

Preventing, improving & reversing diabetes through Whole Food Plant Based Nutrition

{ Dr Mahesh Shah



Who I am...

& GP

& Nutritional Therapist

& UK Director of Reversive Medicine for
WFPB.ORG

& Medical Advisor for Humane Being

BLUE ZONES

LONGEVITY HOTSPOTS

LOMA LINDA
CALIFORNIA

NICOYA
COSTA RICA

SARDINIA
ITALY

ICARIA
GREECE

OKINAWA
JAPAN

BLUE ZONE LIFE LESSONS



MOVE NATURALLY



RIGHT TRIBE



RIGHT OUTLOOK



EAT WISELY

macular degeneration inflammation
cataracts lyme heart attack autism
migraine lyme arthritis COPD stroke neuropathy
asthma depression liver diabetes colitis stroke
arthritis cholesterol HIV obesity
diabetes neuropathy stroke insomnia alzheimer's
parkinson's
Chronic Disease
liver lupus stroke sleep apnea thyroid disorder
hypertension migraine colitis
down's fibromyalgia heart attack bi-polar arthritis
autism lyme autoimmune depression
kidney disease toxicity cataracts

Diabetes

- ⌘ A common understanding: When one has high blood sugars
- ⌘ Type 1 diabetes – the immune system attacks and destroys the cells that make insulin – the hormone which helps us control blood sugar levels

Diabetes

- & Type 2 diabetes – the body doesn't respond as well to insulin (and not as much as much insulin)
- & Pre-diabetes – sugar levels that are higher than normal

Diabetes UK & worldwide

UK

- ⌘ 3.7 million diagnosed with diabetes
- ⌘ 4.6 million likely to have diabetes
- ⌘ 12.3 million at risk of diabetes

Worldwide

- ⌘ Diabetes has risen from 108 million in 1980 to 422 million in 2014
- ⌘ 2016 - 1.6 million deaths were directly caused by diabetes

Signs & symptoms

⌘ Thirst

⌘ Passing urine more frequently

⌘ Tiredness

⌘ Itching around the genitalia, or frequent thrush

⌘ Slowly healing cuts or wounds

⌘ Blurred vision

⌘ Weight loss

Major Complications of Diabetes

Microvascular

Eye

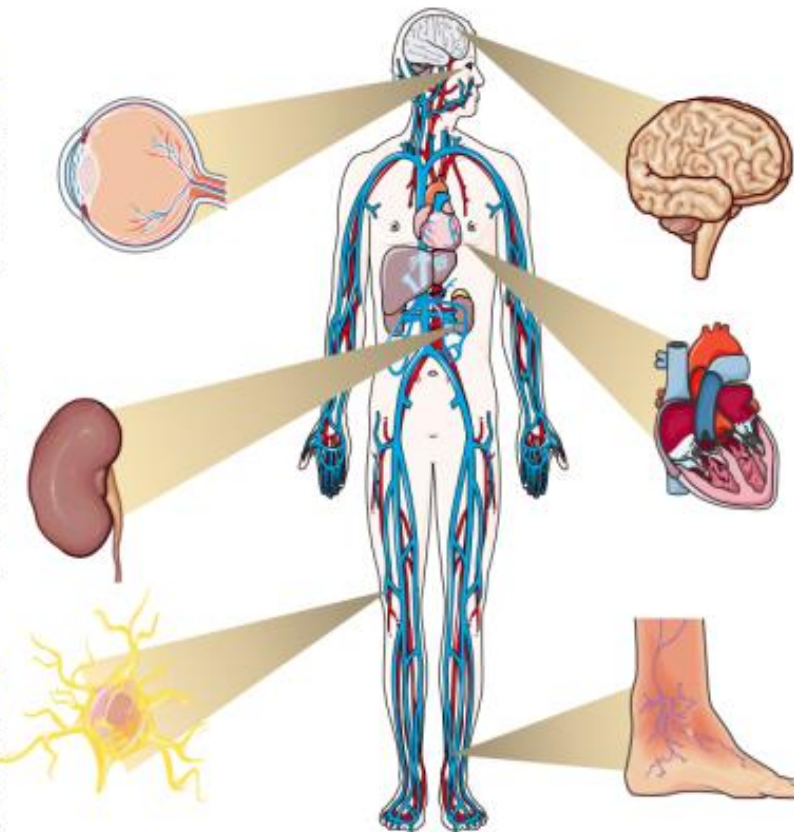
High blood glucose and high blood pressure can damage eye blood vessels, causing retinopathy, cataracts and glaucoma

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 gangrene and other complications.



ORGANIC BALANCE CALORIES NATURAL BEAUTY WELLNESS WALK PLANNING REGENERATION LIFESTYLE ENERGY MOTIVATION WEIGHT LOSS ACHIEVE IMPORTANT BODY FOCUS RESOLUTION CARDIO WALK BEAUTY EXERCISE CALORIES BODY
VITAMIN ASSESSMENT EAT EXERCISE WEIGHT LOSS CALORIES BODY
WEIGHT LOSS FRUIT NUTRITION TRANSFORMATION VITAMIN MOTIVATION

LIFESTYLE

ENDURANCE WEIGHT LOSS RESOLUTION GOALS ACTIVE TRAINING MOVE SUCCESS FITNESS BODY PERFORMANCE RUN EXERCISE PERFORMANCE
CARDIO IMPORTANT ENDURANCE HEALTHY RESOLUTION BODY PERFORMANCE RUN EXERCISE PERFORMANCE



**What ideas do you have
about food and diabetes?**

Ketogenic Food Pyramid



Exclude These Foods



Bread



Pasta



Sugar



Milk



Corn



Beans



Rice

Ketogenic Diet Short-Term Benefits:

- **Rapid weight loss**
- **Reduced fasting glucose**
- **Reduced post-meal glucose**
- **Reduced A1c**
- **Reduced total cholesterol**
- **Reduced LDL cholesterol**
- **Flatline blood glucose**

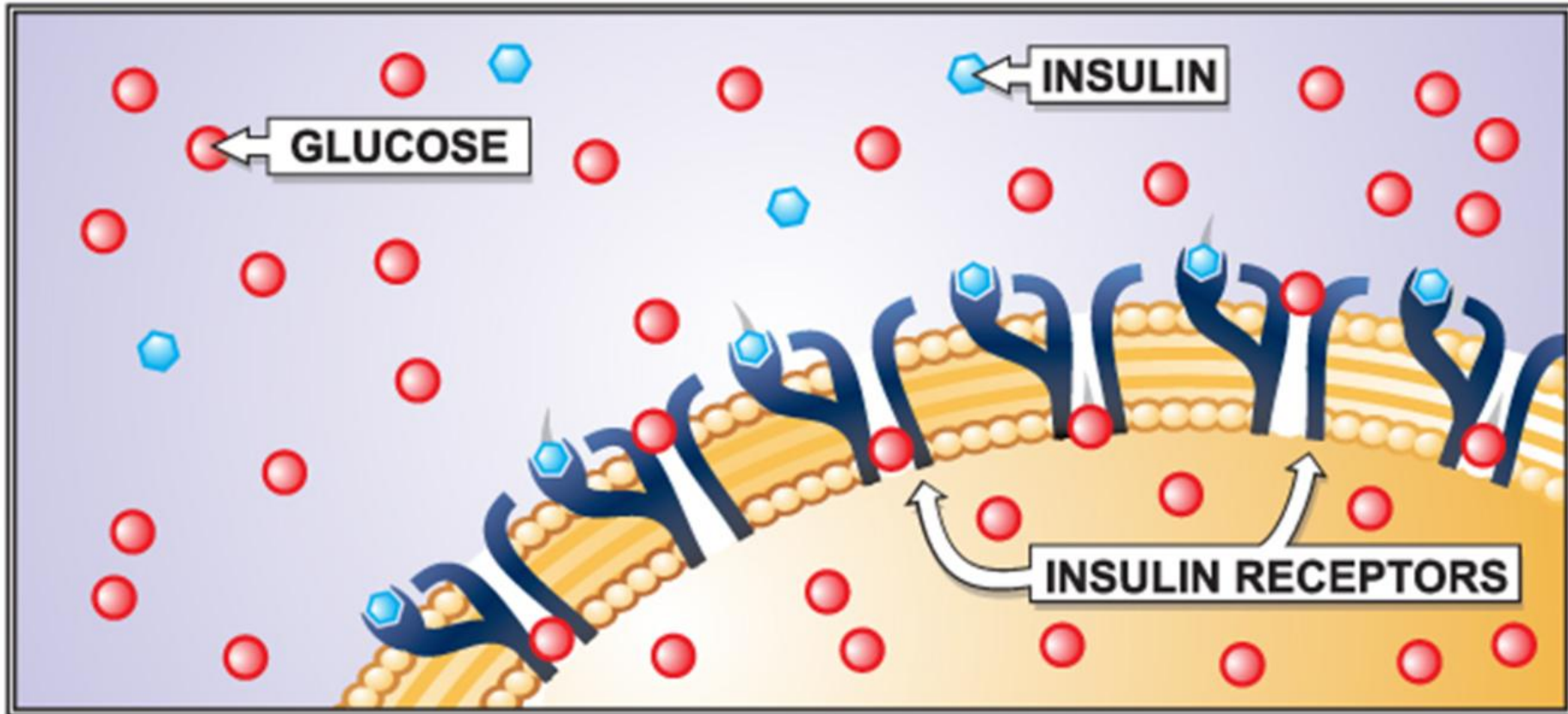
Kinsman, S., Vining, E., Quaskey, S., Mellits, D. and Freeman, J. (1992). Efficacy of the Ketogenic Diet for Intractable Seizure Disorders: Review of 58 Cases. *Epilepsia*, 33(6), pp.1132-1136.

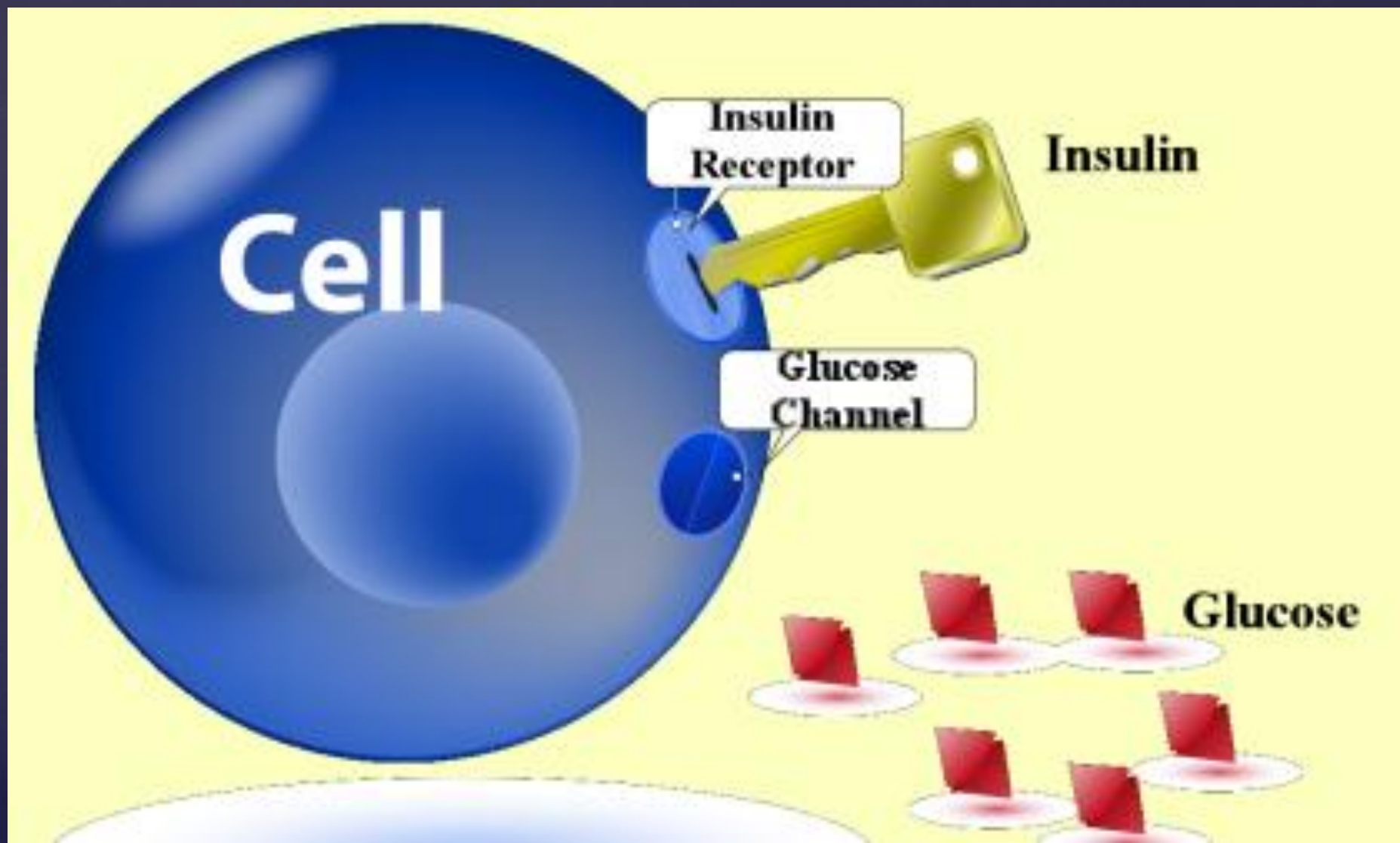
Vining, E. (1998). A Multicenter Study of the Efficacy of the Ketogenic Diet. *Archives of Neurology*, 55(11), p.1433.

Gasior, M., Rogawski, M. and Hartman, A. (2006). Neuroprotective and disease-modifying effects of the ketogenic diet. *Behavioural Pharmacology*, 17(5-6), pp.431-439.

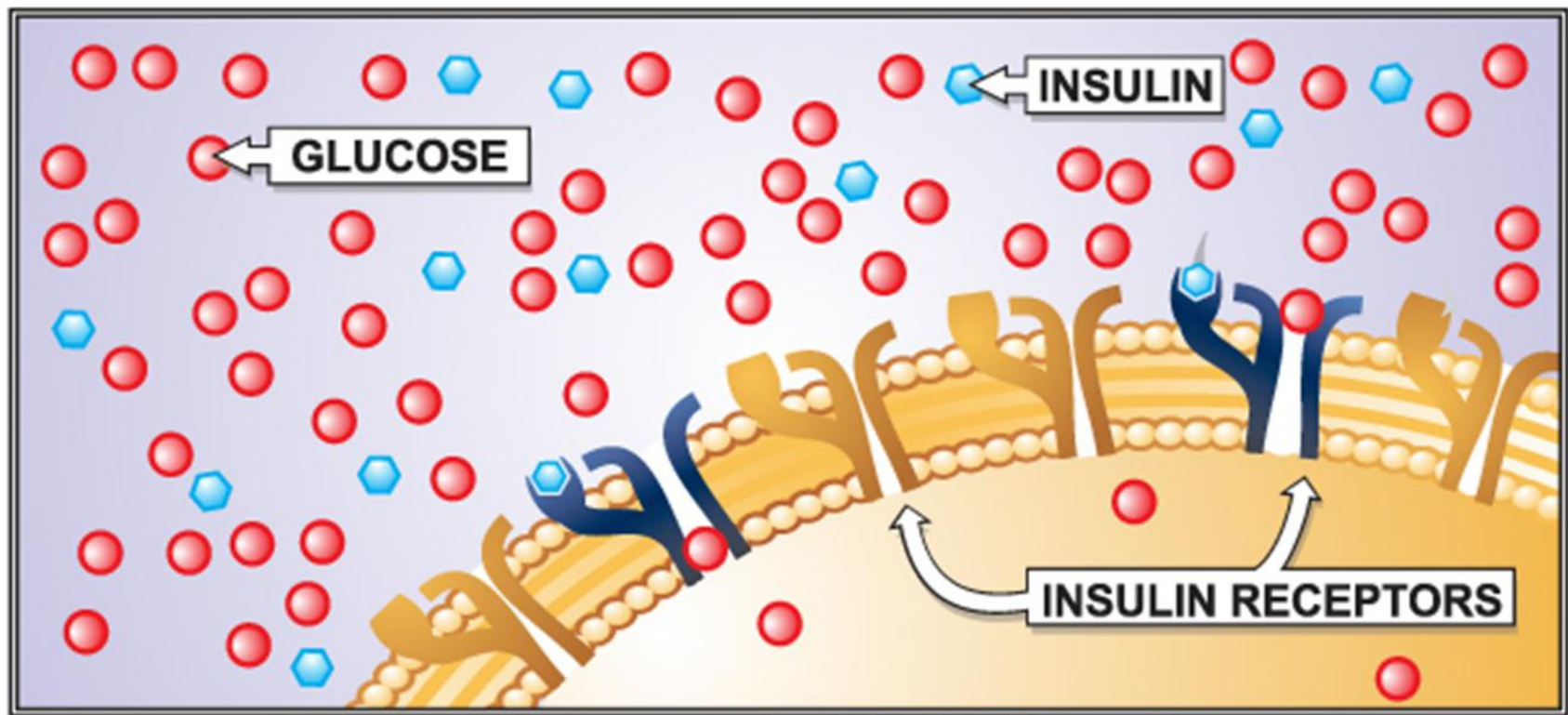
**Let's familiarise with how
things work in the body...**

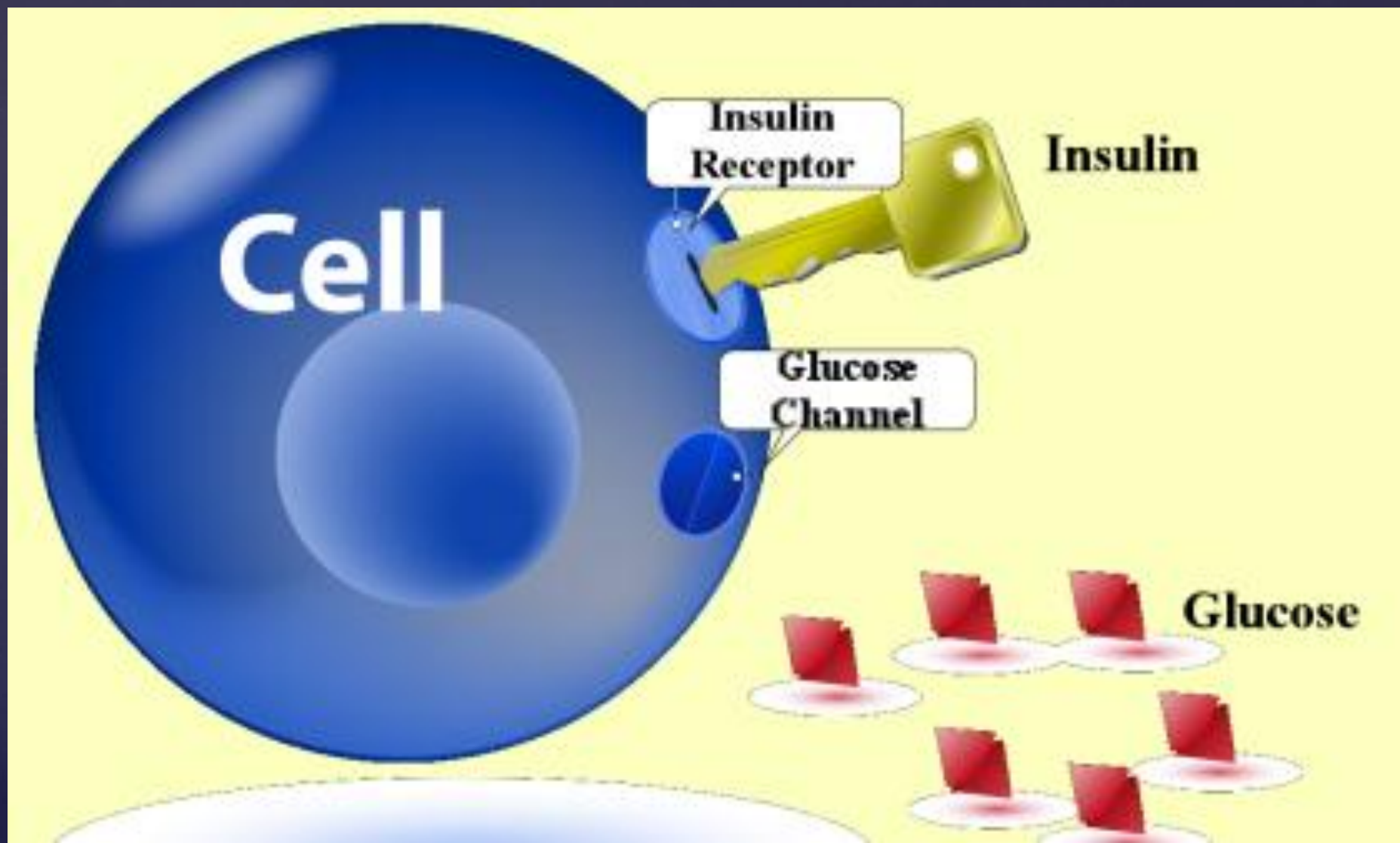
NORMAL CELL





INSULIN RESISTANT CELL





Cell

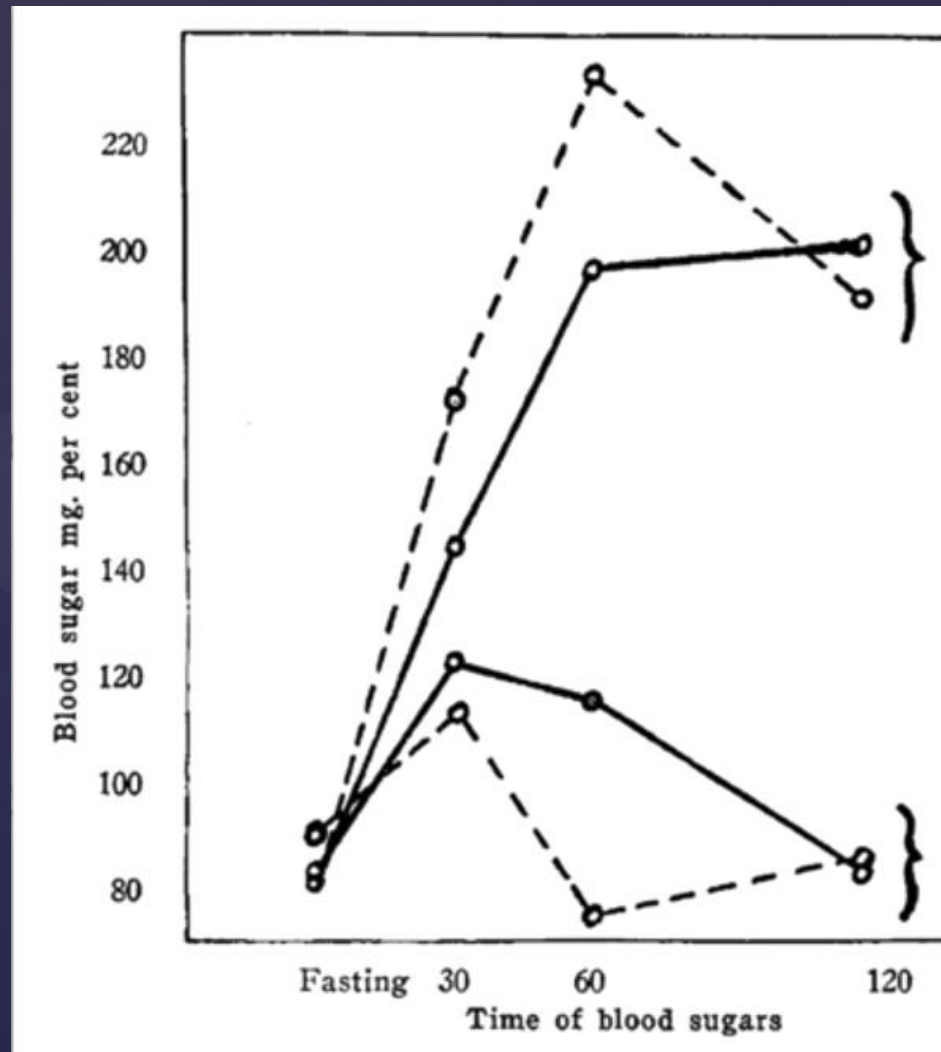
Insulin Receptor

Insulin

Glucose Channel

Glucose

1927 & Dr Sweeney's students!

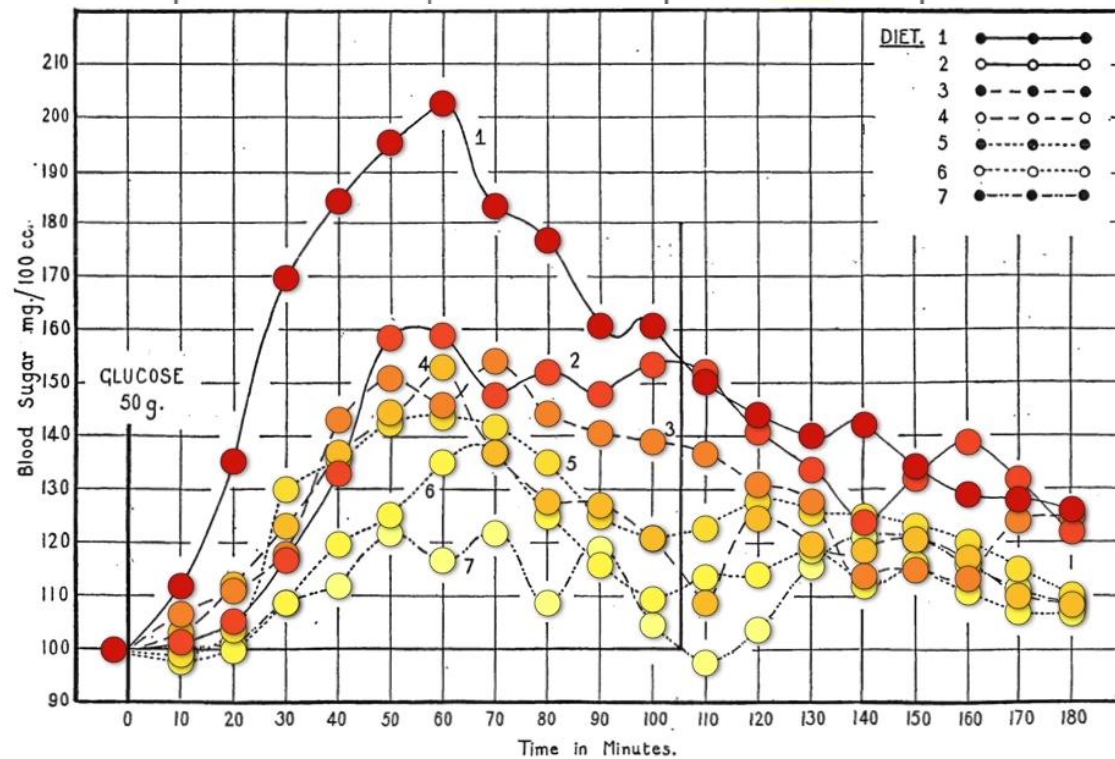


Sweeney JS (1927), 'Dietary factors that influence the dextrose tolerance test', *Arch Intern Med*, 40(9), pp 818-830.

<https://nutritionfacts.org/video/what-causes-insulin-resistance/> - numerous studies, all cited

TABLE II. DIETS (SERIES 1).

Diet No.	Composition			Calories
	Carb.	Prot.	Fat.	
1	50	80	210	2,680
2	125	80	207	2,680
3	200	80	173	2,680
4	275	80	140	2,680
5	350	80	107	2,680
6	425	80	73	2,680
7	500	80	40	2,680



The background of the slide is a microscopic image of adipose tissue, showing large, clear lipid droplets within cells, outlined by a blue-stained cell membrane. The text 'SATURATED FAT!' is overlaid in a large, bold, red serif font in the center of the image.

SATURATED FAT!

Krssak, M., Falk Petersen, K., Dresner A. et al (1999). Intramyocellular lipid concentrations are correlated with insulin sensitivity in humans: a 1 H NMR spectroscopy study. *Diabetologia*, 42(1), pp.113-116.

Diabetes as a Disease of Fat Toxicity, Michael Greger M.D. FACLM ,April 8th, 2015 Volume 24 – www.nutritionfacts.org

Estadella, D., da Penha Oller do Nascimento, C., Oyama, L., Ribeiro, E., Dâmaso, A. and de Piano, A. (2013). Lipotoxicity: Effects of Dietary Saturated and Transfatty Acids. *Mediators of Inflammation*, 2013, pp.1-13.

Cunha, D., Igoillo-Esteve, M., Gurzov, E., Germano, C., Naamane, N., Marhfour, I., Fukaya, M., Vanderwinden, J., Gysemans, C., Mathieu, C., Marselli, L., Marchetti, P., Harding, H., Ron, D., Eizirik, D. and Cnop, M. (2012). Death Protein 5 and p53-Upregulated Modulator of Apoptosis Mediate the Endoplasmic Reticulum Stress-Mitochondrial Dialog Triggering Lipotoxic Rodent and Human -Cell Apoptosis. *Diabetes*, 61(11), pp.2763-2775.

Xiao, C., Giacca, A., Carpentier, A. and Lewis, G. (2006). Differential effects of monounsaturated, polyunsaturated and saturated fat ingestion on glucose-stimulated insulin secretion, sensitivity and clearance in overweight and obese, non-diabetic humans. *Diabetologia*, 49(6), pp.1371-1379.

Saturated fat from...



METABOLIC DOMINOES

Domino #2

Dysfunctional
insulin receptors

Domino #3

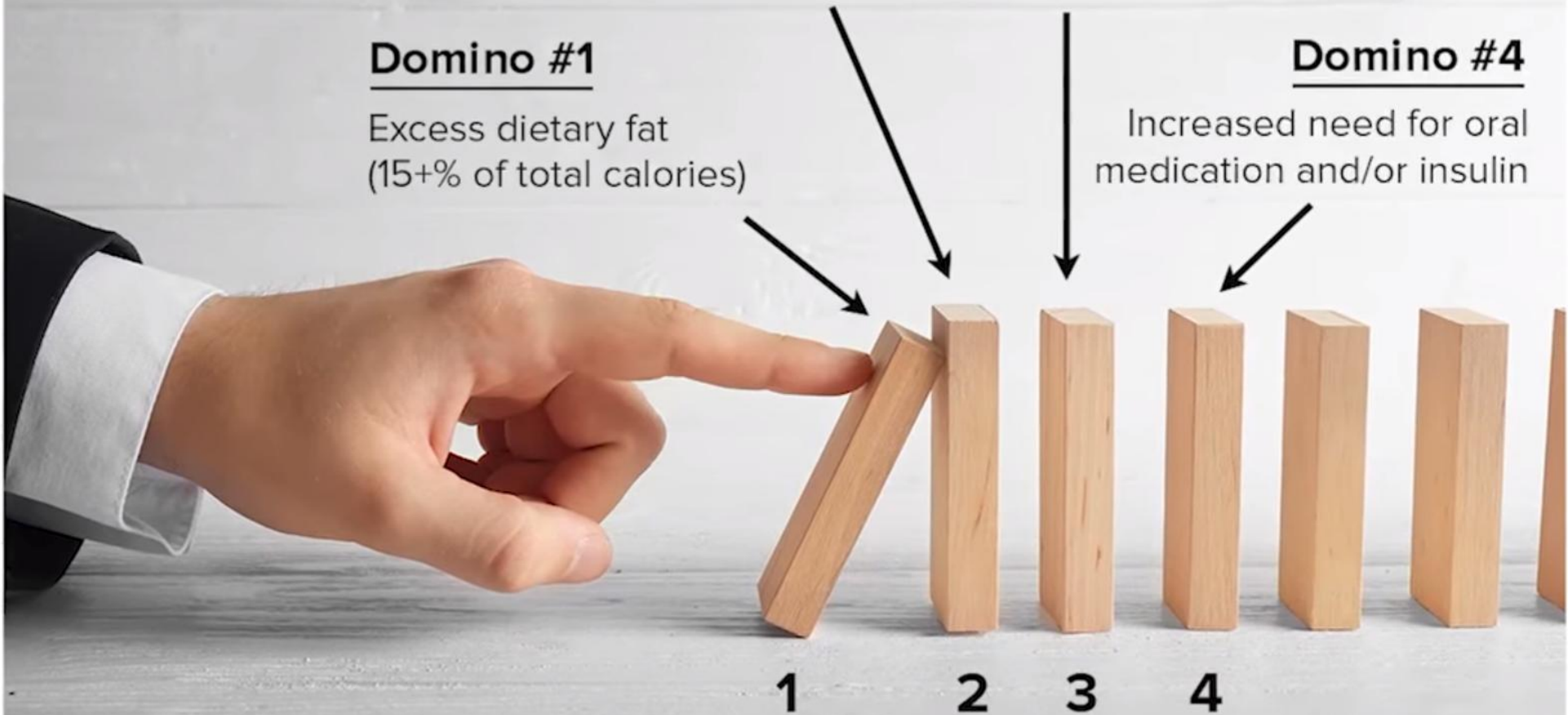
Glucose is trapped
in your blood

Domino #1

Excess dietary fat
(15+% of total calories)

Domino #4

Increased need for oral
medication and/or insulin



These are the molecular mechanisms that cause insulin resistance

The Gut Microbiome

Trillions of microorganisms, mainly bacteria, in the large bowel

There is a symbiotic relationship between the host body and the microbiota

Healthy levels of beneficial bacteria important for normal physiological processes, including cardiovascular health

Help synthesise nutrients e.g. SCFA, B vitamins, Vit K2

Gestation, mode of delivery and feeding can all affect the microbiome

Prebiotics – un-digestible fibres stimulate growth of beneficial bacteria e.g. FOS, inulin, resistant starches



Obesity & the microbiome

- ⌘ Microbial imbalance (dysbiosis) may be a key factor in obesity
- ⌘ There may be reduced microbial diversity
- ⌘ Difference in energy extraction & gut peptide synthesis e.g. GLP1

Mirza H et al. A metronidazole-resistant isolate of *Blastocystis* spp. is susceptible to nitric oxide and downregulates intestinal epithelial inducible nitric oxide synthase by a novel parasite survival mechanism. *Infect Immun*. 2011; 79 (12): 5019-5026.

Nourrisson C et al. *Blastocystis* is associated with decrease of fecal microbiota protective bacteria: comparative analysis between patients with Irritable Bowel Syndrome and control subjects. *PLoS ONE*. 2014; 9 (11): e111868

Ralston KS et al. Trophocytosis by *Entamoeba histolytica* contributes to cell killing and tissue invasion. *Nature*. 2014; 508 (7497): 526-30

MacDonald, P., El-kholy, W., Riedel, M., Salapatek, A., Light, P. and Wheeler, M. (2002). The Multiple Actions of GLP-1 on the Process of Glucose-Stimulated Insulin Secretion. *Diabetes*, 51(Supplement 3), pp.S434-S442.

Yamane, S. and Inagaki, N. (2018). Regulation of glucagon-like peptide-1 sensitivity by gut microbiota dysbiosis. *Journal of Diabetes Investigation*, 9(2), pp.262-264.

BLUE ZONES

LONGEVITY HOTSPOTS

LOMA LINDA
CALIFORNIA

NICOYA
COSTA RICA

SARDINIA
ITALY

ICARIA
GREECE

OKINAWA
JAPAN

BLUE ZONE LIFE LESSONS



MOVE NATURALLY



RIGHT TRIBE

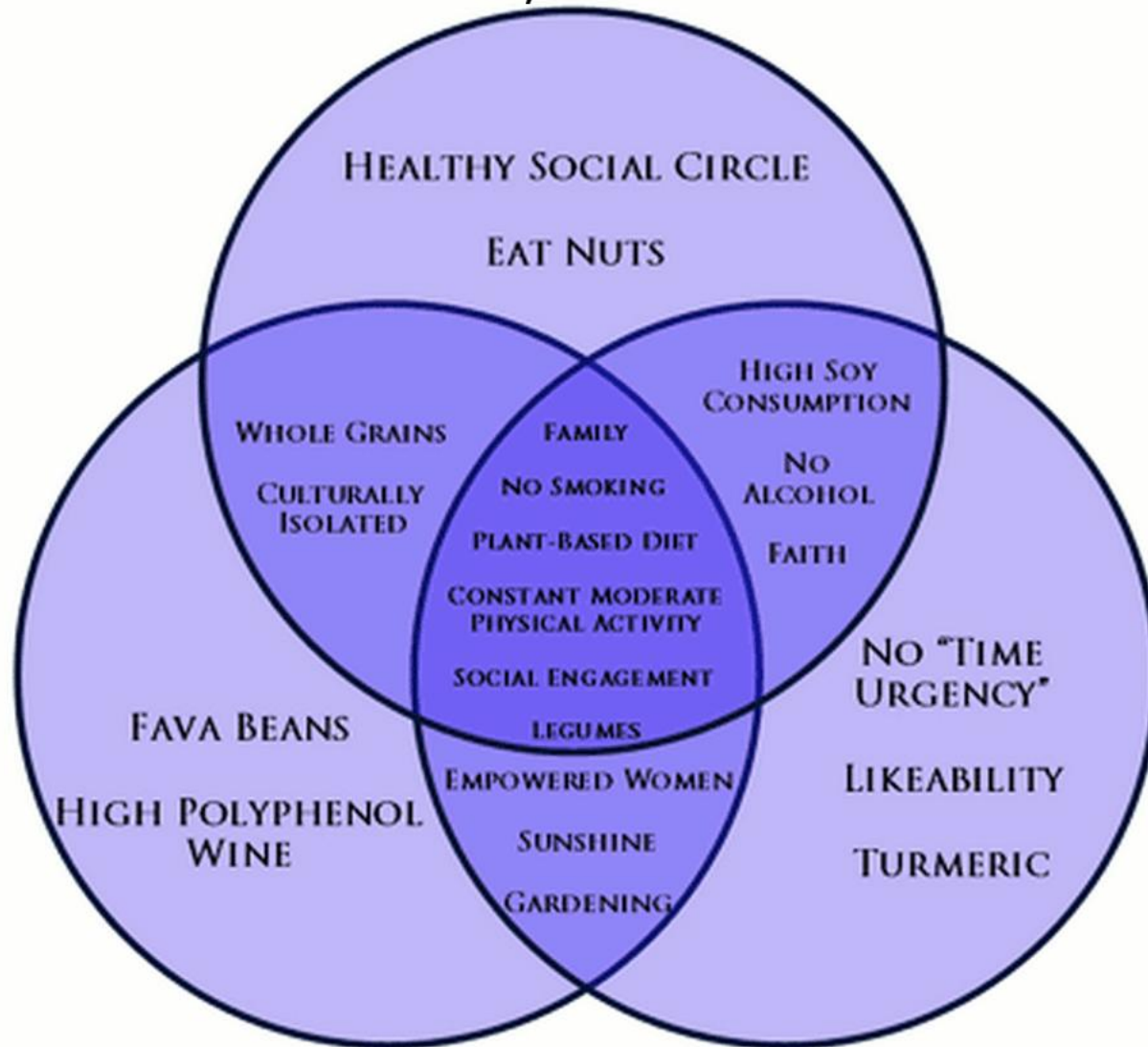


RIGHT OUTLOOK



EAT WISELY

Loma Linda, United States



Sardinia,
Italy

Okinawa,
Japan

A Plant Based Diet centres around...

- **Whole foods**

- **Fruits and veg**
- **Wholegrains**
- **Legumes**
- **Nuts & seeds**
- **Spices**

- **Full of:**

- **Micronutrients, phytonutrients, fibre**
- **Healthy protein, fats, carbs**



But what about fruits for diabetics???

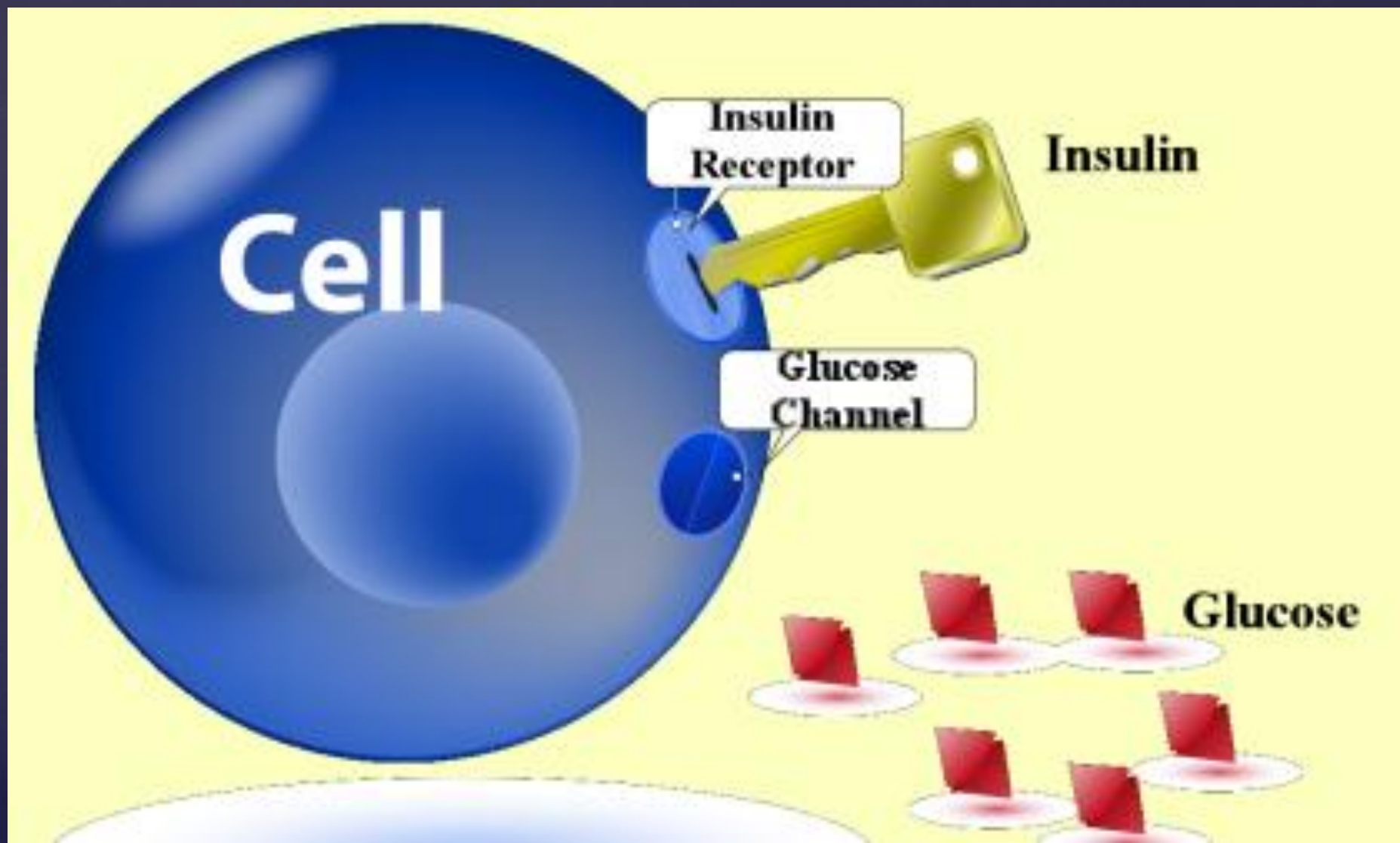


<https://nutritionfacts.org/video/how-much-fruit-is-too-much/>










Jenkins, D., Kendall, C., Popovich, D., Vidgen, E., Mehling, C., Vuksan, V., Ransom, T., Rao, A., Rosenberg-Zand, R., Tariq, N., Corey, P., Jones, P., Raeini, M., Story, J., Furumoto, E., Illingworth, D., Pappu, A. and Connelly, P. (2001). Effect of a very-high-fiber vegetable, fruit, and nut diet on serum lipids and colonic function. *Metabolism*, 50(4), pp.494-503.

Muraki, I., Imamura, F., Manson, J., Hu, F., Willett, W., van Dam, R. and Sun, Q. (2013). Fruit consumption and risk of type 2 diabetes: results from three prospective longitudinal cohort studies. *BMJ*, 347(aug28 1), pp.f5001-f5001.

<https://nutritionfacts.org/video/if-fructose-is-bad-what-about-fruit/>



Adventist Health Study - 2

	BEEF	POULTRY/FISH	DAIRY/EGGS	Diet group	Diabetes ³
NON-VEGE				Nonvegetarian	1.00
SEMI-VEGE				Semivegetarian	0.72 (0.65, 0.79)
PESCO-VEGE	NONE			Pescovegetarian	0.49 (0.44, 0.55)
LACTO-OVO	NONE	NONE		Lactoovo-vegetarian	0.39 (0.36, 0.42)
VEGAN	NONE	NONE	NONE	Vegan	0.22 (0.18, 0.28)
				<i>P</i> ⁴	0.0001
				<i>n</i> = 89,224.	

- S Tonstad, K Stewart, K Oda, M Batech, R P Herring, G E Fraser. Vegetarian diets and incidence of diabetes in the Adventist Health Study-2. *Nutr Metab Cardiovasc Dis.* 2013 Apr;23(4):292-9

- <https://nutritionfacts.org/video/plant-based-diets-and-diabetes/>

Adventist Health Study - 2

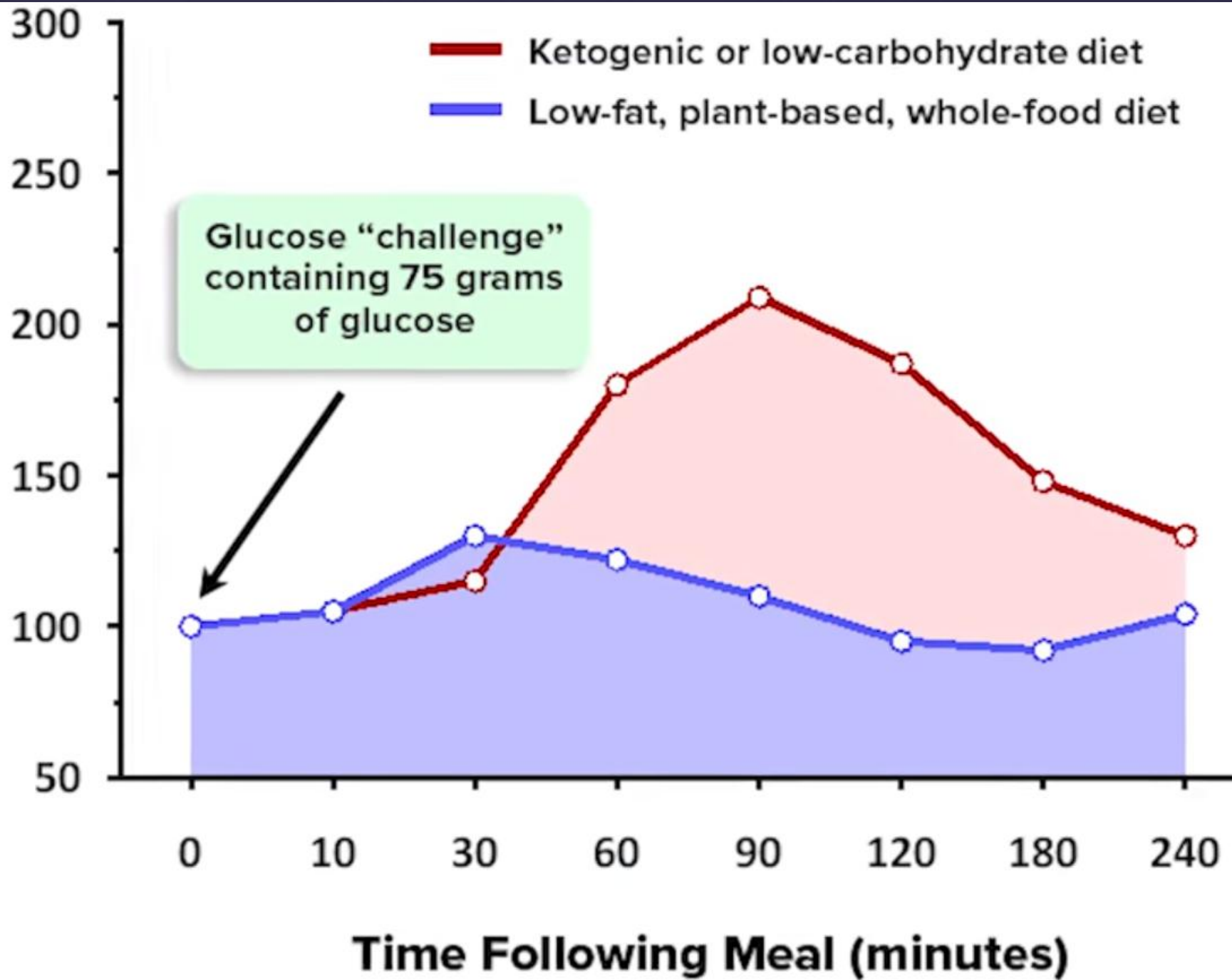
Diet group	BMI ²	Diabetes ³	Hypertension ³
Nonvegetarian	28.26 (28.22, 28.30)	1.00	1.00
Semivegetarian	27.00 (26.96, 27.04)	0.72 (0.65, 0.79)	0.77 (0.72, 0.82)
Pescovegetarian	25.73 (25.69, 25.77)	0.49 (0.44, 0.55)	0.62 (0.59, 0.66)
Lactoovo-vegetarian	25.48 (25.44, 25.52)	0.39 (0.36, 0.42)	0.45 (0.44, 0.47)
Vegan	23.13 (23.09, 23.16)	0.22 (0.18, 0.28)	0.25 (0.22, 0.28)
<i>P</i> ⁴	0.0001	0.0001	0.0001

n = 89,224.

- S Tonstad, K Stewart, K Oda, M Batech, R P Herring, G E Fraser. Vegetarian diets and incidence of diabetes in the Adventist Health Study-2. Nutr Metab Cardiovasc Dis. 2013 Apr;23(4):292-9

- <https://nutritionfacts.org/video/plant-based-diets-and-diabetes/>

Blood glucose (mg/dL)



Time Following Meal (minutes)

Long-Term Side Effects of Ketogenic Diets

diarrhea, nausea, constipation, vomiting, acid reflux, hair loss, kidney stones, muscle cramps or weakness, hypoglycemia, low platelet count, impaired cognition, inability to concentrate, impaired mood, disordered mineral metabolism, stunted growth in children, increased risk for bone fractures,

Groesbeck, D., Bluml, R. and Kossoff, E. (2007). Long-term use of the ketogenic diet in the treatment of epilepsy. *Developmental Medicine & Child Neurology*, 48(12), pp.978-981.

Kang, H., Chung, D., Kim, D. and Kim, H. (2004). Early- and Late-onset Complications of the Ketogenic Diet for Intractable Epilepsy. *Epilepsia*, 45(9), pp.1116-1123.

Coppola, G., Veggiotti, P., Cusmai, R., Bertoli, S., Cardinali, S., Dionisi-Vici, C., Elia, M., Lispi, M., Sarnelli, C., Tagliabue, A., Toraldo, C. and Pascotto, A. (2002). The ketogenic diet in children, adolescents and young adults with refractory epilepsy: an Italian multicentric experience. *Epilepsy Research*, 48(3), pp.221-227.

Suo, C., Liao, J., Lu, X., Fang, K., Hu, Y., Chen, L., Cao, D., Huang, T., Li, B. and Li, C. (2013). Efficacy and safety of the ketogenic diet in Chinese children. *Seizure*, 22(3), pp.174-178.

Long-Term Side Effects of Ketogenic Diets

**osteopenia and osteoporosis,
increased bruising, acute pancreatitis,
hyperlipidemia, high cholesterol,
insulin resistance, elevated cortisol,
heart arrhythmia, myocardial infarction,
menstrual irregularities,
amenorrhea (loss of periods),
all-cause mortality**

Bergqvist, A., Schall, J., Stallings, V. and Zemel, B. (2008). Progressive bone mineral content loss in children with intractable epilepsy treated with the ketogenic diet. *The American Journal of Clinical Nutrition*, 88(6), pp.1678-1684.

<https://www.ncbi.nlm.nih.gov/pubmed/22003821>

Stewart, W., Gordon, K. and Camfield, P. (2001). Acute Pancreatitis Causing Death in a Child on the Ketogenic Diet. *Journal of Child Neurology*, 16(9), pp.682-682.

Johnston, C., Tjonn, S., Swan, P., White, A., Hutchins, H. and Sears, B. (2006). Ketogenic low-carbohydrate diets have no metabolic advantage over nonketogenic low-carbohydrate diets. *The American Journal of Clinical Nutrition*, 83(5), pp.1055-1061.

Bank, I., Shemie, S., Rosenblatt, B., Bernard, C. and Mackie, A. (2008). Sudden Cardiac Death in Association With the Ketogenic Diet. *Pediatric Neurology*, 39(6), pp.429-431.

Plant based diet and diabetes

IS IT THE FOOD OR THE WEIGHT LOSS?

- ⌘ 20 diabetic, insulin injecting men (15-57u/day)
- ⌘ Fed a whole food plant based diet
- ⌘ Weight neutral effect



& **Overweight/obese**

& **Type 2 diabetes**

& **High blood pressure**

& **High cholesterol**

& **Chest pains**

& **TRIPLE BYPASS**

FIGURE 1

Restoration of myocardial perfusion²

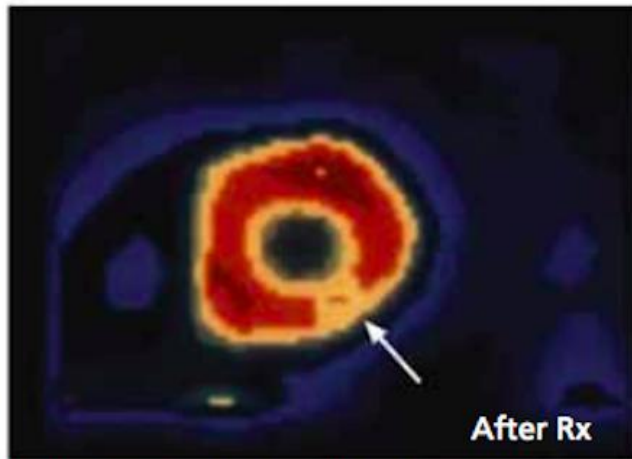
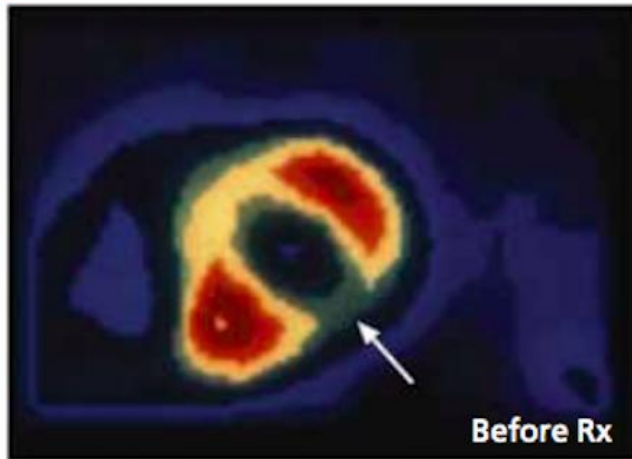
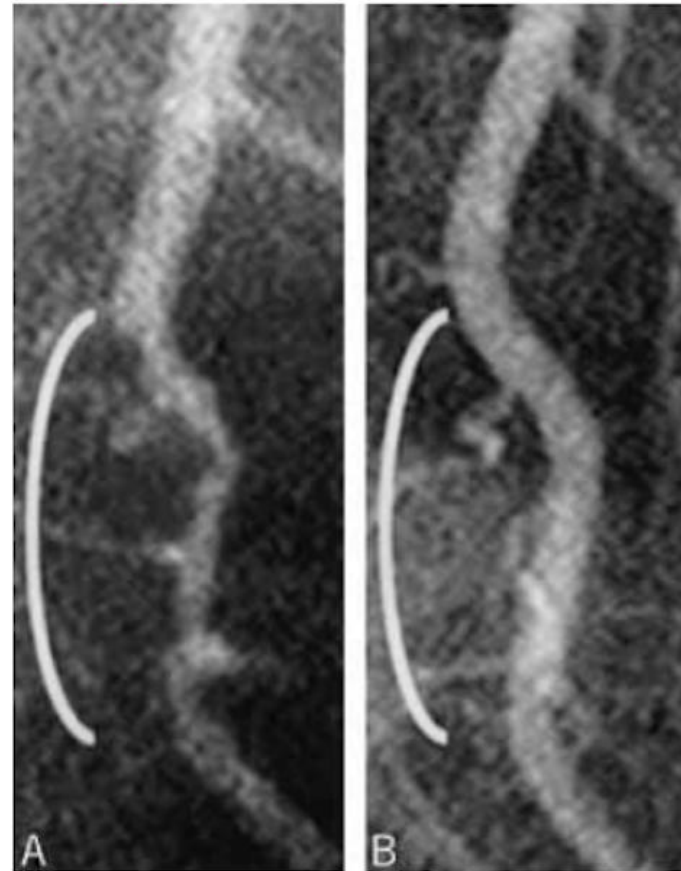


FIGURE 1 FROM: PREVENT AND REVERSE HEART DISEASE BY CALDWELL B. ESSELSTYN, JR., M.D., COPYRIGHT © 2007 BY CALDWELL B. ESSELSTYN, JR., M.D., USED WITH PERMISSION OF AVERY PUBLISHING, AN IMPRINT OF PENGUIN GROUP (USA) LLC.

Positron emission tomography performed on a patient with coronary artery disease shows an area of myocardium with insufficient blood flow (top). Following only 3 weeks of plant-based nutritional intervention, normal blood flow was restored (bottom).

FIGURE 2

Reversal of coronary artery disease⁴



Coronary angiography reveals a diseased distal left anterior descending artery (A). Following 32 months of a plant-based nutritional intervention without cholesterol-lowering medication, the artery regained its normal configuration (B).

So you want to go plant based!

- ⌘ You can get all the nutrition you need from a whole food plant based diet
- ⌘ B12 supplementation (+ Vit D) – get levels checked
- ⌘ Whole foods – sugar, oil and salt free
- ⌘ You don't have to give up anything!

**But what about
your protein &
calcium???**



Viva!

Protein-rich foods



Edamame (soya beans)



Quinoa



Red kidney beans



Chick peas



Mangetout



Almonds



Rice (brown)



Spaghetti (whole wheat)



Peanut butter
and peanuts



Baked beans



Lentils
(green, brown and red)



Broccoli



Mung beans



Flour: wholemeal,
chapatti, soya



Tofu



Mushy peas



Cashew nuts



Pistachio nuts



Sesame seeds



Sunflower seeds



Bread (wholemeal)



Muesli



Breakfast cereals:
Ready Brek, Shredded
Wheat, Weetabix



Walnuts



Asparagus



Watercress

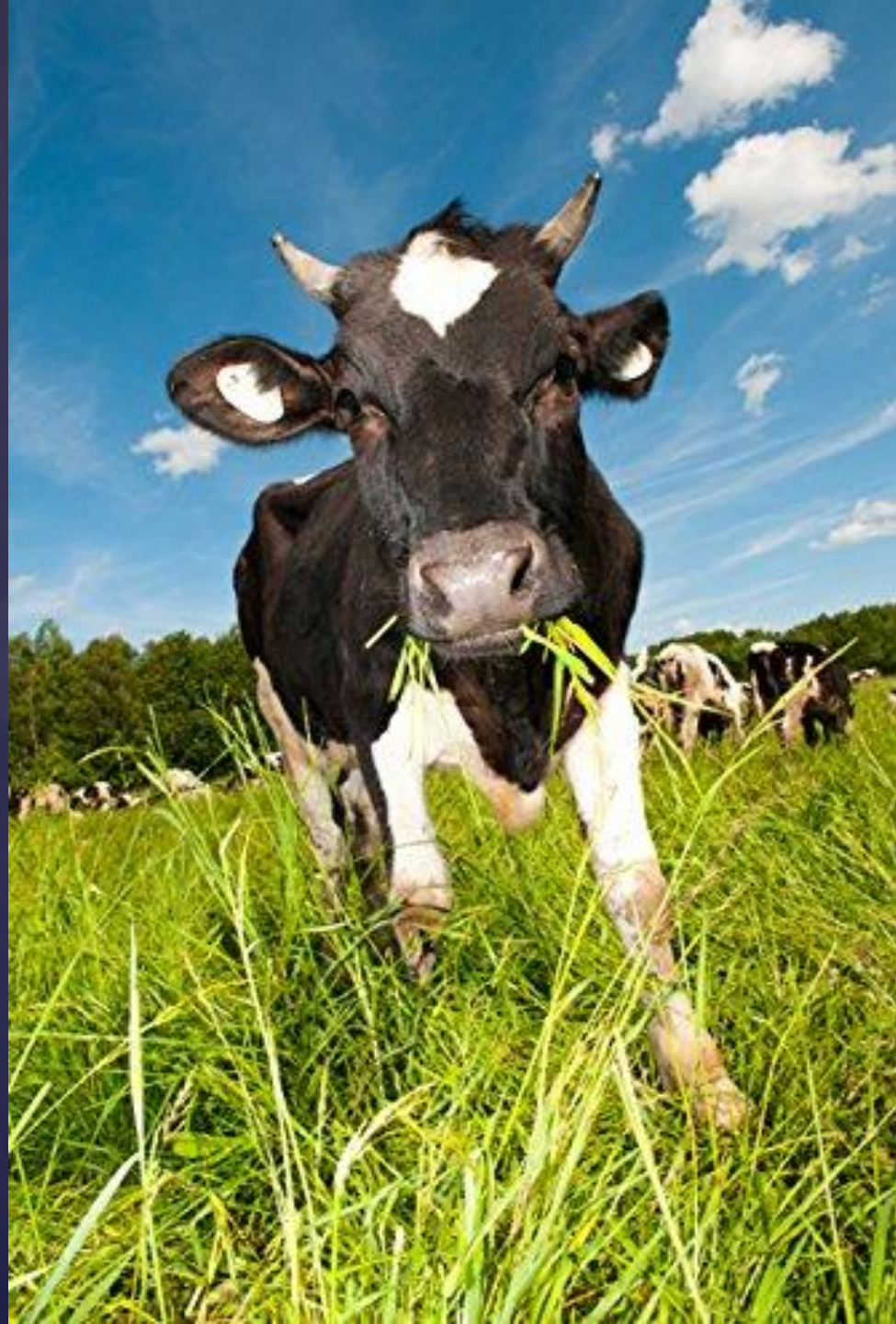


Brussels sprouts



Corn on the cob

www.viva.org.uk www.vivahealth.org.uk
www.veganrecipeclub.org.uk



Viva!

Calcium-rich foods



Almonds



Amaranth grain



Asparagus



Apricots (dried)



Artichokes



Baked beans (haricot)



Blackberries



Blackstrap molasses



Blackcurrants



Bok choy



Brazil nuts



Bread (wholemeal)



Broccoli



Chickpeas



Cinnamon



Edamame (soya beans)



Fennel



Kale



Kidney beans



Olives



Oranges



Sesame seeds
(and other seeds)



Soya milk (fortified)



Spring greens



Tofu



Swede



Walnuts



Watercress

Dairy – not as healthy as you think!

& Fat

& Protein

& Hormones

& Pus

& Heart disease, diabetes, hormone problems, cancer etc...



**What about my
Indian food, mithai
and snacks?!**



Coconut barfi

Ingredients

- ⌘ 2 cups desiccated coconut/fresh coconut
- ⌘ ½ cup coarsely powdered cashews
- ⌘ ¼ cup dry dates powder
- ⌘ ½ tsp cardamom powder
- ⌘ 1 cup raisins or as required to bind the barfi

Method

- ⌘ Mix all the ingredients except the raisins very well. Mash the raisins and knead them in the coconut mixture. Press this mixture in the steel plate and cut into the desired shapes. Garnish with desiccated coconut. Refrigerate the barfi for 6-8 hours before de-plating. Store in the refrigerator.

Makes about 25 squares

More on sharan-india.org

[ABOUT US](#)[HEALTH PROGRAMMES](#)[WHY VEGAN](#)[TRY VEGAN](#)[RECIPES](#)[RESOURCES](#)

Recipes



Healthy cooking

A vegan diet is already a very healthy choice, but by cutting out sugar and oil you are even more kind to your body. This is especially important if you're trying to reverse a disease.

These recipes have been written with Indians in mind. A search for vegan recipes on the internet yields an amazing selection, which are perfect for Europe, USA and Australia/ New Zealand, but here in India many of the ingredients are not available. However we do have our own share of different, healthy, locally grown vegan ingredient

[Read mores](#)

[Cooking for health](#)
[Recipe booklets and DVDs](#)

Recipes

[Dairy and meat alternatives](#)
[Indian main dishes](#)
[Global main dishes](#)
[Breakfast](#)
[Breads and spreads](#)
[Salads & Dressings](#)
[Drinks](#)



Join our mailing list

 [▶](#)

Get in touch

[CONTACT](#)

Looking for something?

[SEARCH](#)

Follow SHARAN



[Looking for help or advice?](#)

[Translate »](#)



Oil-free Roti!

Flaxseed mix (INSTEAD OF OIL!!!)

- Milled flax seeds (2 Tbsp)
- Water (5 Tbsp)

Boil the water and add the milled flax seeds; it will go gloopy! (which is good!)

Leave to stand for 15 mins

Spelt flour (2 medium bowls)

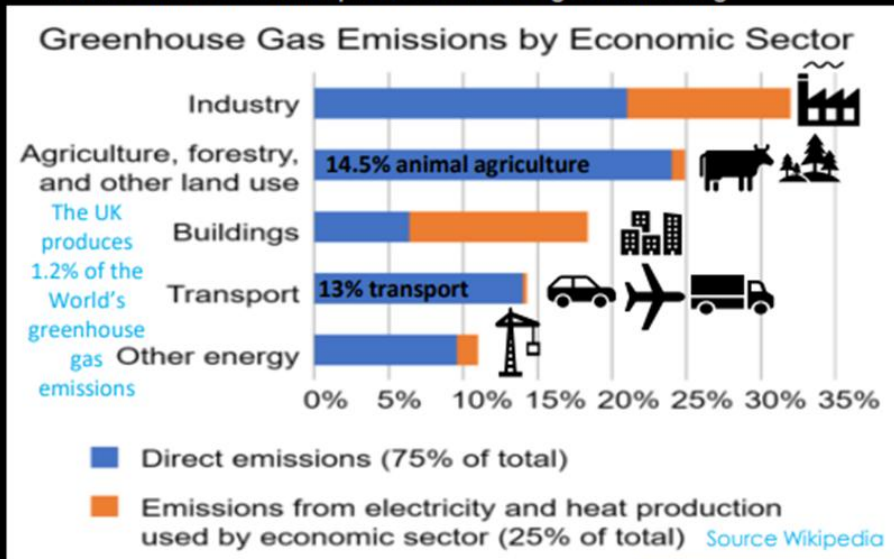
Add the flaxseed mix to this and mix well

Cook & Enjoy!

Makes approx. 6 Roti

What is causing climate change ?

- **Us** – making things for us to buy or buildings – all takes energy
- Burning **fossil fuels** for energy is the largest source of emissions of CO₂
- **Eating animals** is energy consuming, it uses more land and water and is the biggest contributor to land clearing (deforestation). A high meat diet also means a high carbon footprint
- **Habitat destruction** - deforestation – trees absorb CO₂, burning them releases it into the atmosphere and adds to global warming

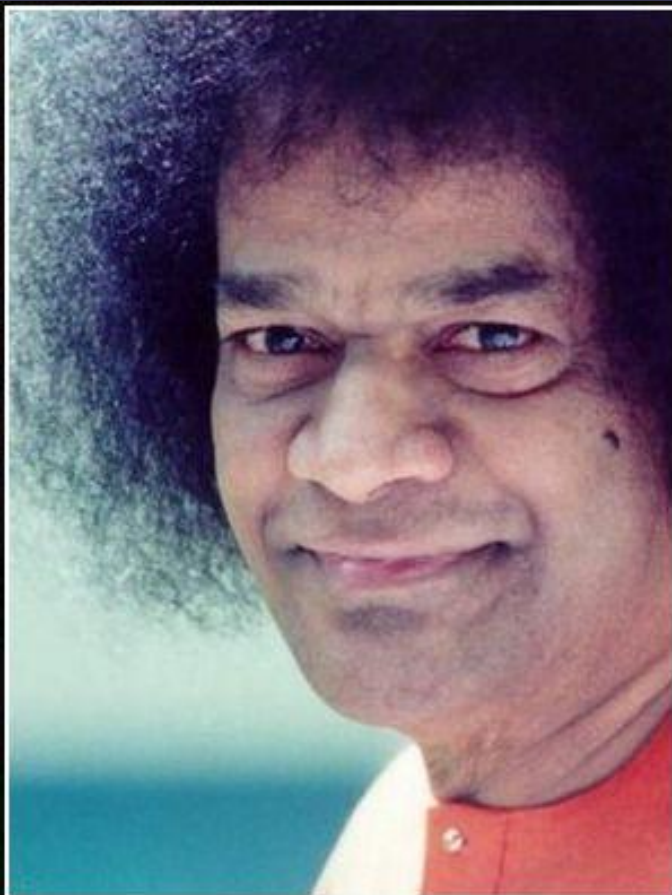


As the world warms up, feedback-loops accelerate warming – for example melting polar ice means less of the sun's heat is reflected back into space, whilst more sea means more heat retention. Climate change causes habitat destruction – for example as ice caps melt it will impact on polar bears, walruses, some seals and some sea birds.



Our lifestyles – need or greed ?

Your journey to a cruelty free, sustainable lifestyle With our support



Love all. Serve all. Help ever. Hurt
never.

— *Sathya Sai Baba* —

AZ QUOTES







RESOURCES

- www.nutritionfacts.org - by Dr Michael Greger – lots of videos of peer reviewed scientific research
- www.masteringdiabetes.org – A great resource with free evidence based info and webinars by two high carb, low fat whole food plant based type 1 diabetics with amazingly managed diabetes., one of whom has a PhD in nutritional biochemistry!
- <http://www.dresselstyn.com/site/> - wonderful cardiovascular resource by Dr Esselstyn, including scientific articles
- **How Not To Die** – Excellent book by Dr Michael Greger
- **The China Study** – One the founding research studies on the benefits of plant based diets

RESOURCES

- https://www.youtube.com/watch?v=_TokqrtFfi8 - The Most Powerful Strategy for Healing People and the Planet | Michael Klaper MD | TEDxTraverseCity
- **Prevent and Reverse Heart Disease** – book by Dr Caldwell Esselstyn!
- **Proteinaholic** – Excellent book by Dr Garth Davis (bariatric surgeon) who now prescribes plant based nutrition!
- www.cookingwithplants.com – an amazing whole food plant based cooking site with all things you'd love!
- **The How Not To Die Cookbook** – An amazing whole food plant based cook book by Dr Michael Greger

RESOURCES

- **Becoming Vegan** - A great book by Brenda Davis
- <https://www.youtube.com/watch?v=kGDYydkvg3E&t=2301s> – Are we designed to eat meat? Milton Mills MD
- <https://www.youtube.com/watch?v=Og62hbN1794> – What The Health documentary
- <https://www.youtube.com/watch?v=0CdwWliv7Hg&t=2s> - Calorie Density: How To Eat More, Weigh Less & Live Longer by Jeff Novick (Dietitian)
- **Plant Based Science London** – YouTube channel
- <https://sharan-india.org/> - Whole food plant based Indian recipes