-diabetic subjects. Diabetes. 1999; 48 (9): 1836–41.
Lee S, Boesch C et al. Effects of an overnight intravenous lipid infusion on intramyocellular lipid content and insulin sensitivity in African – American versus Caucasian adolescents. Metab Clin Exp. 2013; 62 (3): 417–23.

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Red Meat Associated with Type 2 Diabetes

The American Journal of Clinical Nutrition xxx (xxxx) xxx

The American Journal of CLINICAL NUTRITION

journal homepage: https://ajcn.nutrition.org/

Original Research Article

Red meat intake and risk of type 2 diabetes in a prospective cohort study of United States females and males

Xiao Gu [1], Jean-Philippe Drouin-Chartier [2,3], Frank M. Sacks [1], Frank B. Hu [1,4], Bernard Rosner [5], Walter C. Willett [1,4,*]

[1] Department of Nutrition, Harvard T.H. Chan School of Public Health, Boston, MA, United States; [2] Centre Nutrition, Santé et Société (NUTRISS), Institut sur la Nutrition et les Aliments Fonctionnels (INAF), Université Laval, Québec, Canada; [3] Faculté de Pharmacie, Université Laval, Québec, Canada; [4] Department of Epidemiology, Harvard T.H. Chan School of Public Health, Boston, MA, United States; [5] Channing Division of Network Medicine, Department of Medicine, Brigham and Women's Hospital and Harvard Medical School, Boston, MA, United States

ABSTRACT

Background: Studies with methodological advancements are warranted to confirm the relation of red meat consumption to the incidence of type 2 diabetes (T2D).

Objective: We aimed to assess the relationships of intakes of total, processed, and unprocessed red meat to risk of T2D and to estimate the effects of substituting different protein sources for red meats on T2D risk.

Methods: Our study included 216,695 participants (81% females) from the Nurses' Health Study (NHS), NHS II, and Health Professionals Follow-up Study (HPFS). Red meat intakes were assessed with semiquantitative food frequency questionnaires (FFQs) every 2 to 4 y since the study baselines. We used multivariable-adjusted proportional hazards models to estimate the associations between red meats and T2D.

Results: Over 5,483,981 person-years of follow-up, we documented 22,761 T2D cases. Intakes of total, processed, and unprocessed red meat were positively and approximately linearly associated with higher risks of T2D. Comparing the highest to the lowest quintiles, hazard ratios (HR) were 1.62 (95% confidence interval [CI]: 1.53, 1.71) for total red meat, 1.51 (95% CI: 1.44, 1.58) for processed red meat, and 1.40 (95% CI: 1.33, 1.47) for unprocessed red meat. The percentage lower risk of T2D associated with substituting 1 serving/d of nuts and legumes for total red meat was 30% (HR = 0.70, 95% CI: 0.66, 0.74), for processed red meat was 41% (HR = 0.59, 95% CI: 0.55, 0.64), and for unprocessed red meat was 29% (HR = 0.71, 95% CI: 0.67, 0.75); Substituting 1 serving/d of dairy for total, processed, or unprocessed red meat was also associated with significantly lower risk of T2D. The observed associations became stronger after we calibrated dietary intakes to intakes assessed by weighed diet records.

Conclusions: Our study supports current dietary recommendations for limiting consumption of red meat intake and emphasizes the importance of different alternative sources of protein for T2D prevention.

Keywords: red meat, processed red meat, unprocessed red meat, type 2 diabetes, calibration, sources of protein, substitution

Introduction

Type 2 diabetes (T2D) is a major public health concern globally, and both the incidence and prevalence are increasing rapidly [1, 2]. In observational studies, red meat intake has been associated with risk of type 2 diabetes (T2D) [3, 4], and replacement of red meat with other protein sources has been associated with lower risk in statistical substitution analyses [5–9]. However, in short-term randomized controlled trials (RCTs), definitive effects of red meat intake on biomarkers of glycemic control or inflammation have not been seen [10, 11]. Challenges to the quality of observational studies and reinterpretation of existing evidence have been used to counter recommendations to limit the consumption of red meat [12, 13]. That long-term RCTs of red meat intake and incident T2D might never be conducted has been acknowledged, in part due to lack of clinical equipoise and feasibility because T2D may take decades to develop [9]. Therefore, long-term observational studies with methodological advancements are warranted to evaluate the relation of red meat consumption to the incidence of T2D.

Abbreviations: 7DDR, 7-d weighed diet record; AHEI, Alternative Healthy Eating Index; FFQ, semiquantitative food frequency questionnaire; HPFS, Health Professionals Follow-up Study; MLVS, Men's Lifestyle Validation Study; NHS, Nurses' Health Study; NHS II, Nurses' Health Study II; T2D, type 2 diabetes; WLVS, Women's Lifestyle Validation Study.

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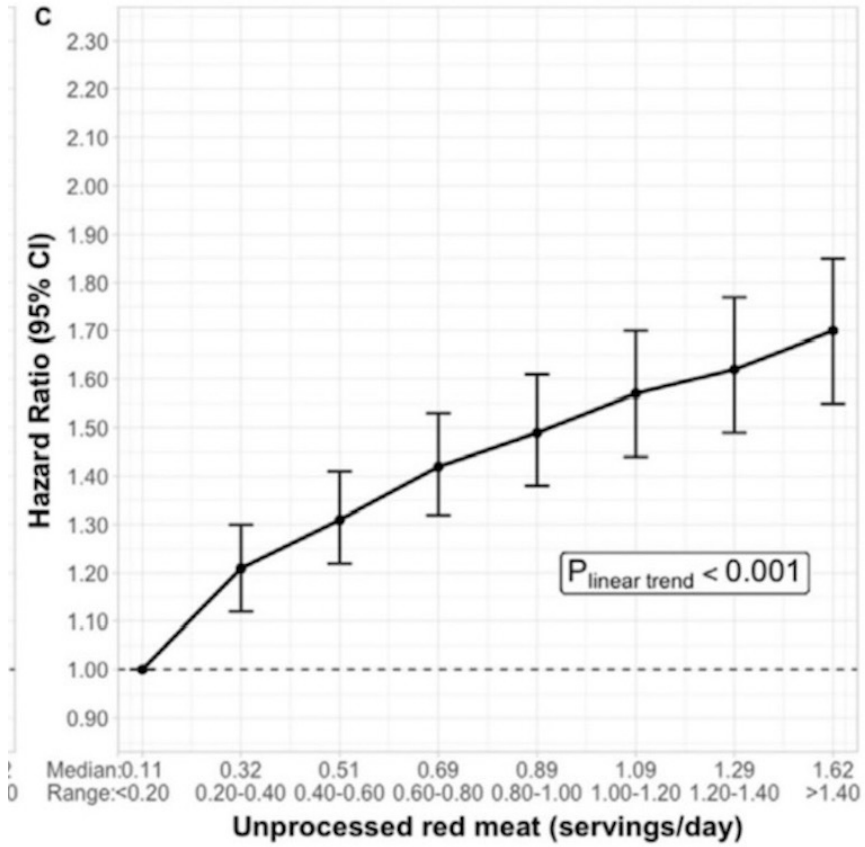
Received 8 May 2023; Received in revised form 24 August 2023; Accepted 30 August 2023; Available online xxxx
0002-9165/

Not all whole foods are created equal with regards to how they affect health.
29% reduced odds of T2DM when eating one serving of nuts or legumes over red meat.



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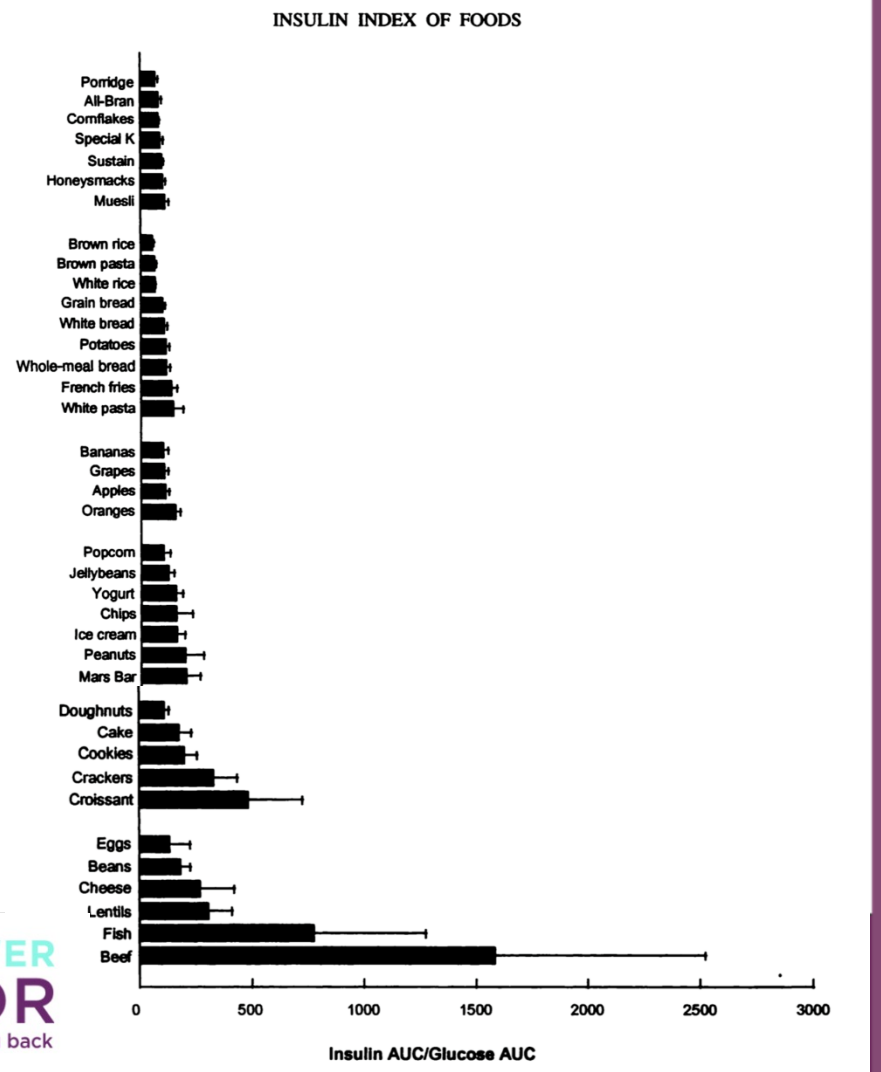
Protein rich foods increase our insulin spike

- A standard portion size of 1000 kJ was chosen because this resulted in realistic serving sizes for most of the foods except apples, oranges, fish, and potatoes.
- Although some of the protein-rich foods may normally be eaten in smaller quantities, fish, beef, cheese, and eggs still had larger insulin responses per gram than did many of the foods consisting predominantly of carbohydrate.
- some protein and fat-rich foods (eggs, beef, fish, lentils, cheese, cake, and doughnuts) induced as much insulin secretion as did some carbohydrate-rich foods (eg, beef was equal to brown rice and fish was equal to grain bread).
- Insulin values were divided by glucose values to determine which foods were markedly insulinogenic relative to their glycaemic effect.
- On average, the **protein-rich foods stimulated a large amount of insulin secre**tion relative to their glycaemic response, followed by the bakery products, snack foods, fruit, and breakfast cereals.



Am J Clin Nutr. 1997 Nov;66(5):1264-76.
An insulin index of foods: the insulin demand generated by 1000-kJ portions of common foods. Holt SH[1], Miller JC, Petocz P.

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how do cells react to high fat intake?

High Fat Diet

Lipid Overload

Damaged Mitochondria

Low Grade Inflammation

Insulin Resistance

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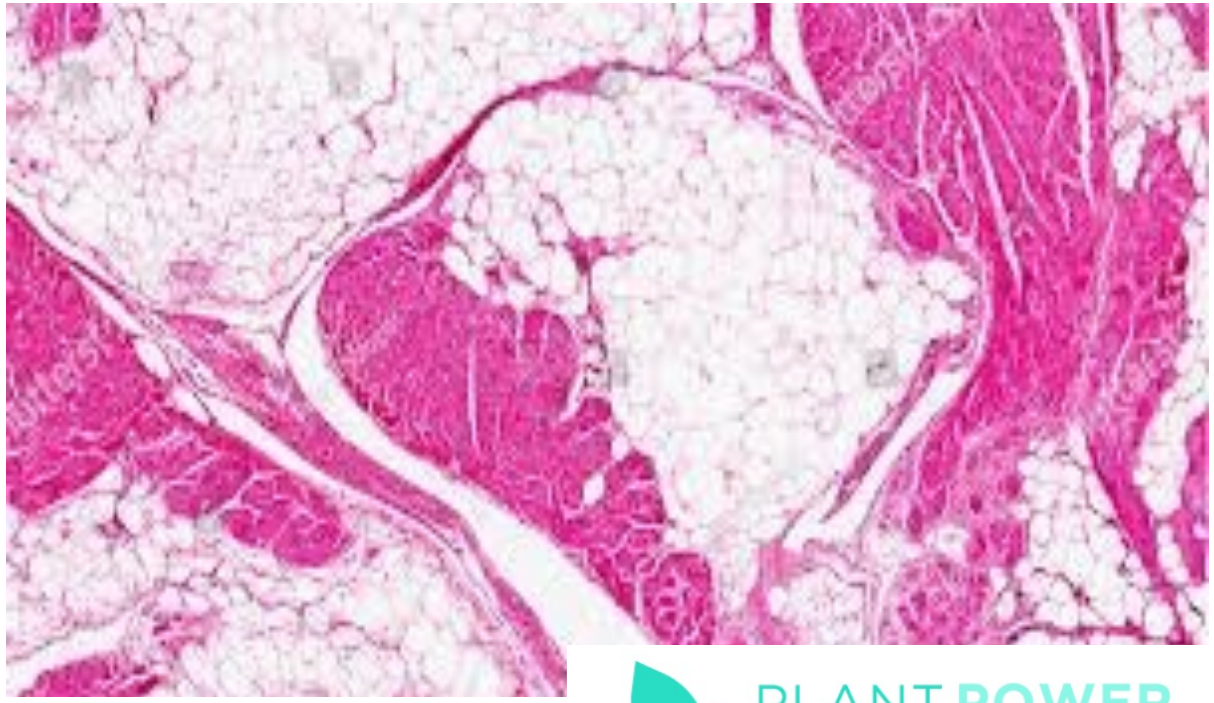
Imperial College research

Insulin resistance in muscle fat: vegans v omnivores

Matched by gender, age, BMI

Vegans:

- Significantly less fat trapped in muscles
- Higher insulin sensitivity
- Better blood glucose and insulin levels
- Improved beta-cell function



L M Goff, J D Bell, P W So, A Dornhorst, G S Frost. Veganism and its relationship with insulin resistance and intramyocellular lipid. Eur J Clin Nutr. 2005 Feb;59(2):291-8
J Gojda, J Patkova, M Jacek, J Potockova, J Trnka, P Kraml, M Andel. Higher insulin sensitivity in vegans is not associated with higher mitochondrial density. Eur J Clin Nutr. 2013 Dec;67(12):1310-5

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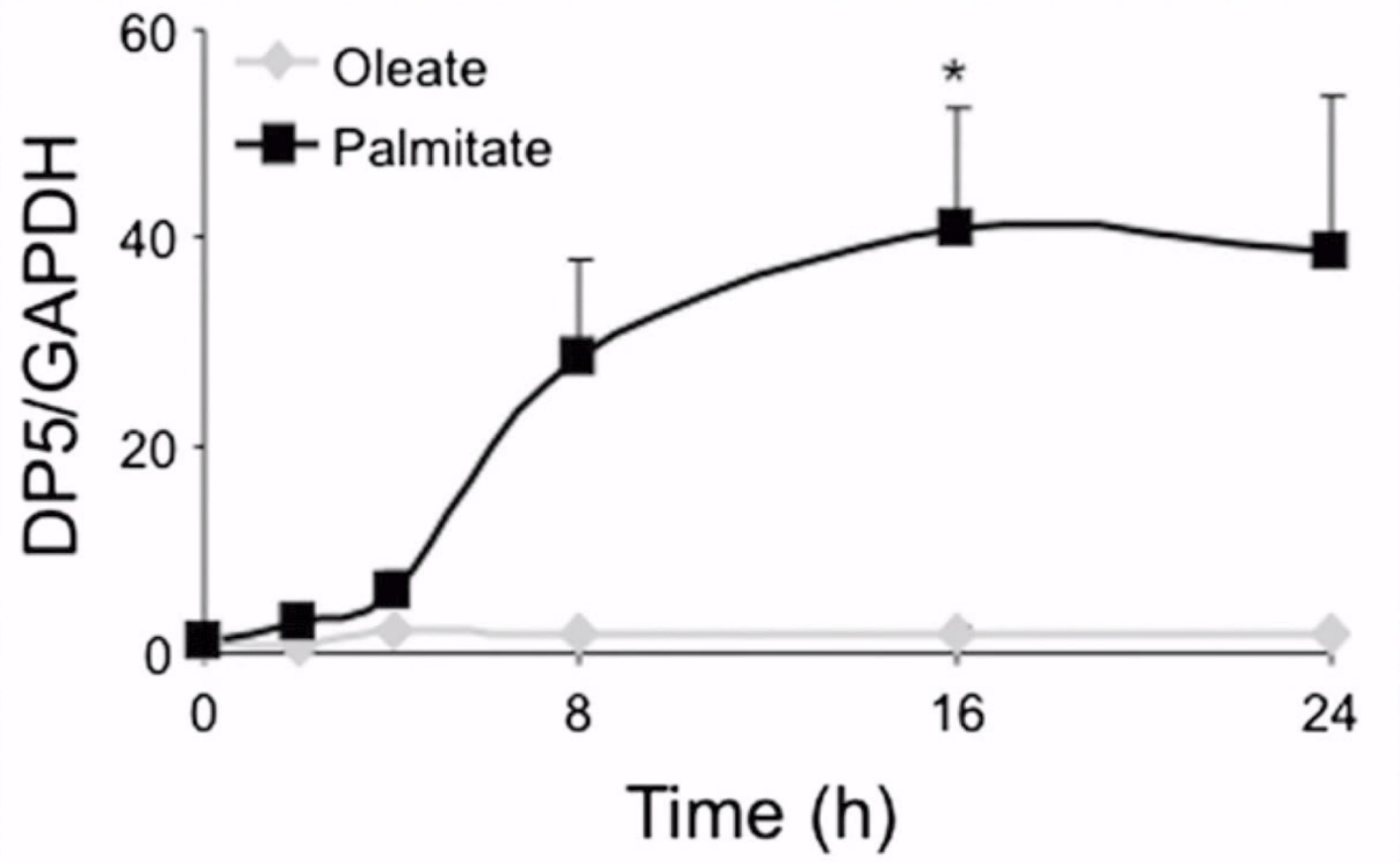

FIG. 2. Palmitate-induced *DP5* expression contributes to β-cell death.

D A Cunha, M Igoillo-Esteve, E N Gurzov, C M Germano, N Naamane, I Marhfour, M Fukaya, J M Vanderwinden, C Gysemans, C Mathieu, L Marselli, P Marchetti, H P Harding, D Ron, D L Eizirik, M Cnop. Death protein 5 and p53-upregulated modulator of apoptosis mediate the endoplasmic reticulum stress-mitochondrial dialog triggering lipotoxic…human β-cell apoptosis. Diabetes. 2012 Nov;61(11):2763-75. doi: 10.2337/db12-0123

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Is it the calories or the food itself?

Crossover trial 20 men who had diabetes for up to 20 years:

- Forced to eat more food if they were losing weight on WFPB
- What happened?
- Many were able to completely stop insulin within 2-3 weeks
- WITHOUT LOSING WEIGHT

Patient	Insulin	
	Control	HCF
	unit/day	
1	15	0
2	15	0
3	15	0
4	15	2
5	15	0
6	17	0
7	17	0
8	18	0
9	20	0
10	20	0
Group (10)	17	0.2
11	22	5
12	28	15
13	29	15
14	32	18(8)
15	32	0
16	32	14(0)
17	34	20
Group (7)	30	12
18	40	35
19	46	43
20	57	48
Group (3)	48	42
Total (20)	26	11

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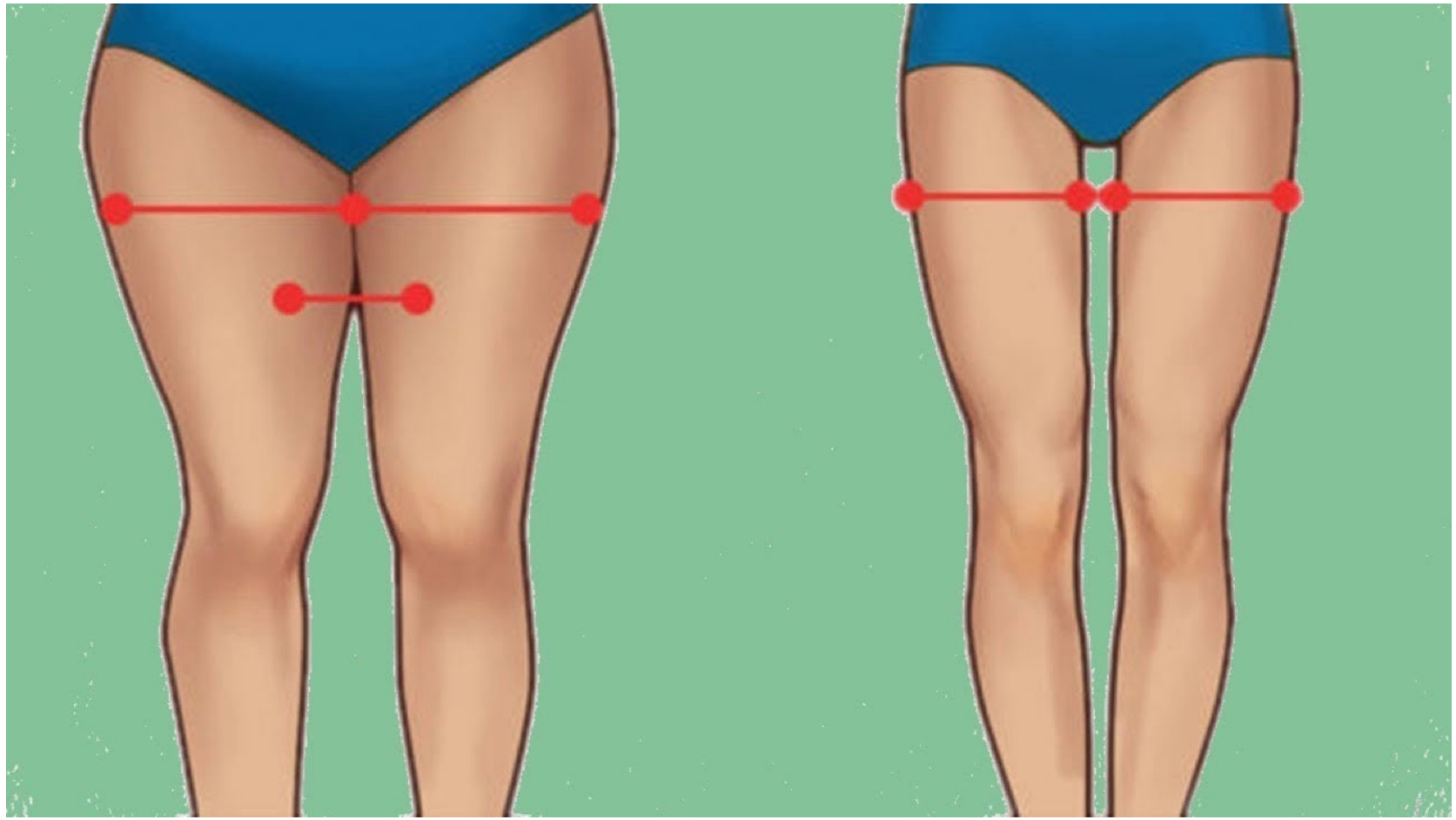

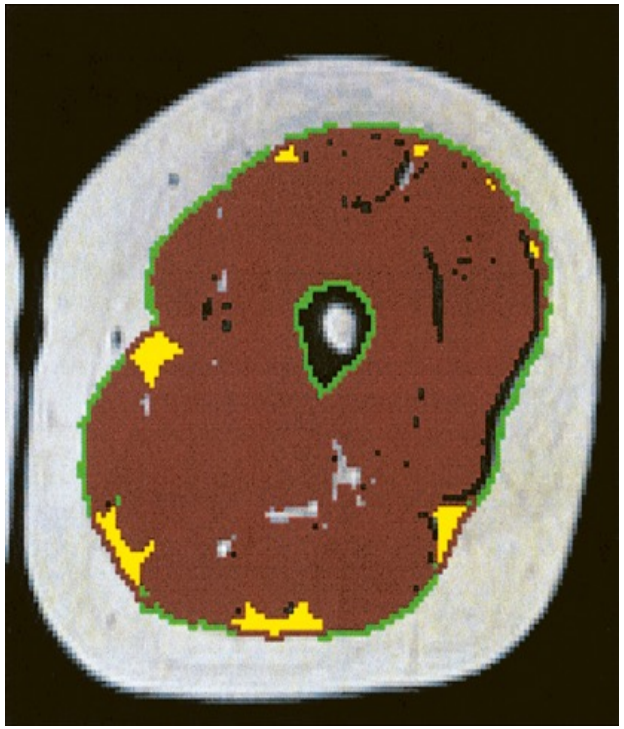

Reduced subfascial and intracellular fat

The Effect of a Vegetarian vs Conventional Hypocaloric Diabetic Diet on Thigh Adipose Tissue Distribution in Subjects with Type 2 Diabetes: A Randomized Study

Hana Kahleova , MD, PhD, Marta Klementova , MD, Vit Herynek , PhD, Antonin Skoch , MD, PhD, Stepan Herynek, Martin Hill , PhD,

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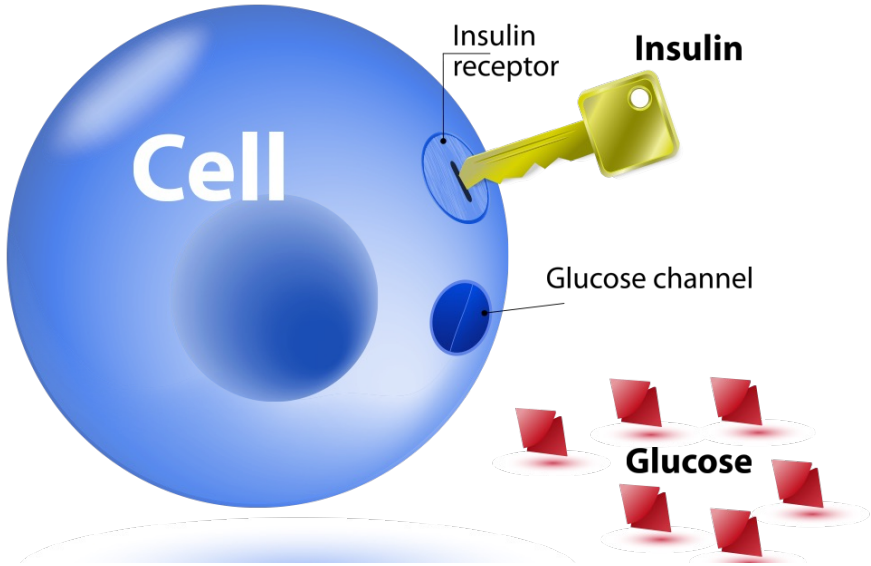
Improved Body Composition and Insulin Resistance can both be Achieved using Plant Based Diets



Nutr Diabetes. 2018 Nov 2;8(1):58. doi: 10.1038/s41387-018-0067-4.
A plant-based diet in overweight individuals in a 16-week randomized clinical trial: metabolic benefits of plant protein.
Kahleova H[1], Fleeman R[2], Hlozkova A[2], Holubkov R[3], Barnard ND[2,4].

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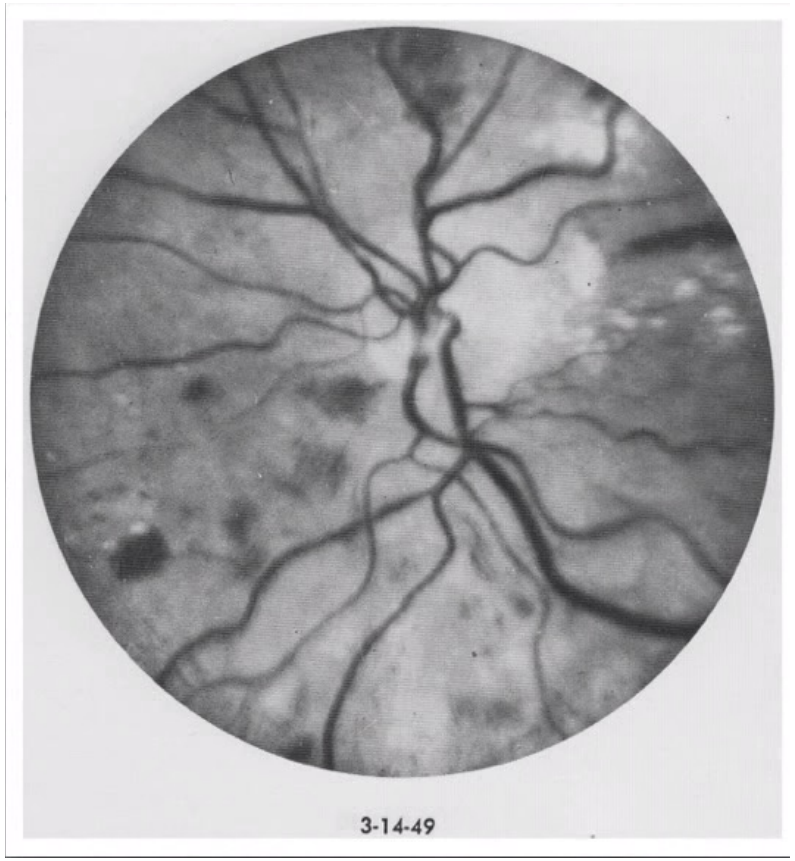
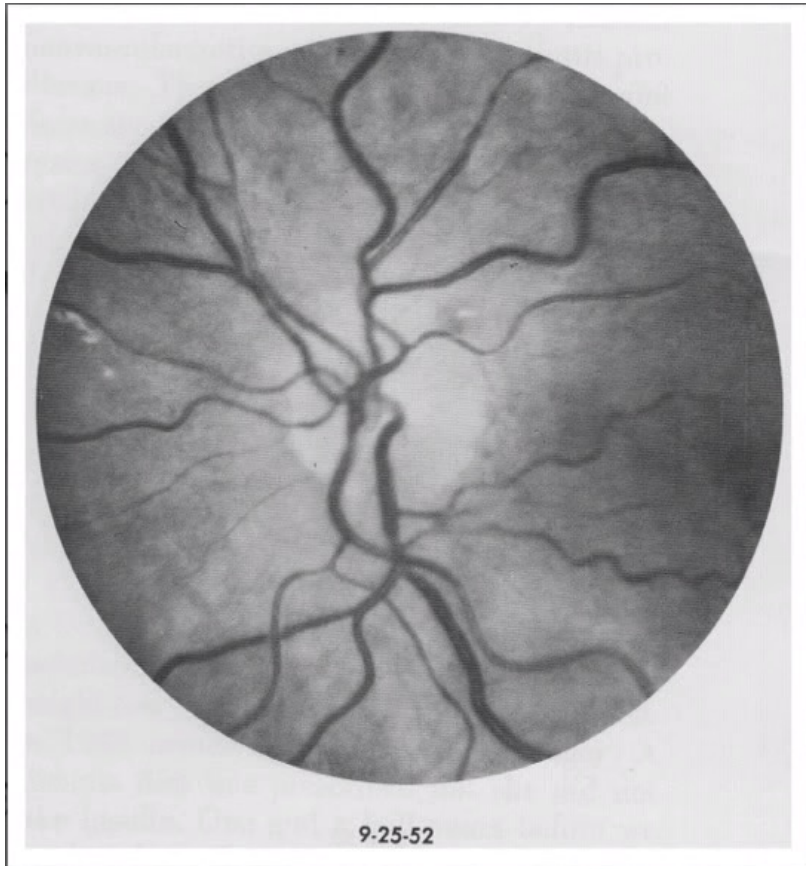
The rice diet





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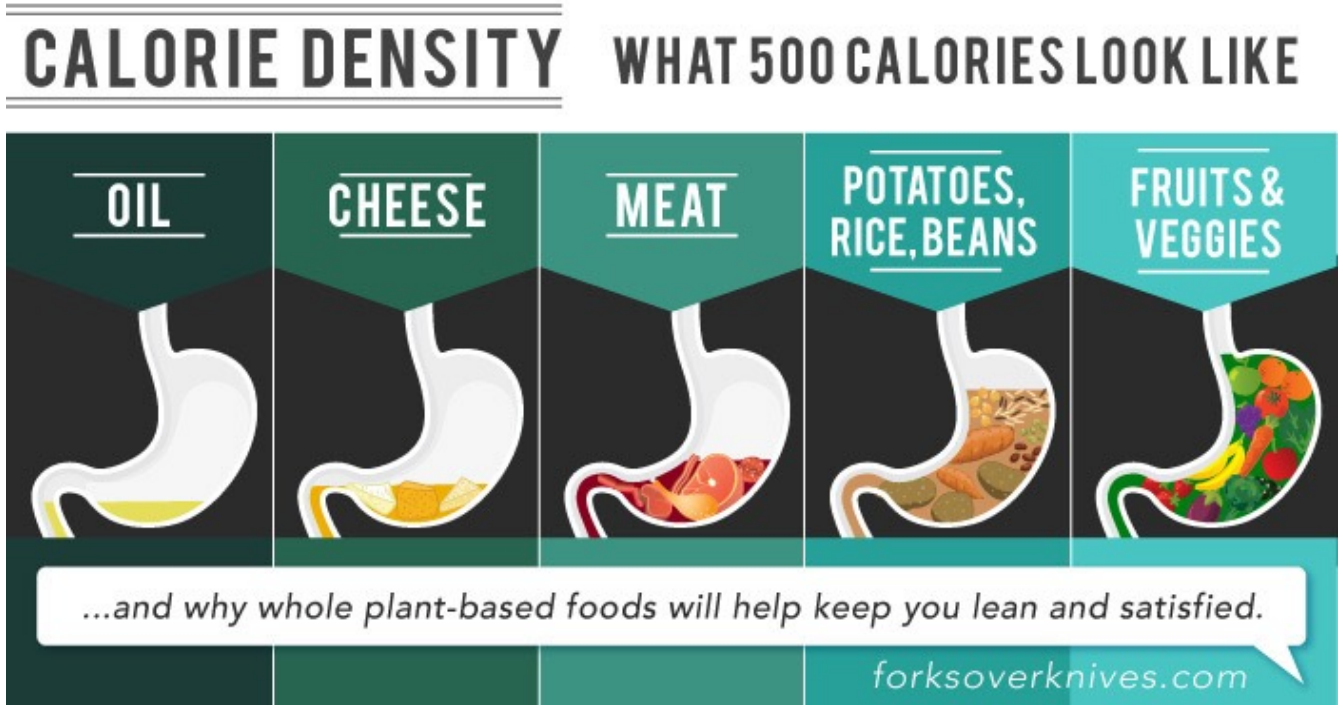

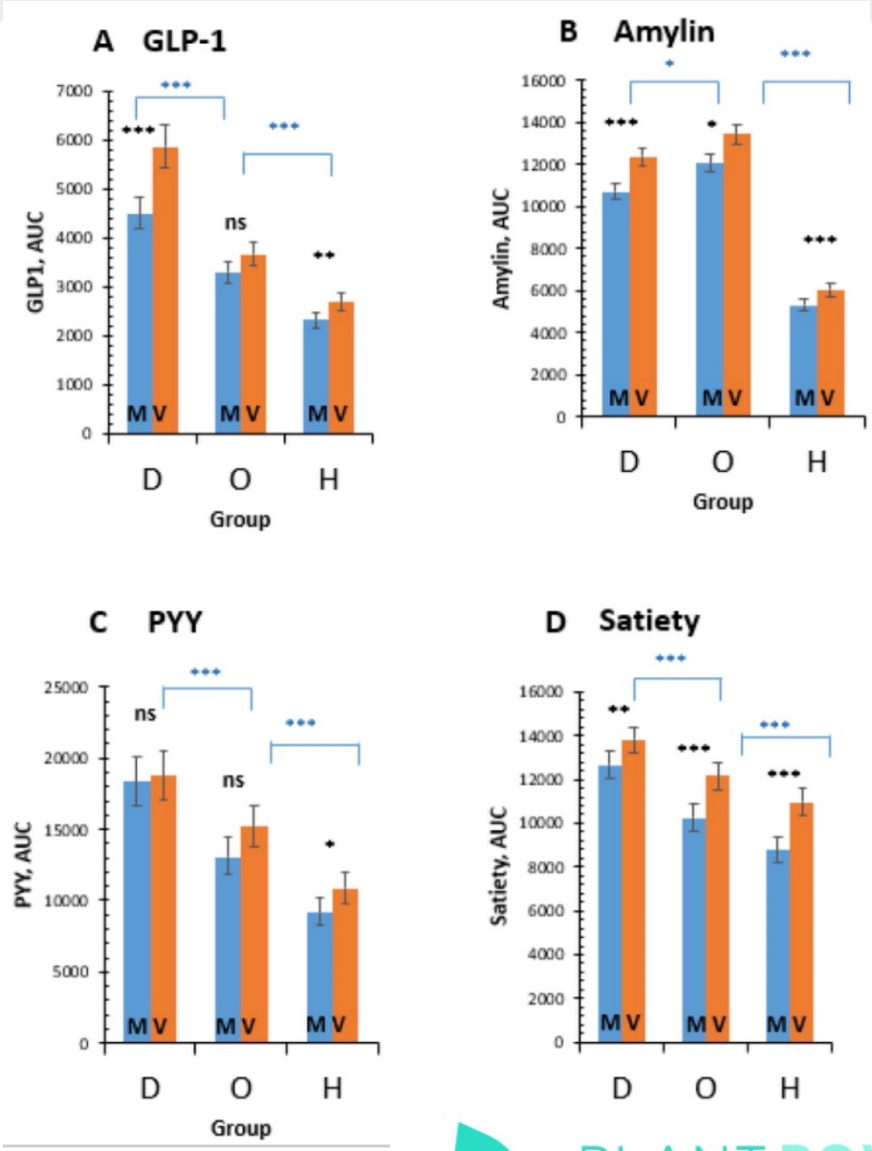

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Diabetes, Obesity and Metabolism

The diet-derived short chain fatty acid propionate improves beta-cell function in humans and stimulates insulin secretion from human islets in vitro

Attilio Pingitore PhD
Edward S. Chambers PhD
Thomas Hill MSc

First published: 20 October 2016
https://doi.org/10.1111/dom.12811

Applied Physiology Nutrition and Metabolism

The fermentable fibre inulin increases postprandial serum short-chain fatty acids and reduces free-fatty acids and ghrelin in healthy subjects

Joshua Tarini,[a] Thomas M.S. Wolever[ab]
[a]Department of Nutritional Sciences, Faculty of Medicine, University of Toronto,

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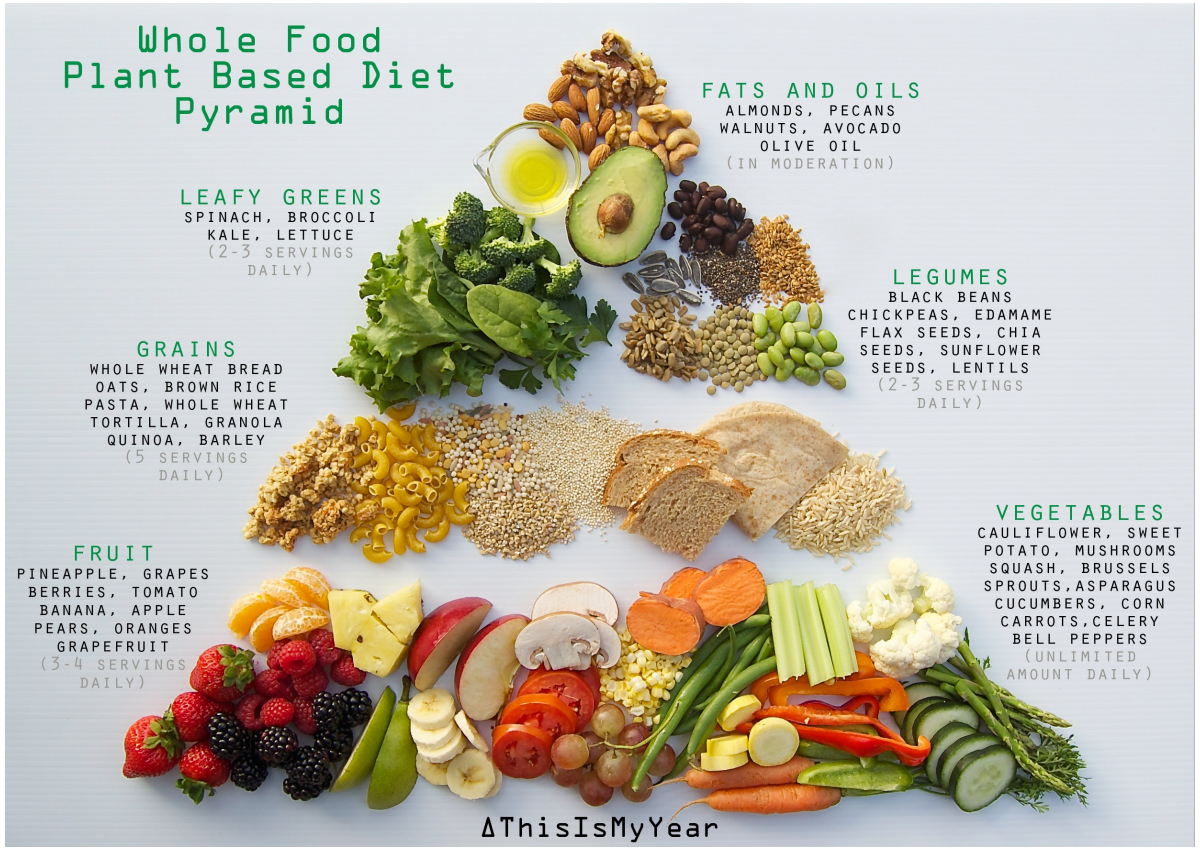
Method 3. WFPB diet.



- Leafy greens
- Vegetables
- Fruits
- Grains such as brown rice, wholemeal bread and pasta
- Pulses including beans, chickpeas, lentils and green peas
- Seeds and nuts
- DHA
- How to lose weight sustainably AND reverse insulin resistance

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Whole food plant-based diet

Breakfast
301 kcal
Protein: 9.5 g
Saturated fat: 1.1 g
Dietary fibre: 10.2 g

Snack
303 kcal
Protein: 8.7 g
Saturated fat: 2.3 g
Dietary fibre: 8.6 g

Lunch
375 kcal
Protein: 21.6 g
Saturated fat: 1.9 g
Dietary fibre: 11.7 g

1907 kcal

Protein: 70.5 g

15.6% total energy
AMDR 15-25%

Saturated: 8.05 g

3.5% total energy
SDT = < 10%

Dietary fibre: 63.2 g

AI = 25-30 g/d
SDT = 28-38 g/d

Snack
333 kcal
Protein: 8.3 g
Saturated fat: 1.9 g
Dietary fibre: 13.6 g

Dinner
417 kcal
Protein: 21 g
Saturated fat: 0.75 g
Dietary fibre: 15.4 g

Dessert
178 kcal
Protein: 3.4 g
Saturated fat: 0.1 g
Dietary fibre: 5.7 g

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- 100 people randomly assigned to vegan and ADA diet
- Evaluated at baseline and at nearly 6 months.
- 43% of the vegans reduced diabetes meds
- 26% of the ADA diet cohort reduced meds
- Body weight reduced 6.5kg vs 3.1kg in ADA group
- Double the reduction in LDL levels too

A Low-Fat Vegan Diet Improves Glycemic Control and Cardiovascular Risk Factors in a Randomized Clinical Trial in Individuals With Type 2 Diabetes
Diabetes Care 29:1777–1783, 2006 NEAL D. BARNARD, MD1,2 JOSHUA COHEN, MD1 DAVID J.A. JENKINS, et al

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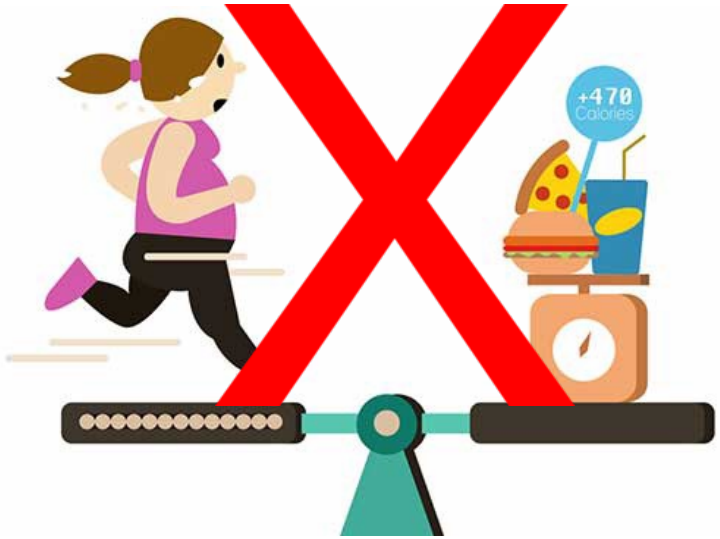
BROAD



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PLOS | MEDICINE

RESEARCH ARTICLE

Plant-Based Dietary Patterns and Incidenc of Type 2 Diabetes in US Men and Women Results from Three Prospective Cohort Studies

Ambika Satija[1,2]*, Shilpa N. Bhupathiraju[1], Eric B. Rimm[1,2,3], Donna Spiegelman[1,2,...], Stephanie E. Chiuve[1,2,6], Lea Borgi[7], Walter C. Willett[1,2,3], JoAnn E. Manson[2,6,8], Qi Sun[1,3], Frank B. Hu[1,2,3]

1 Department of Nutrition, Harvard T.H. Chan School of Public Health, Boston, Massachusetts, United States of America, **2** Department of Epidemiology, Harvard T.H. Chan School of Public Health, Boston, Massachusetts, United States of America, **3** Channing Division of Network Medicine, Department of Medicine, Brigham and Women's Hospital, Boston, Massachusetts, United States of America, **4** Department of Biostatistics, Harvard T.H. Chan School of Public Health, Boston, Massachusetts, United States of America, **5** Department of Global Health, Harvard T.H. Chan School of Public Health, Boston, Massachusetts, United States of America, **6** Division of Preventive Medicine, Department of Medicine, Brigham and Women's Hospital, Boston, Massachusetts, United States of America, **7** Renal Division, Brigham and Women's Hospital, Boston, Massachusetts, United States of America, **8** Harvard Medical School, Boston, Massachusetts, United States of America

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OPEN ACCESS

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Academic Editor: Steven C Moore, National Cancer Institute, UNITED STATES

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Published: June 14, 2016

Data Availability Statement: The Health Professionals Follow-up Study, the Nurses' Health Study, and the Nurses' Health Study 2 data may be used in collaboration with a principal investigator. Please see the study websites for more information: https://www.hsph.harvard.edu/hpfs/hpfs_collaborators.htm, and http://www.nurseshealthstudy.org/researchers.

Funding: This work was supported by research grants DK58845, UM1 CA186107, UM1 CA176726, and UM1 CA167552 from the National Institutes of Health. The funders had no role in study design, data

Abstract

Background

Plant-based diets have been recommended to reduce the risk of type 2 diabetes (T2D). However, not all plant foods are necessarily beneficial. We examined the association of an overall plant-based diet and hypothesized healthful and unhealthful versions of a plant-based diet with T2D incidence in three prospective cohort studies in the US.

Methods and Findings

We included 69,949 women from the Nurses' Health Study (1984–2012), 90,239 women from the Nurses' Health Study 2 (1991–2011), and 40,539 men from the Health Professionals Follow-Up Study (1986–2010), free of chronic diseases at baseline. Dietary data were collected every 2–4 y using a semi-quantitative food frequency questionnaire. Using these data, we created an overall plant-based diet index (PDI), where plant foods received positive scores, while animal foods (animal fats, dairy, eggs, fish/seafood, poultry/red meat, miscellaneous animal-based foods) received reverse scores. We also created a healthful plant-based diet index (hPDI), where healthy plant foods (whole grains, fruits, vegetables, nuts, legumes, vegetable oils, tea/coffee) received positive scores, while less healthy plant foods (fruit juices, sweetened beverages, refined grains, potatoes, sweets/desserts) and animal foods received reverse scores. Lastly, we created an unhealthful plant-based diet index

HARVARD
SCHOOL OF PUBLIC HEALTH

Nurses' Health Study

HPFS
stands for
Health Professionals Follow Up Study

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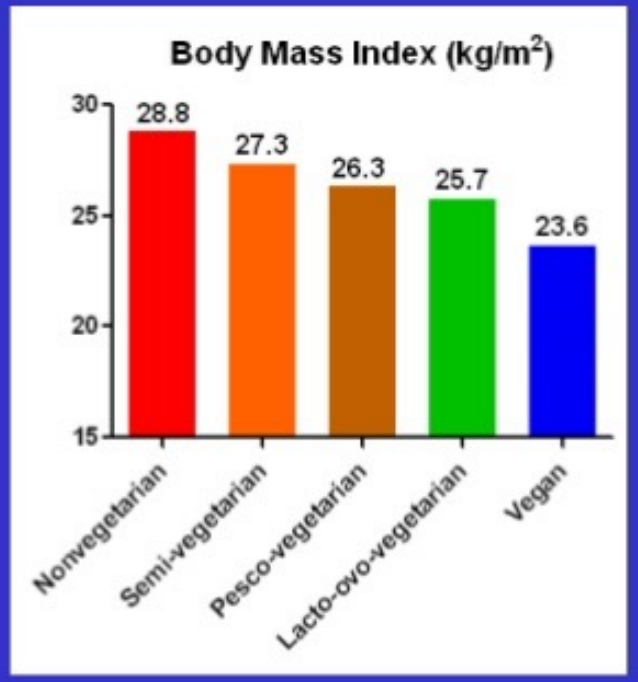
Adventist Health Study – 2

60,903 participants, aged ≥30, enrolled 2002-2006



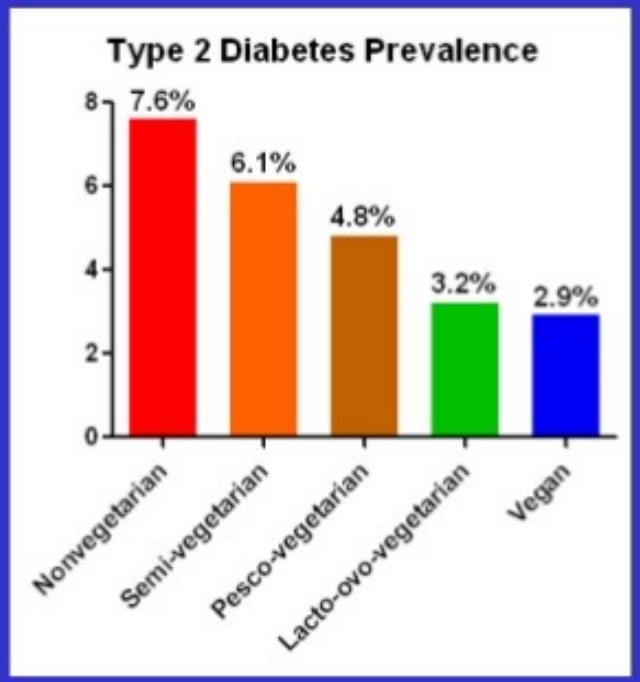


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Table 4.

Dietary Specifics and Types of Diets: Statements that Reached Consensus.

Number*	Statement	Mean	Outliers
68	Reducing calorie intake can be achieved by reducing food volume, portion size, energy density, or a combination of these approaches	8.71	0
70	Dietary intervention for T2D[a] should emphasize unrefined carbohydrates for the carbohydrate component of the diet	8.21	1
72	Dietary intervention for T2D may include some liquid meal replacements to facilitate patient adherence to a calorie-restricted diet	8.10	0
73	Dietary interventions may be similar for achieving initial remission and sustaining prolonged remission of T2D	7.29	0
74	Dietary interventions may differ for achieving initial remission and sustaining prolonged remission of T2D	7.21	1
75	A whole-food, plant-based diet is defined as a diet composed primarily of whole grains, vegetables, legumes, fruits, nuts, and seeds while avoiding or minimizing animal foods and refined foods including added fats	8.43	0
77A	Diet as a primary intervention for T2D is most effective in achieving remission when emphasizing whole, plant-based foods with minimal consumption of meat and other animal products	7.60	1
77B	Diet as a primary intervention for T2D is most effective in achieving remission when emphasizing whole, plant-based foods	8.00	1
78	A whole-food, plant-based diet is more effective than a standard American diet in promoting remission of T2D	8.64	0
79	A low-fat, whole-food, plant-based diet can often sustain remission of T2D	8.30	0
81	Limits on energy-rich and carbohydrate-rich plant foods (e.g., nuts, seeds, grains, and starchy vegetables) may be necessary to produce the weight loss for remission of T2D	7.29	1
84	Healthy, food-based dietary interventions (e.g., Mediterranean, DASH,[b] whole-food plant-based diets) are preferable to calorie or isolated nutrient restriction (e.g., low carbohydrate, low fat, and high protein) for long-term (sustained) remission of T2D	8.21	0
85	The intensity and pace of medication de-escalation(s) required will be dependent upon the intensity of the lifestyle intervention(s) for achieving remission of T2D	8.07	1
86	The risk of adverse events, including the potential to cause or exacerbate chronic disease and to increase cardiovascular risk, should influence the choice of diet as a primary intervention for remission of T2D	8.29	1
87	A very-low-carbohydrate diet can be associated with significant adverse events and cardiovascular risk that make this diet inadvisable for long-term remission of T2D	8.43	0
88	Dietary intervention for sustained remission of T2D should minimize ultra-processed foods	8.14	0

*Number in the initial list of candidate statements.
[a]Type 2 diabetes.
[b]Dietary Approaches to Stop Hypertension (Diet).

Dietary Interventions to Treat Type 2 Diabetes in Adults with a Goal of Remission: An Expert Consensus Statement from the American College of Lifestyle Medicine

Richard M. Rosenfeld, MD, MPH, MBA, John H. Kelly, MD, MPH, Monica Agarwal, MD, MEHP, FACE, Show all authors

First Published May 18, 2022 | Research Article | Check for updates
https://doi.org/10.1177/15598276221087624

Article information

‘’diet as a primary intervention for T2D is most effective in achieving remission when emphasizing whole, plant-based foods with minimal consumption of meat and other animal products. ’’

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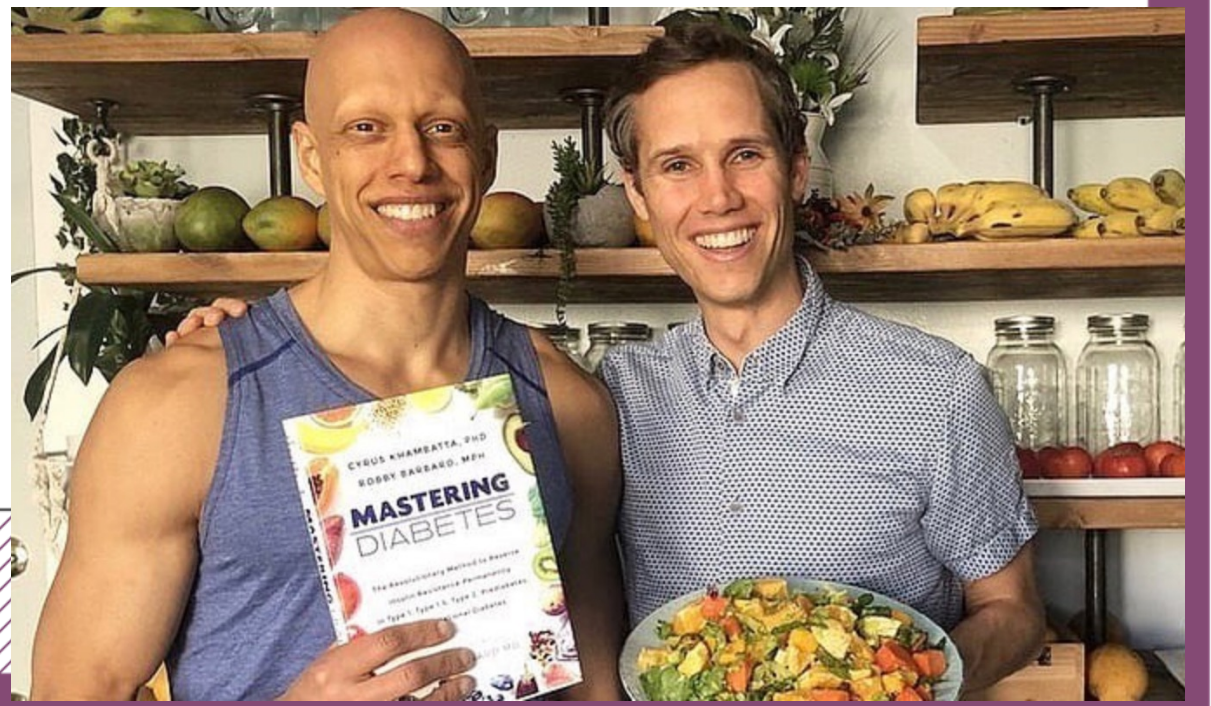
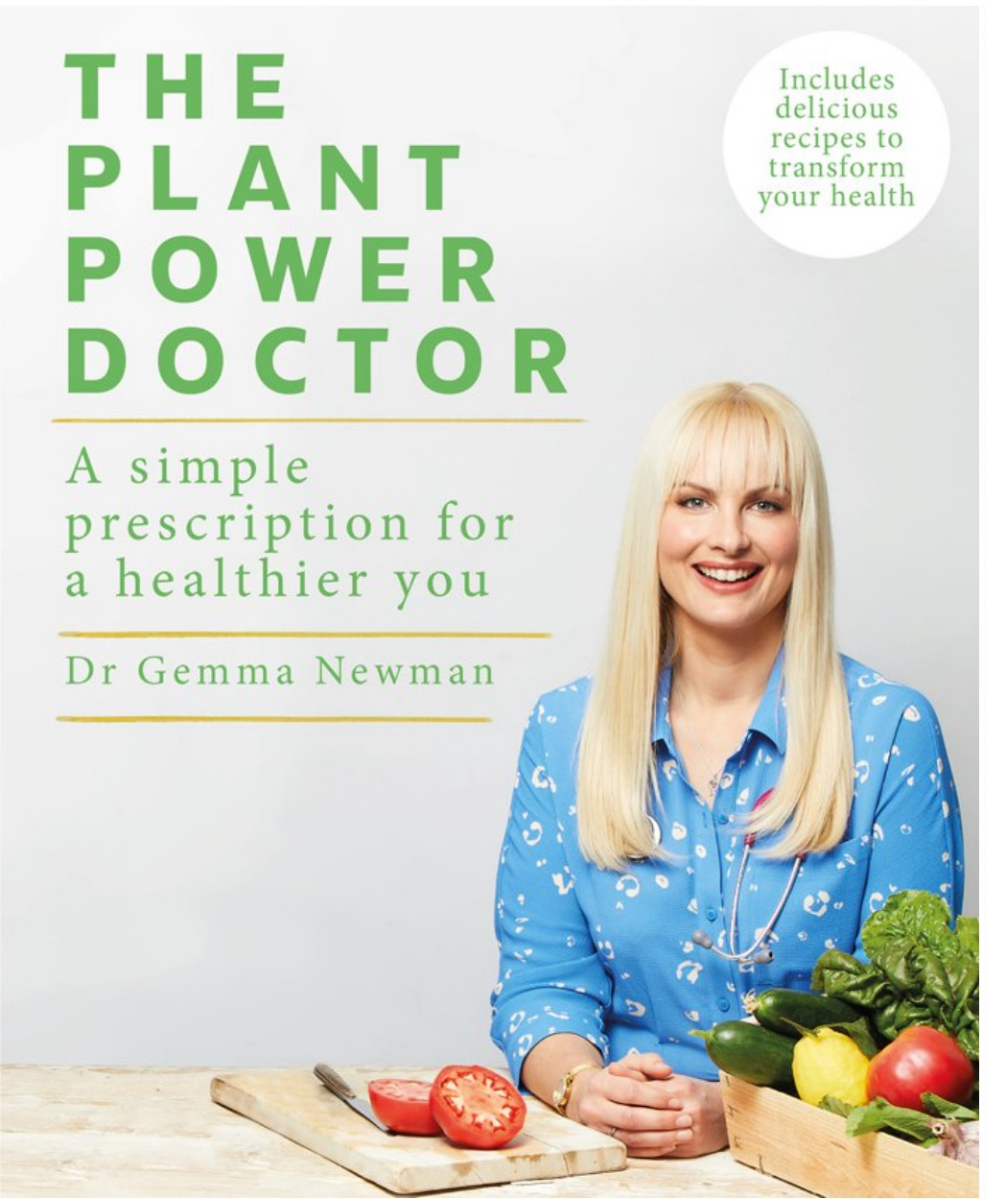
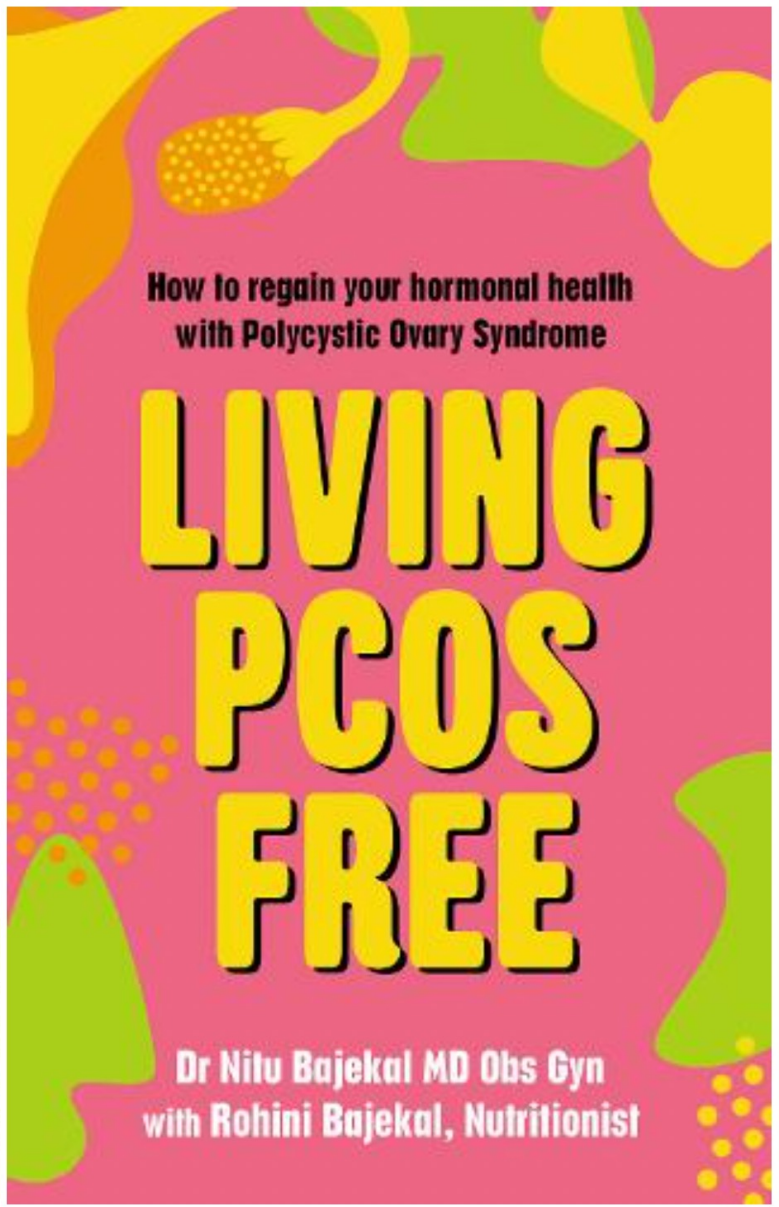
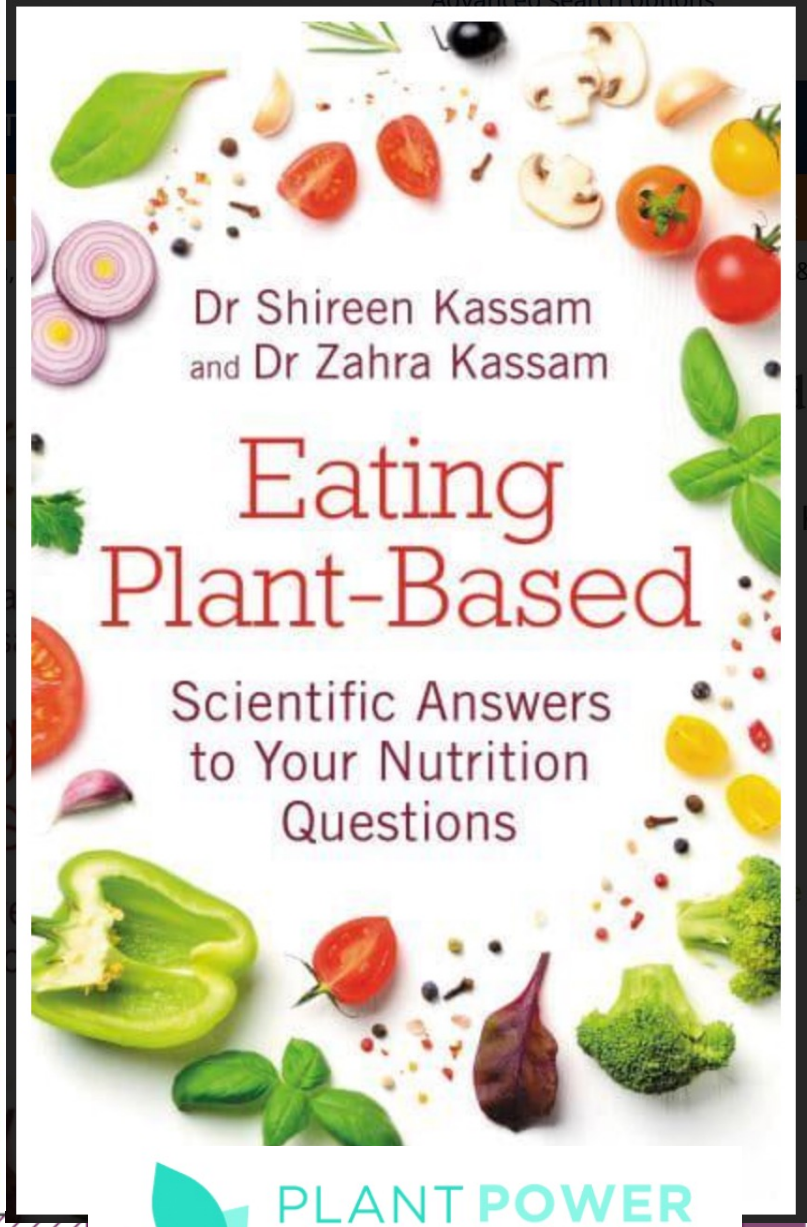
PLANT BASED HEALTH ONLINE
For a Healthier Future









Resources for Patients living with T2DM + PCOS

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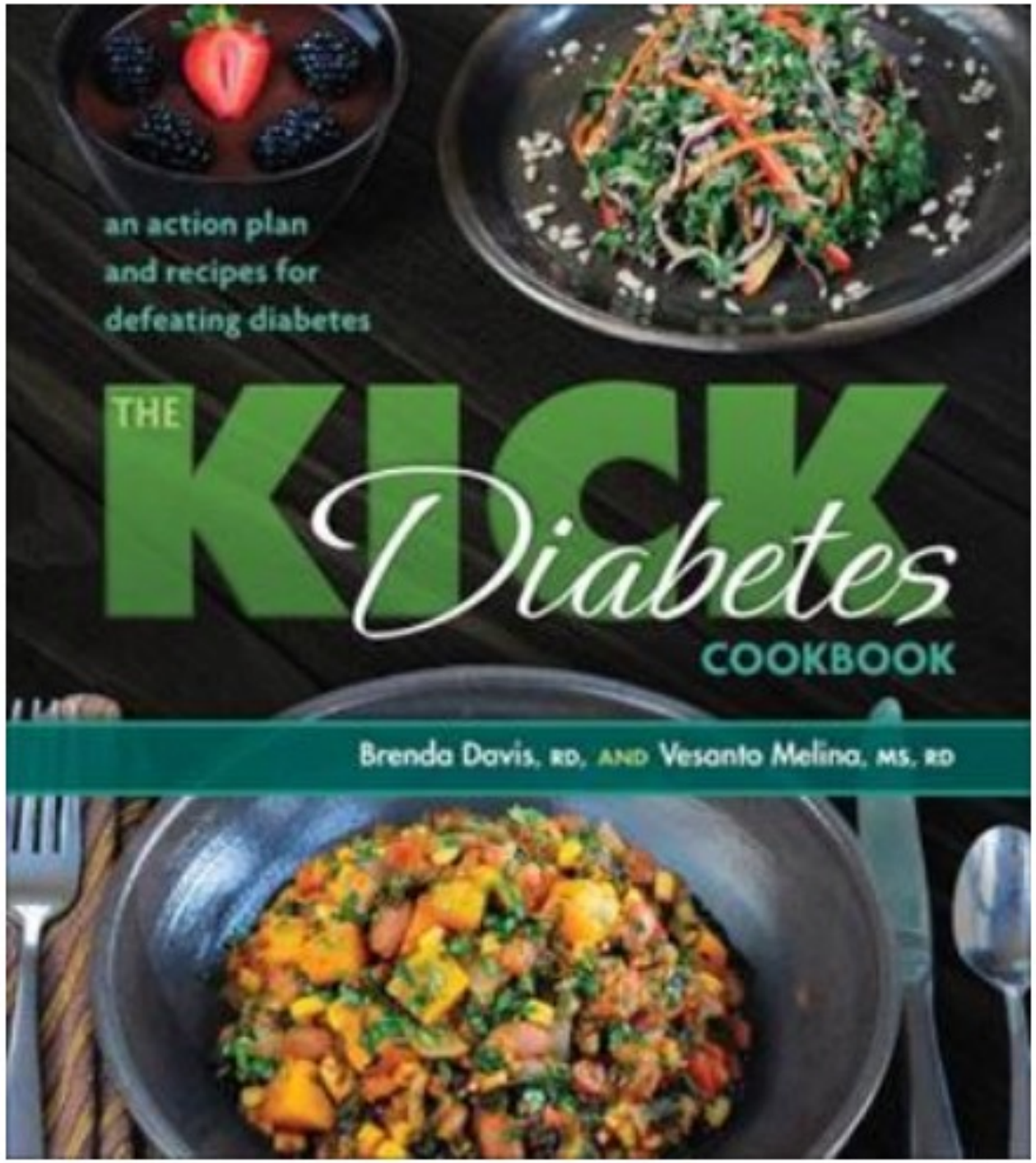
3 TIMES MORE EFFECTIVE THAN OTHER DIET PLANS

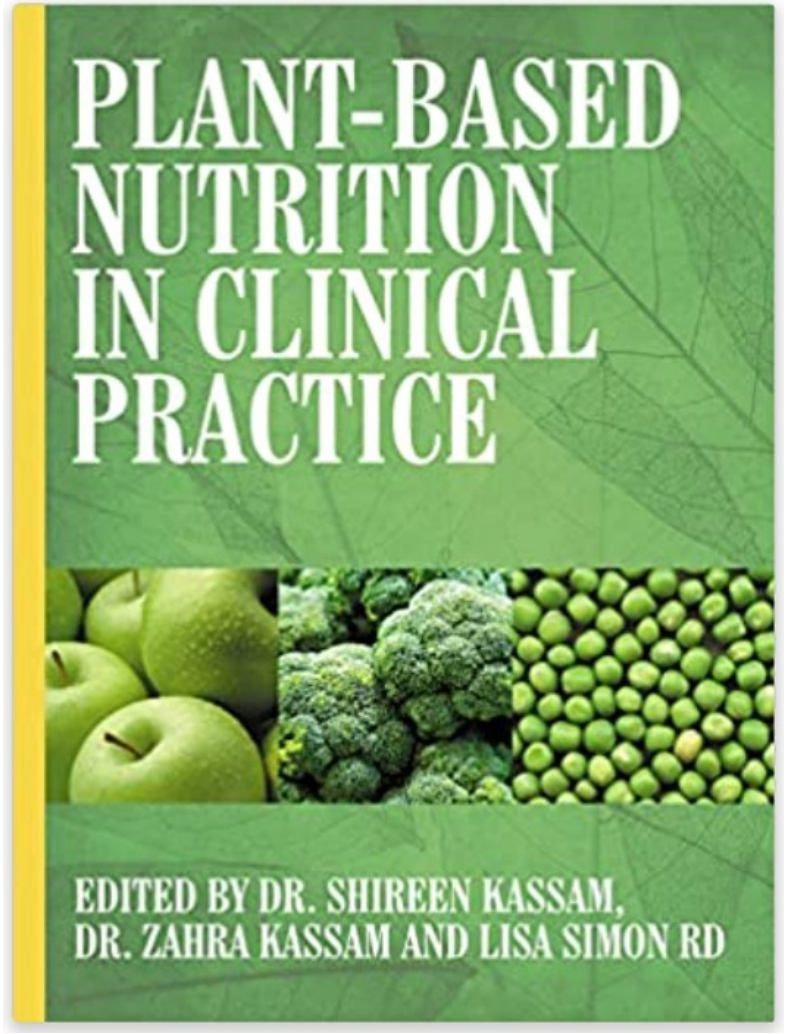
DR. NEAL BARNARD'S PROGRAM for REVERSING DIABETES

THE SCIENTIFICALLY PROVEN SYSTEM FOR REVERSING DIABETES WITHOUT DRUGS

NEAL D. BARNARD, MD
With menus and recipes by Bryanna Clark Grogan



Professional Resources



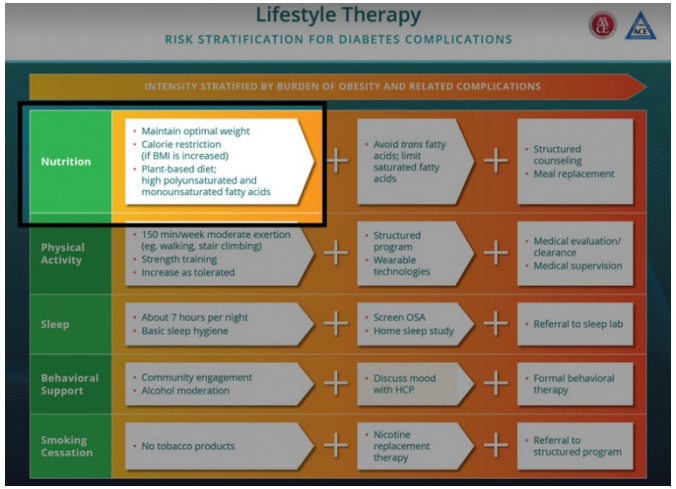
Diabetologia. 2023 Jun;66(6):965-985. doi: 10.1007/s00125-023-05894-8.

Evidence-based European recommendations for the dietary management of diabetes

Diabetes and Nutrition Study Group (DNSG) of the European Association for the Study of Diabetes (EASD)

Collaborators + expand

PMID: 37069434 DOI: 10.1007/s00125-023-05894-8



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Eating is emotional

Motivation to change

Simple swaps

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Simple substitutions

- Choose soy milk over cow's milk.
- Swap eggs with tofu in a scramble.
- Add black beans to tacos in place of minced meat
- Top pasta dishes with nutritional yeast instead of cheese.
- Try banana nice cream as an alternative to ice-cream
- Use tempeh in a stir-fry instead of chicken.

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Adding more vegetables

- Start meals with a salad or vegetable soup, or serve a side of sautéed greens.
- Have a plate of prepared raw veggies available for snacking.
- Keep a variety of frozen vegetables on hand, for a quick addition to any meal.
- Roast a big batch of mixed vegetables that can be used for a few meals.
- Incorporate vegetables into smoothies.

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ONE THING

- That surprised you
- That you'll take and use with your patients when you go back to work next week
- Come and chat!

- THANK YOU!!!

@PLANTPOWERDOCTOR

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Further Reading for Consolidation of the Evidence for Plant Based Nutrition on Diabetes

- https://pbdmedicine.org/2017/11/17/the-prevention-and-treatment-of-type-2-diabetes-mellitus-with-a-plant-based-diet-published/#more-631
- http://journals.plosid=10.1371/journal.pone.0088547.org/plosone/article?
- Taiwanese study of vegetarians vs omnivores - half the risk of diabetes. In the sample size no vegans had diabetes. Vegetarians had higher intakes of carbohydrates, fiber, calcium, magnesium, total and non-heme iron, folate, vitamin A, and lower intakes of saturated fat, cholesterol, and vitamin B12.
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Further Reading for Consolidation of the Evidence 2

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