



ZERO FIVE 100
ZERO CALORIES FIVE DAYS 100 MILES

Eight People covered a distance of 100 miles over five days with zero calories to gather information to re-think diabetes management

The task:

A group of 8 runners, two with Type 1 Diabetes (T1D), and including Olympic athlete James Cracknell, have covered 100 miles over five days, between Henley and Bristol, consuming zero calories. The Zero Five 100 challenge was set up by Dr Ian Lake, who has Type 1 Diabetes (T1D), aiming to explore the safety and effectiveness of fueling from stored body fat during a five days fasting and endurance exercise.

This project was built on existing research, which has shown that low carbohydrate lifestyle results in a metabolic shift from carbohydrate to fat metabolism, when the body's main fuel source is fat and ketones rather than glucose. This has been shown to stabilise blood glucose levels and reduce the need for insulin treatment in diabetes. Nutritional ketosis is a physiological response to a high fat, low carbohydrate diet, and it is not to be confused with diabetic ketoacidosis, which is the result of poorly controlled diabetes.

It is not the intention to present this project as validation of cessation of eating for those with eating disorders. Eating disorders require specialist management well beyond the findings of this project. Neither is it a recommendation to anyone to copy the method. This project required careful planning over several months and no one in the group intends to repeat it.

An endurance event was chosen to demonstrate how fat metabolism can be used as an alternative to traditional carbohydrate-based fueling in a group of volunteers. A detailed series of metabolic tests and health checks along the way made this a serious scientific endeavour. This was a data-gathering exercise to explore the science and will produce informative media for the public via written results and articles for academia and mainstream media, YouTube videos, film, and a website.

The Team:

The safety of the project was carefully planned and monitored by the team's experts, who have considerable experience in low carbohydrate lifestyle from a variety of backgrounds.

Dr Ian Lake, GP with Type 1 Diabetes and main contact; lakeian@hotmail.co.uk. Tel (07906) 964-542

Jon Furniss, Engineer with Type 1 Diabetes

James Cracknell, Olympic Athlete and Journalist

Dr Trudi Deakin, Dietitian

Dr Ali Ibrahim, Consultant Psychiatrist

Gayle Gerry, NHS Practice Nurse

Steve Bennett, Businessman (Primal Living)

Jake Thompson, Businessman on a ketogenic diet weight programme

All individuals were physically and mentally fit, and well nourished. They had trained in both fasting techniques, and in covering the distanced needed per day. Individuals were free to cease participation at any time.

All volunteers completed the project safely and well, in high spirits.

Disclaimer: The team are not advocating anyone to undertake such a project themselves. Neither are they advocating that this is an optimal or desirable form of activity. It was an experiment in metabolic performance. This was not a test to assess the limits of human performance. Nor was it an experiment in starvation. There are significant differences between fasting and starvation. Fasting is time delayed eating in well-nourished individuals, as opposed to starvation which results in nutritional deficiencies and malnutrition.

The Route:

From Henley on Thames to Bristol following the River Thames and Kennet & Avon Canal. The project took place from 19th to 23rd September 2020.

Rationale:

A ketogenic diet (< 50g carbs per day) observed over a period > 2-4 weeks puts the body into fat-burning mode, allowing access to a large and (in our society) increasingly untapped reservoir of energy. Participants with diabetes have shown a ketogenic diet can be used to control diabetes and improve metabolic health in patients more effectively than the current medical nutritional advice. All types of diabetes affect 8% of the population (5 million people) in the UK at the cost of £10billion/yr. The situation with Type 2 (T2D) is predicted to even get worse. Fewer than 10% of people with T1D reach the NICE guideline target with conventional management (National Diabetes Audit), whilst 90% achieve it on a ketogenic diet (Lennerz-Ludwig). <https://pubmed.ncbi.nlm.nih.gov/29735574/> Hence, there are evidence-based alternatives to standard care available, and we need a radical re-think of how we manage the condition. So, this applies to the general population and especially crucial for pandemic preparedness in 2020 given significant co-morbidities for Covid19 are metabolically driven (obesity, high blood pressure, diabetes, cardiovascular disease).

Complications of diabetes are mainly iatrogenic (use of high volumes of medication and higher than necessary carbohydrate recommendations). Diabetic iatrogenic illness is potentially preventable & does not need to be thought of as an inevitable consequence of life-saving medication management.

This project was designed to be a significant personal challenge for each participant, but also to explore concerns expressed by sports scientists and medical specialists regarding the safety and practicality of ketogenic diets, especially in the treatment of diabetes. It was deliberately 'extreme' to explore the practical limits of ketogenic lifestyle. Findings should then easily translate to normal and diabetic ketogenic lifestyles.

Carbohydrate vs Fat Fuelling:

Advice via dietary guidelines to consume 55% of total energy from carbs makes it incredibly difficult for a person with diabetes to control their condition since they are essentially carbohydrate intolerant. Hence, current dietary advice is akin to pouring fuel on the fire of diabetes.

The body has the potential to store energy for future use. Glucose is stored as glycogen and has a capacity to provide around 2000calories of energy. By contrast estimated fat stores in normal-weight individuals are vast. And women have more body fat than men. For example, a 60kg women with a typical 25% body fat has 135,000 calories of fat stored in her body!! We aimed to explore the potential of that fat store and prove that starvation would not occur, also that there would be no significant muscle protein breakdown during the event. The event distance approximates to a mere 20,000 calories of the fat store, so at the very low end of the range of the fat 'tank'. Breath metabolic testing showed our bodies were fat-burning throughout.

Measurements:

Weight, CGM, ketones, body composition, etc.

Project Results:

We investigated and demonstrated the following:

1. The two people with T1D found, as expected, that the common concern that fat burning leads to diabetic ketoacidosis is not valid. They demonstrated that insulin is needed in reduced amounts during fat burning, and it is not necessary to eat glucose at all (except to rescue hypo's) if you are a fat-adapted Type 1.
2. The potential of fat stores to provide energy over extended periods in ketogenic-adapted individuals. Breath metabolic testing and blood ketones showed our bodies were fat-burning & working optimally. There was no 'hitting the wall' as we were tapping into a fat store that has ten times the energy capacity compared to total glycogen stores.
3. Dietary carbohydrate is not essential for human performance. Our liver can make all the glucose required for crucial cell functions, which was demonstrated by continuous glucose monitoring. A ketogenic diet (including essential fats and protein) puts the body into fat-burning mode and allows access to the reservoir of fat energy. All participants had stable glucose levels, including the two people with type 1 diabetes.

Additional findings:

4. Unexpected findings were that participants experienced improved mood, mental clarity and focus. Furthermore, all participants maintained high levels energy. Some of them experienced minor musculoskeletal discomfort, but others had none at all.

Re-Thinking Diabetes:

Through our research and experiences in training, and as proven in this event, we expect this project will help remove current obstacles that appear to be getting in the way of providing an option that will reduce the disease burden of diabetes (both T1D and T2D) and metabolic ill health. Some of the safety concerns holding back delivery of low carbohydrate lifestyles and fasting in healthcare settings have been answered.

Clinicians and people with diabetes on this project feel ketogenic diets should be a management option that can be delivered with skill: should a diabetic patient (T1D or T2D) decide to take up this option.

The website blogs for this event can be found on : zerofive100.com

Ian Lake has a website to provide information on ketogenic diets in Type 1 Diabetes: type1keto.com

Supporters

