
Reply from Professor Taylor on frequent questions asked

Further information on the research on Reversing Type 2 Diabetes

Thank you for contacting me about the studies on reversing type 2 diabetes. These have caused great interest amongst people with diabetes, and as of 2018, I have received well over 3,000 enquiries and messages. Although I have replied to most of these personally, I am sorry to say that it is no longer feasible to do this. The research continues. I hope the following items will provide some useful information, but bear in mind that this is only factual information and only your doctor can provide personal medical advice.

What are the main research findings?

1. The initial study was in people who had type 2 diabetes of up to 4 years. Type 2 diabetes of several years duration can be reversed to normal. Weight loss of around 15kg is usually needed. After more than 10 years of diabetes a return to normal glucose control, even with major weight loss, is much less likely.
2. It is certainly possible to wake up the insulin producing cells of the pancreas by losing a substantial amount of weight.
3. This happens because the fat content in the pancreas decreases. Previous studies have shown that fat stops insulin release. The insulin producing cells recover their special function, and this continues providing fat is not allowed to accumulate.
4. If weight is then kept steady, diabetes does not come back at least over several years.

Could it work for me?

- This research is in “type 2 diabetes”, the usual common form of diabetes. There are some rare forms of diabetes which may be mistaken for type 2 diabetes:
 - a) Diabetes occurring after several attacks of pancreatitis is likely to be due to direct damage to the pancreas (known as “pancreatic diabetes”)
 - b) Secondly, people who are slim and are diagnosed with diabetes in their teens and twenties, with a very strong family history of diabetes, may have a genetic form (known as “monogenic diabetes”)
 - c) Thirdly, type 1 diabetes sometimes comes on slowly in adults, and these people usually require insulin therapy within a few years of diagnosis (“slow onset type 1”)

None of these rare conditions will respond in the same way as the common, true type 2 diabetes.

- So, if you have the common form of type 2 diabetes, this could work for you. However, you should not underestimate just how much change in your day-to-day life will be necessary to bring this about. It requires motivation and persistence.

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Could it work for people with a normal BMI?

- Yes, most certainly, provided that the diagnosis of type 2 diabetes is correct. Some people are unable to cope with even moderate amounts of fat in their liver and pancreas. Type 2 diabetes only happens when a Personal Fat Threshold is exceeded. Losing weight from a level, which is “normal” for the general population, is then essential for health. See the online article by Richard Doughty.

Practical advice

- The particular diet used in the 2011 study was designed to mimic the sudden reduction of calorie intake that occurs after gastric bypass surgery. By using such a vigorous approach, we were testing whether we could reverse diabetes in a similar short time period to that observed after surgery. That allowed us to discover the underlying mechanisms.
- A surprising observation was that people found this dietary approach to be easier than they had expected.
- The essential point is that substantial weight loss must be achieved. The time course of weight loss is much less important.
- It is a simple fact that the fat stored in the wrong parts of the body (inside the liver and pancreas) is used up first when the body has to rely upon its own stores of fat to burn. Any pattern of eating which brings about substantial weight loss over a period of time will be effective. Different approaches suit different individuals best.
- It is also very important to emphasise that sustainability of weight loss is the most important thing to ensure that diabetes stays away after the initial weight loss. Ordinary steady weight loss, by cutting back on the amount eaten each day, may be preferable. However, if you are not able to lose around 2½ stone over, say, six months by this approach, then the very low calorie diet may be best for you. We now know that the very low calorie approach can be followed by very steady weight control.

A. The slower standard approach would involve:

- a) Decreasing total food (and alcohol) intake by about one half
- b) Using smaller plates
- c) Eating more slowly
- d) Recognising that the sensation of hunger is sign of success, not a signal to eat
- e) Enjoy that hunger. Celebrate with a glass of water; maybe fizzy water

However, if a person finds this difficult, the liquid meal approach may be more successful.

More details about steady, avoidance of weight gain are available on the [Diabetes UK website](#).

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B. The research diet

To carry out the Newcastle research study, the following diet was used:

- One sachet of a liquid formula diet (~ 200 calories) three times per day. The study used Optifast, but there are many other brands available from supermarkets or online (see below).
- Three portions of non-starchy vegetables per day. Lack of variety was a problem of the diet, so we devised a few recipes to make the vegetables more interesting. The range of possibilities is infinite, but you can find the recipes we used on the website - <http://www.ncl.ac.uk/magres/research/diabetes/reversal.htm>.
- No alcohol during the 2 month period of weight loss. This is merely because alcohol itself is so calorific – 7 calories in every gram.
- You should consult your doctor before embarking upon any very low calorie diet. In particular, any medication you are taking may need to be adjusted. Some general information about this is also on the website (refer to Information for your doctor: <https://www.ncl.ac.uk/magres/research/diabetes/reversal/#publicinformation>). None of this information is a substitute for proper, individual medical advice.
- Our research subjects found the diet challenging to stick to especially in the first 36 hours. Motivated people were selected to take part in the research and support from the team was given frequently. Support from the families of the research volunteers was very important in helping them comply with the diet. Hunger was not a particular problem after the first few days, but the complete change in social activities (not going to the pub, not joining in the family meals etc.) was a challenge over the eight weeks. Careful planning in advance is essential.
- **DO NOT INCREASE EXERCISE DURING THE WEIGHT LOSS PERIOD.** See below.

Optifast

Although Optifast was used in the study, this is not readily available in the UK. An alternative liquid food supplement of similar calorific content is equally suitable. These are available from most local supermarkets; you should try several brands to find one most suited to your taste. One brand available on the internet is Exante. Do not be concerned by the high sugar content, as after the first day of very low calorie diet your body is able to handle this reasonably well. The product may need to be made up in water or skimmed milk. Always read the advice upon the particular product.

After achieving your target weight - how do you keep your weight down in the long term?

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Once you are at your personal target weight, the critical thing now is to become accustomed to eating approximately 2/3 of the total amount you used to eat. Plan a gradual transition to normal eating over 2-4 weeks. There need be no restriction upon any particular foodstuffs, although naturally foods that are very calorie-dense are best avoided. The goal is keeping the weight down [you may find your weight increases 1 – 2 kg over a few days on returning to a higher calorie intake; this is because your glycogen stores return to normal and glycogen is stored in the water inside your body].

If you are increasing your exercise, do not eat more. It is so easy to over- compensate for exercise.

Most people maintain a consistent healthy weight in the long term; most successfully by:

- a) Weigh weekly - write it down
- b) Watch portion size carefully and don't eat between meals
- c) Walk, cycle, stairs. Maintain a high level of everyday physical activity
- d) Party but payback. Enjoy life and especially occasions to celebrate, but there is a price. You must eat only about half your current intake for a few days

How about exercise?

- Do not increase your usual daily activity whilst losing weight. This is because sub-conscious compensatory eating will make weight loss very difficult.
- However, a sustainable increase in daily physical activity during long term weight maintenance is essential, along with keeping food portion size under control.
- DUK is also funding research into reversing type 2 diabetes in non-obese people <https://www.ncl.ac.uk/magres/research/diabetes/newstudy-retune/>.

What research is going on?

- Diabetes UK is funding the major 5 year study (DiRECT) to find out how many people can reverse or improve their diabetes by a low calorie liquid diet. This is being carried out entirely in Primary Care. Further details are available on the [Diabetes UK website](#).

Future volunteers?

Thanks to all who offered to help with future studies.

We are looking for volunteers who have normal or very slightly raised body weight (a BMI of less than 27) and who have developed type 2 diabetes.

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Any other information?

- Further information will be posted on the website
<https://www.ncl.ac.uk/magres/research/diabetes/#research>
- Already available are the links to the full scientific papers describing the reversibility of diabetes and also the scientific review of the existing knowledge in 2008, which described the “twin cycle hypothesis” which we have now tested.
- An up-to-date review of how weight loss works was added in 2013. In 2016, a review of what is happening to the insulin producing cells (beta cells) provides further explanation. In 2017, a further review described practical dietary management after weight loss. The first year results of DiRECT are published in The Lancet.
- Also available is a paper, which describes what happened to diabetes when weight loss was achieved at home. This information was provided by many people around the world using email.
- In the Information for Doctors, other research papers are available. Where possible, the full paper is provided as a printable file and if copyright permits this, the link to the paper is provided.
- Also, all information will be added to the website, which is updated from time to time.
- Please remember that this website and its links provide information and not personal medical advice. Do consult your Doctor for personal advice.

Thank you for your interest in this work.
With best wishes for your personal recovery

Roy Taylor July 2018