Type 2 Diabetes

Carbohydrates and their role in diabetes

Diabetes mellitus is a group of diseases that is characterised by high levels of blood glucose. The term is usually shortened to *diabetes*. *Diabetes* is derived from the Greek via Latin meaning *siphon* which refers to the increase in urination. *Mellitus* relates to *honey* which refers to the increase in sugar in the urine.

For a person with Type 2 diabetes, the problem is that sugar (glucose) is not able to pass from the bloodstream into the cells. Since the glucose cannot get into the cells, it ends up in the blood stream and removed from the body in urine.

It seems obvious that if you have too much sugar in your blood then you need to limit the amount of sugar and starch in your diet. Starches are complex carbohydrates that consists of many glucose molecules. Glucose is the result of the digestion of starches.

According to Diabetes Australia website:

> Type 2 diabetes is a progressive condition in which the body becomes resistant to the normal effects of insulin and/or gradually loses the capacity to produce enough insulin in the pancreas. We do not know what causes type 2 diabetes. Type 2 diabetes is associated with modifiable lifestyle risk factors. Type 2 diabetes also has strong genetic and family related risk factors.[1]

Notice the assertion that "we do not know what causes type 2 diabetes." The same page states, "While there is currently no cure for type 2 diabetes, the condition can be managed through lifestyle modifications and medication. Type 2 diabetes is progressive and needs to be managed effectively to prevent complications."

Included in their advice for a healthy diet is the following.

To reduce saturated fat:

- Choose reduced or low-fat milk, yoghurt, cheese, ice-cream and custard
- Choose lean meat and trim any fat off before cooking
- Remove the skin from chicken, duck and other poultry (where possible, before cooking)
- Avoid using butter, lard, dripping, cream, sour cream, copha, coconut milk, coconut cream and hard cooking margarines
- Limit pastries, cakes, puddings, chocolate and cream biscuits to special occasions
- Limit pre-packaged biscuits, savoury packet snacks, cakes, frozen and convenience meals
- Limit the use of processed deli meats (devon/polony/fritz/luncheon meat, chicken loaf, salami etc) and sausages
- Avoid fried takeaway foods such as chips, fried chicken and battered fish and choose BBQ chicken (without the skin) and grilled fish instead
- Avoid pies, sausage rolls and pastries
- Rather than creamy sauces or dressings, choose those that are based on tomato, soy or other low fat ingredients
- Limit creamy style soups.

The Protein foods are needed by the body for growth and repair. Protein does not break down into

glucose, so it does not directly raise blood glucose levels.

The main protein foods are:

- Meats, chicken, fish, & tofu
- Eggs
- Nuts & seeds
- Cheese

Cows, elephants, gorillas, mammoths and brontosauruses obtain all their protein needs from non-animal sources. Lentils, peas, tofu, leafy green vegetables and grains contain significant amounts of protein.

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It has been known since at least 1927 that high-fat diets increase insulin resistance.[2] [3] Healthy, young medical students were divided into four dietary groups:

- high-carbohydrate diet consisting of sugar, candy, syrup, baked potatoes, bananas, and oatmeal, rice, and white bread
- high-fat diet consisting of olive oil, butter, mayonnaise, egg-yolks, and cream
- high-protein diet consisting of lean meat, lean fish, and egg-whites
- the fourth group was placed on a fasting regime

The students were fed their diets for two days and a glucose tolerance test was performed on the morning of the third day.

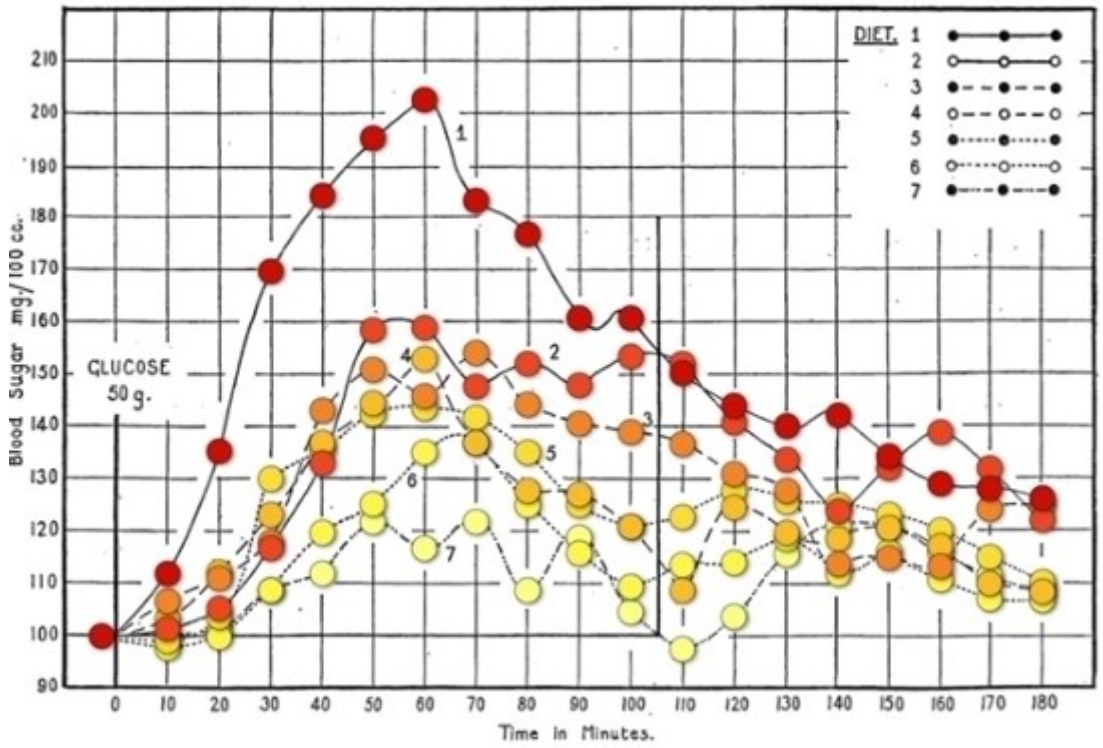
The students who consumed the high-carbohydrate showed an increase in tolerance for dextrose; those on the high-protein diet showed a mild inability to remove sugar from the blood; those on the high-fat and starvation diets showed a significant decrease in their tolerance for sugar.

After only two days on their experimental diets, the only group showing a normal, healthy response to the glucose tolerance test was the high-carbohydrate group.

Normally, insulin attaches to protein receptors on the cell's surface and signals the cell membrane to allow glucose to enter. If there is an accumulation of fat in the cell, it interferes with insulin's signalling process and glucose cannot enter the cell. Fat can accumulate inside muscle cells even in slim people. The real cause of type 2 diabetes is not an excess of sugar or carbohydrates. It is an accumulation of fat inside the cells that interferes with the muscle cells ability to respond to insulin. The muscle cells are unable to access glucose, which is required for energy production.

In the same paper, Sweeney graphed blood glucose levels after feeding seven different diets with different carbohydrate and fat content.

Diet	Carb	Pro	Fat
Diet 1	7%	12%	81%
Diet 2	19%	12%	69%
Diet 3	30%	12%	58%
Diet 4	41%	12%	47%
Diet 5	52%	12%	36%
Diet 6	64%	12%	25%
Diet 7	75%	12%	13%



As the fat content increases, so does the insulin resistance – that is, an impaired insulin response. The shade of red is darker as the fat content rises. So we have known since at least 1927 that fat impairs the insulin response.

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An intervention trial,[4] published in 2006, compared 99 individuals being treated for type 2 diabetes. 49 were placed on a low-fat vegan diet and 50 on a diet following the American Diabetes Association (ADA) diet. The results were compared after a 22 week period.

In every criteria measured, the participants in the low-fat vegan diet performed better than those following the ADA diet. The values shown are the average of the two groups.

Criteria	Vegan	ADA
% of participants that reduced diabetic medication	43%	23%
Reduction in HbA1C	0.96	0.56
Reduction in HbA1C (Excluding those who reduced medication)	1.23	0.38
Body weight decrease (kg)	6.5	3.1
LDL cholesterol decrease (%) (Excluding those who reduced medication)	21.2	10.7
Reduction in urinary albumin (mg/24 h)	15.9	10.9

The reduction of HbA1C that excludes the medication is more relevant as it removes the confounding results of participants reducing their medication.

Haemoglobin is a protein that contains iron that colours the blood red. About 92% of haemoglobin is HbA (A for adult) with other components being A1a1, A1a2, A1b and A1c. HbA1c binds to glucose and is also referred as glycosylated haemoglobin. The blood test HbA1c is used to determine how well diabetes is controlled. Normal range is less than 6%. This range is stable and reflects the blood glucose levels over a period of 6 to 8 weeks.

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Dr John McDougall published a paper that described the effects of consuming a whole-food, plant-based diet. The diet consisted of no animal-derived products or isolated vegetable oils. Meals included whole-wheat flour products, corn, rice, oats, barley, quinoa, potatoes, sweet potatoes, beans, peas, lentil, fresh fruits and non-starchy green, orange, and yellow vegetables. The macro nutrient profile was approximately 7% fat, 12% protein, and 81% carbohydrate by energy consumption.

Notice the inclusion of whole-wheat, grains and potatoes, which are frequently discouraged.

After only seven days, there was a substantial reduction to relevant bio-markers. The reduction occurred even though 86% of patients on blood pressure medications and 90% of patients on diabetes medications reduced their dosage or discontinued the medication.[5]

Decrease in	Median	Interquartile Range (IQR)
Weight	1.4 kg	1.8 kg
Cholesterol	22 mg/dL (0.6 mmol/L)	29 mg/dL (0.75 mmol/L)
Systolic BP	8 mmHg	18 mmHg
Diastolic BP	4 mmHg	10 mmHg
Blood glucose	3 mg/dL (0.2 mmol/L)	11 mg/dL (0.6 mmol/L)

Note: The median is the midpoint value. 50% of the participants experienced a greater change and 50% experienced a smaller change. The IQR is the range of values experienced by the middle 50% of the participants.

A strong commitment to health has been a part of Adventist's tradition since its founding in the 1840s.

The Adventist Health Study-1 (AHS-1) study showed 30-year-old Adventist males lives 7.3 years longer than the average 30-year-old white Californian male and with females living 4.4 years longer than the average Californian white female. For vegetarians, it is 9.5 years longer for men and 6.1 years longer for women.

The comparison of the types of diet (in the AHS-2) showed a significant difference in both the body weight and the incidence of type 2 Diabetes.[6]

Category	%	BMI (kg / m^2)	Prevalence Type 2 Diabetes (%)	Odd ratio (*)
Vegan No red meat, fish, poultry, dairy, eggs	4.2	23.6	2.9	0.51
Lacto-ovo vegetarians Vegan with eggs and milk	31.6	25.7	3.2	0.54
Pesco-vegetarians Vegan with fish, milk and eggs	11.4	26.3	4.8	0.70
Semi-vegetarians Red meat, poultry less than once a week plus fish, milk, and eggs	6.1	27.3	6.1	0.76
Non-vegetarians Red meat, poultry more than once a week plus fish, milk, and eggs	46.8	28.8	7.6	1

(*) After adjustment for age, sex, ethnicity, education, income, physical activity, television watching, sleep habits, alcohol use and BMI.

The Odd Ratio is indicative of the relative risk of Type 2 diabetes compared with Californian non-vegetarian Seventh-day Adventists. This is even more impressive given that non-vegetarian Adventists are much healthier than the average American—and Californians in general are much healthier than the average Americans, exceeded in life expectancy only by Hawaii and Minnesota. Californians expect to live six years longer than those in Mississippi.

Vegetarians and vegans usually have a high-fat diet, even though the fats are derived from plants. A much healthier alternative is a whole-food, plant-based diet with no added oils of any kind.

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Dr James Anderson is Emeritus Professor at the University of Kentucky who has been researching diabetes for more than 30 years. He advocates a high-carbohydrate, high-fiber diet for treating diabetes.

> Ideally, diets providing 70% of calories as carbohydrate and up to 70 gm fiber daily offer the greatest health benefits for individuals with diabetes. However, these diets allow only one to two ounces of meat daily and are impractical for home use for many individuals.[7]

Living with diabetes is not always practical either.

The diet of people that live in countries that have low incidence of diabetes do not have a diet remotely like the standard diabetic diet. They eat a diet that is high in complex carbohydrates.

In type II diabetes, insulin is created in the pancreas and is transported via the blood to each cell. However, the insulin is unable to pass through the cell membrane – a condition known as insulin resistance. This is due to a build-up of fat (intramyocellular lipids) inside skeletal muscle cells.[8 9 10 11]

Since there are only 3 major components of food – fats, proteins and carbohydrates, if you reduce carbohydrates then you will be increasing fats or proteins. It is the increase of fats in the diet that cause diabetes – not an increase in carbohydrates. Excess protein is broken down into amino acids and eliminated by the kidneys. This increases the renal acid load on an intricate filtration system that will eventually fail to perform at optimal levels.

Instead of limiting the amount of fruit, we need lots of fruit and vegetables – no added sugars – no added oils.

If people are on diabetic medication and go on a low-fat diet, then there is a real danger of hypoglycaemia. The blood glucose levels can drop so quickly that you can be at risk.

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Frequently medical and dietetic advice is to avoid fruit because of the high level of the simple sugars, glucose and fructose. The high-fructose fruits include apples, cherries, mangoes, watermelon and pears. Other fruits high in total sugars include figs, grapes and bananas.

A Harvard Health newsletter states, "The nutritional problems of fructose and sugar come when they are added to foods. Fruit, on the other hand, is beneficial in almost any amount." Obtaining sugars in your diet from whole foods is significantly different from adding them as isolated components.

Avoidance of fruit juices is advisable.

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A number of popular authors and websites advocate eating eggs as a way of preventing type 2 diabetes. However, this does not substantiated by the evidence.

A Chinese study[12] showed eating 2-6 eggs/week had a 75% increase in the prevalence of diabetes compared with those eating 1 egg/week. Those eating 1 or more eggs a day increased the risk more than 2¼ times. The same study showed plasma triglyceride and total cholesterol levels were significantly higher, particularly with women, who consumed 2 eggs/week.

A Lithuanian study[13] showed similar results. This study compared people eating less than 1 egg/week (the previous study was comparing those eating 1 egg/week). Eating 3-4 eggs per week resulted in a 2.6 times increase and whilst 5 or more eggs/week resulted in a 3 times increase compared with those eating less than 1 egg/week.

The *Physicians' Health Study* commenced in 1981. It consisted of a study of 22, 071 male doctors between 40 and 84 years of age in the US.

The role of egg consumption on health was examined. The result from a 20-year follow-up showed a significant correlation between egg consumption and all-cause mortality.[14]

Egg consumption was divided into 5 categories—less than 1 egg per week, 1 egg per week, 2–4 eggs, 5–6 eggs per week and 7 or more eggs per week.

A key finding is that physicians consuming 7 or more eggs per week had a 31% increase in all-cause mortality compared with those consuming less than 1 egg per week. For diabetic physicians, the association was much higher with the increase in mortality slightly more than doubled.

A British study reported a 2.7 times greater risk of death with an egg consumption greater than 6 eggs per week.[15]

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The American Diabetes Association has many "Recipes for Healthy Living" featured on their website.[16] Below is the full list from their ***Featured Recipes*** website.

- Grilled Lamb Kabobs with Garlic Lemon Vinaigrette
- Mango Chicken Salad with Jicama
- Broccoli, Mushroom, and Cheddar Omelet
- Greek Salad (Feta Cheese)
- Pork Pita Pocket
- Avocado BLT (Bacon, Lettuce and Tomato)
- Long Leaf Tex-Mex Chicken Salad Wraps
- Baked Red Snapper with Golden Onions

None of these recipes are conducive to improved health or diabetic outcomes. Even avocado (without the bacon) is an issue with people who are overweight or have diabetes because of the high fat content. Added oils in the dressings are also detrimental.

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Another common misconception is that carbohydrate foods make you fat. There is no mechanism for humans to convert glucose to fat. Excess carbohydrates are stored as glycogen – a complex carbohydrate consisting of branches of glucose which is stored in the liver and muscles. Carbohydrates are not converted to fat. Fats are stored as fats.

Limiting carbohydrates for any reason results in an increase in the consumption of fats and protein. Instead of solving the problems of obesity and diabetes, limiting carbohydrates contributes to it.

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The studies of Neal Barnard and John McDougall demonstrate that type 2 diabetes is not a condition that is inevitable. Both of their programs are based on a whole-food, plant-based diet with no added oils. Neal Barnard has produced a book,[17] *Dr Neal Barnard's Program to Reverse Diabetes*, outlining his program. John McDougall has written several books,[18] including *The Starch Solution*.

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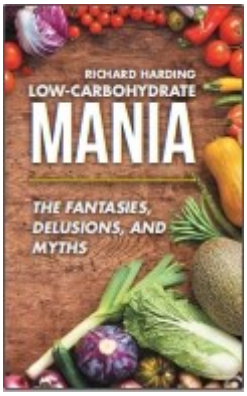

I have written a book, *Low-Carbohydrate Mania: The Fantasies, Delusions, and Myths*, that examines the advice contained in many popular books, magazines, and websites claim that we have been following expert medical advice for the past 40 years and we are unhealthier than ever. They declare that the idea that saturated fats and cholesterol cause heart disease is the greatest scientific deception of our times and that a high-fat, low-carbohydrate diet is essential for our well-being.

These views have become accepted as the truth. Instead of informing our society about healthy dietary choices, they are causing widespread harm.

However, standard medical advice has not been helpful in reducing the rising prevalence of obesity, diabetes, and autoimmune diseases. This advice often contains guidance such as "everything in moderation" and that we need to be "practical" and "flexible".

Advice which is not very constructive.

Fortunately, the diets that are optimal for our health are also the best for the environment and for the animals we share the earth with.

Richard Harding

www.wisenutritioncoaching.com.au

bookstore.balboapress.com/Products/SKU-001118879/LowCarbohydrate-Mania.aspx

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