The *CSIRO Low-Carb Diet* was developed in Australia by the CSIRO.

The diet is “low in carbohydrate and high in protein and unsaturated fat and claims improvement in metabolic health, blood glucose control and diabetes management”.

There is a tendency for low-carbohydrate studies to follow a particular pattern. A low-carbohydrate diet is compared with a “low-fat” diet with very overweight and diabetic participants. The diets are usually very energy restricted and the compliance rate for both diets are not high. Restricting energy intake confounds results as energy restriction manifests certain outcomes independent of dietary components.

High-fat, low-carbohydrate diets raise cholesterol, LDL-cholesterol, lipoprotein(a), triglycerides, uric acid, C reactive protein, fibrinogen, cortisol, IGF-1, homocysteine, ketones (acetone, acetoacetate and β-hydroxybutyrate) whilst coronary blood flow, body temperature and blood pH (blood becomes more acidic) are reduced. [1]

> High-fat, low-carbohydrate dietary trials focus on the macro-nutrient components of the diet-carbohydrate, fat and protein. Very rarely are other components considered. The quality of a diet is far more sophisticated.
>
> The food we eat is a complex combination of many components— many different types of fat, carbohydrates, amino acids, and dietary fiber along with a multitude of vitamins, minerals and phytonutrients such as carotenoids, and polyphenols.
>
> The vast majority of our nutrients is obtained from fruits, vegetables, greens and whole grains. A whole-food, plant-based diet will contain approximately 80% carbohydrate, 10% fat and 10% protein. The goal, however, is not to meet a prescribed macro-nutrient profile.

## Very low-carbohydrate weight loss diet

A long-term (52 weeks) trial was undertaken by the Australian CSIRO to determine the weight loss and cardiometabolic effects of a very-low-carbohydrate, high-saturated-fat diet and a high-carbohydrate, low-fat diet. [2]

Below is the macronutrient profiles of the two diet groups. Note that the objective is to study long-term effects but the study is only lasted 12 months.

| Macro-nutrient | Low-Carb | Low-Fat |
|---|---|---|
| Carbohydrate | 4% | 46% |
| Protein | 35% | 24% |
| Fat | 61% | 30% |

The compliance rate for the low-carbohydrate diet was 60% and 70% for the low-fat diet.

Low-carbohydrate diets increases LDL cholesterol. The authors note that, “the increase in LDL cholesterol with the LC diet suggests that this measure should be monitored”.

The “low-fat” diet was 30% energy from fat. This is not a low-fat diet. The current average fat consumption is approximately 33%.

An approximation of the amount of protein consumed can be obtained by taking the midpoint of the energy consumption (6.5 MJ / 1550 kCal) and calculating the amount of energy obtained from protein from both diets. Since each gram of protein yields 17 MJ or 4 kCal of energy, then the low-carbohydrate group is consuming in the vicinity of 135 g protein with the “low-fat” group consuming 90 g protein.

This far exceeds the recommended dietary intake of close to 50 g based on the RDI of 0.84 g of protein for each kg of body weight.

Consuming more protein than you need is detrimental. There is an increase in blood urea, blood becomes more acidic, vitamin D is levels are lowered and blood cholesterol is increased.

At the end of the year-long study, both groups were still overweight with a BMI of 28.4 for the low-carbohydrate group and 29.2 for the low-fat group.

Ketones were present in the low-carbohydrate group. Ketosis occurs during starvation. It is not a normal, healthy condition. No animal species or human society normally lives in a state of ketosis. Ketosis occurs when fat in the body is utilized to obtain energy in the absence of glucose. Glucose is normally obtained from the digestion of carbohydrates. Ketosis results in the production of ketones—acetone being one of the three types of ketones produced during ketosis. Blood acidity rises with an increase in ketones.

During pregnancy, ketosis has been linked to adverse outcomes for the unborn child.

## Low-carbohydrate diet for type 2 diabetes management

This trial measured the effects of a “very low-carbohydrate, high-unsaturated fat diet” on

type 2 diabetes participants compared with a “high–unrefined carbohydrate, low-fat diet” diet over a 24 week and 52 week period. The diet was very restricted in energy intake with the participants consuming 1,429 kcal (6.0 MJ). The authors do not describe how this figure was derived. A reasonable estimate for their daily requirements is 2,400 kcal (10.2 MJ) for males and 2,000 kcal (8.7 MJ) for females. It is impossible not to lose weight on such a restricted diet. [3] [4]

The compliance rate was 79% for low-carbohydrate group and 82% for the low-fat group.

Once again, the “low-fat” diet of 30% energy from fat is NOT a low-fat diet and 53% of energy from carbohydrate is NOT a “high-carbohydrate” diet. The protein requirements far exceed human requirements.

| Macro-nutrient | Low-Carb | Low-Fat |
|---|---|---|
| Carbohydrate | 14% | 53% |
| Protein | 28% | 17% |
| Fat | 58% | 30% |

The participants were obese at the start of the trial and were still obese 12 months later.

The fasting glucose for the “low-carb” group at the start of the trial was 7.8 mmol/L and 8.4 mmol/L for the “high-carb” group. After 52 weeks the values were 7.1 for the “low-carb” group and 6.9 mmol/L for the “high-carb” group. Both are values are higher than the desirable range of 3.6-5.5 mmol/L.

From an average initial weight of 101 kg both groups lost a paltry 10 kg over 1 year (less than 200 g per week) on a calorie restricted diet. At 24 weeks the weight loss was greater than at the end of the study 28 weeks later – the “low-carb” group lost 12. kg and the “high-carb” group” 11.5 kg.

Comparing two very unhealthy diets does not provide any clarification.

## Vegan Diets for Management of Type 2 Diabetes

David Jenkins, the Toronto-based researcher who created the glycaemic index, and Neal Barnard are amongst the co-authors of a trial studying the impact of vegan diets on the management of type 2 diabetes. [5] [6]

Results were evaluated at 22 weeks and 74 weeks. The results below are from 22 weeks because these results distinguish between those participants that did not reduce their medication so it does not confound the results.

Nine vegan (completion rate 82%) and seven (completion rate 86%) from the ADA diet group did not complete the 74 week program, which is much higher than the completions rates for studies comparing high-fat, low-carbohydrate diets with “low-fat” diets. Note that 16 of the 49 vegan-group participants did not strictly adhere to their diet. Their cholesterol intake was reduced from an average of 291 mg/day to 24 mg/day. The ADA group reduced their intake from an average 317 mg/day to 189 mg/day. A vegan diet contains no cholesterol.

| Criteria | Vegan | | | | ADA | | | |
|---|---|---|---|---|---|---|---|---|
| | Start | End | Change | % | Start | End | Change | % |
| Cholesterol medications reduced | - | - | - | -10% | - | - | - | -9% |
| Diabetic medications reduced | - | - | - | **-51%** | - | - | - | **-34%** |
| Weight (kg) | 33.9 | 31.8 | -2.1 | -6% | 35.9 | 34.3 | -1.5 | -4% |
| BMI (kg / (m • m)) | 33.9 | 31.8 | -2.1 | -6% | 35.9 | 34.3 | -1.5 | -4% |
| HbA1C | 8.00 | 7.10 | -1.00 | -13% | 7.90 | 7.40 | -0.60 | -8% |
| HbA1C (Exc those who reduced medication) | 8.07 | 6.84 | -1.23 | **-15%** | 7.88 | 7.50 | -0.38 | **-5%** |
| Total cholesterol (mmol/L) | 4.84 | 4.13 | -0.72 | 15% | 5.15 | 4.52 | -0.63 | -12% |
| Total cholesterol (mmol/L) (Exc those who reduced medication) | 4.93 | 4.06 | -0.87 | **-18%** | 5.05 | 4.56 | -0.49 | **-10%** |
| LDL cholesterol (mmol/L) | 2.70 | 2.28 | -0.42 | -16% | 3.07 | 2.67 | -0.40 | -13% |
| LDL cholesterol (mmol/L) (Exc those who reduced medication) | 2.78 | 2.19 | -0.59 | **-21%** | 2.99 | 2.71 | -0.28 | **-9%** |
| Urinary albumin (mg/24 h) | 33.0 | 14.6 | -18.4 | **-56%** | 55.0 | 43.7 | -11.3 | **-21%** |

## Seventh-day Adventist's Studies

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

The 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. [7]

Note that Californians have a much longer longevity than the average American.

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. [8]

| Category | % | BMI | Type 2 diabetes Odds ratio (*) |
|---|---|---|---|
| **Vegan**<br>No red meat, fish, poultry, dairy, eggs | 4.2 | 23.6 | **0.32** |
| **Lacto-ovo vegetarians**<br>Vegan with eggs and milk | 31.6 | 25.7 | **0.43** |
| **Pesco-vegetarians**<br>Vegan with fish, milk and eggs | 11.4 | 26.3 | **0.56** |
| **Semi-vegetarians**<br>Red meat, poultry less than once a week plus fish, milk, and eggs | 6.1 | 27.3 | **0.69** |
| **Non-vegetarians**<br>Red meat, poultry more than once a week plus fish, milk, and eggs | 46.9 | 28.8 | **1** |

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

## Insulin Resistance is Caused by Fat

Articles published in 1999 and 2001 describe the mechanism of insulin resistance. 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. [9] [10]

Increasing fat consumption, as advocated by the CSIRO diets, is magnifying the problem.

## We Eat Food – not Carbohydrates, Fats & Proteins

The food we eat is a complex combination of many components—many different types of fat, carbohydrates, amino acids, and dietary fiber along with a multitude of micro-nutrients including vitamins, minerals, carotenoids, and polyphenols. Focusing on one component such as carbohydrates, sugars, fats, saturated fats or cholesterol may help understand some elements of health. However, the complex interaction between even two or three components make it impossible to fully comprehend the effects of nutrition in real life. Most medical and nutritional studies are only concerned with the effects of one dietary component or intervention.

Our health is related to many interrelated factors and is not limited to what we eat.

A whole-food, plant-based diet is high in complex carbohydrates, fibre, vitamins, minerals

and micro-nutrients as well as being low in fat, saturated fat and protein.

Dr Katharine Milton is a professor of physical anthropology at the University of California in Berkeley. She received her Ph.D. in anthropology from New York University in 1977.

Her field of expertise is the dietary ecology of primates, including human ancestors and modern humans. Professor Milton's conclusion is:

> It is prudent for modern-day humans to remember their long evolutionary heritage as anthropoid primates and heed current recommendations to increase the number and variety of fresh fruit and vegetables in their diets rather than increase their intake of domesticated animal fat and protein. [11]

## Footnotes


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