

Drowning in honey

THE LINK BETWEEN DIET, OBESITY AND DIABETES IS WELL ESTABLISHED BUT EXPLAINING TO YOUR PATIENTS WHY HEALTH AND LIFESTYLE CHANGES ARE NECESSARY IS NOT ALWAYS SO EASY. REPORTER AND PARAMEDIC **MATT JOHNSON** JOINS THE DOTS BETWEEN THE MODERN DIET AND THE CONSEQUENCES OF SPIRALING BLOOD SUGAR LEVELS.

The plains of Africa are occasionally described – usually by well-fed TV naturalists – as the Stone Age equivalent of the modern supermarket. There is supposedly, a meat section – although it's hard to find as it's constantly running away from you. There's a vegetable section, but it's hidden under half a metre of dirt, and if you do find any roots or tubers after all that digging you are going to have to pound them for a day before you can chew them. There's also a fruit section: it's a small bush four kilometres over there that may or may not have any berries flowering when you finally arrive. In Stone Age terms, a decent meal is the reward for a hard day's physical effort.

Compare this natural state to your actual local supermarket and you can begin to appreciate why your body is a little confused. Just metres from the car park are aisles of energy-dense foods, many of which require no more tiring preparation than tearing open the packet or pushing the button on the microwave. In a matter of minutes, for minimal



Film maker Morgan Spurlock documented his 30 day McDonalds only diet in his hit film Supersize Me.

BATTLE OF THE BULGE

The link between excessive kilojoules and diabetes became clearer during World War 2 when the rate of development of Type 2 diabetes fell dramatically in London and Paris during rationing, only to rise again when food became more plentiful after the war.

energy expenditure, you can saturate your blood with more sugar and fat than your ancestors' digestive systems had to deal with in a good month.

This would be fine if evolution had kept pace with Coles Myer shares, but while our effectiveness at hunting and gathering has improved spectacularly, our bodies are still acting as if every meal is our last for the season, trying to squirrel away as much energy as possible – stacking on the extra kilos in expectation of lean times ahead. We are, in this age of excess, drowning in honey.

Consider this: an apple weighs about 120 grams. For that, you'll get about 15 grams of carbohydrates which, when your digestive enzymes finally get through the tough cell walls, will slowly

liberate about 320 kilojoules. In comparison, a Mars bar weighs half as much (60 grams) but has more than two times the carbohydrates (37 grams that will hit your blood twice as fast because they're not surrounded by fibre) and generates a staggering 1134 kilojoules – more than 10 per cent of most people's daily kilojoule requirement. In just 60 grams! Even a banana, nature's little energy sachet, can't compare, with 120 grams generating only 24 grams of carbs, 427 kilojoules and an absorption rate less than half that of chocolate.

In evolutionary terms, it is only in the past few seconds that foods this dense in easily digestible energy have become available. Until recently our carbohydrates came in complex forms that took our

Things you'd rather avoid:

THE COMPLICATIONS OF DIABETES

Heart disease/stroke:	Diabetes increases your chances of heart disease and/or stroke by up to three times.
Eye disease:	Retinopathy causes blurred vision and can cause blindness. It is a major long-term complication of diabetes and affects about one in four people with diabetes.
Kidney disease:	Diabetes is the fastest growing cause of kidney failure. It is the leading cause of end stage renal disease. About 30 per cent of people with diabetes will develop kidney disease.
Lower limbs:	Neuropathy or peripheral nerve disease and blood vessel damage may lead to leg ulcers and serious foot problems from which limb amputation may result.
Erectile dysfunction in men:	The blocking of arteries that occurs with diabetes and leads to vascular complications in the heart, brain and legs can also occur in the vessels of the penis and lead to erectile dysfunction.

Information from Diabetes Australia

digestive system considerable time to break down into glucose and make available to the cells for energy.

In the past, our blood sugar level (BSL) rose slowly after a meal, stimulating the pancreas to release insulin, a hormone that moves the glucose out of the blood into the cells for energy or stores it in the liver for later use. If there was an occasional excess, it could be converted into fat and stored in fat cells. Faced with modern foods, our pancreas is increasingly overworked trying to deal with the sudden spikes in BSL, and in an increasing number of people it is failing to adequately control their BSL, a condition known as diabetes.

The most obvious effect of all this energy-dense food is that our collective pants don't have as much room as they used to – our bodies are starting to look and feel like all the Jelly Babies we've been eating. It's not pretty, but ugliness alone does not inspire governments to action. Prime Minister John Howard did not recently set aside \$16 million to

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combat obesity because he is hoping to improve the scenery on his morning walks. He has been made aware of the link between diet and diabetes – and the costs associated with the connection.

The form of diabetes most people are aware of is actually the less common form: Type 1, or insulin dependent diabetes. Usually showing up during childhood (hence its old name: juvenile onset diabetes), Type 1 diabetes is actually an auto-immune disease where the body's immune system attacks the insulin secreting cells of the pancreas and sufferers require daily injections of insulin.

Of growing concern are the 85 per cent of diabetics who suffer from Type 2 diabetes (Non-insulin dependent diabetes). In their case it is theorised that the repeated carbohydrate spikes due to poor diet and compounded by a sedentary lifestyle have "fatigued" the pancreas or the sites where the insulin binds. As a result, their BSL becomes uncontrollable and a host of side effects and complications start to arise.

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or a stroke and are suffering from our fastest growing chronic disease – eight people are diagnosed every hour. They join a group 19 per cent of which can expect to be admitted to hospital this year with coronary heart disease. Those people won't be lonely because 15 per cent of sufferers will be receiving treatment for vision problems and about 40 per cent will be either getting their leg ulcers seen to or be having treatment for kidney disease.

Type 2 diabetes will cost us \$3 billion next year. Even without any

complications a Type 2 diabetic costs the community \$10,000 a year. If complications do arise, the cost goes up to almost \$16,000. To put it another way, 4 per cent of diabetics account for 12 per cent of health costs in Australia. I don't know about you but I can't afford this – so put down the donut.

But why wait until you're diagnosed to join the party? It is estimated that 1.2 million Australians are "pre-diabetic". That is, they have a poorly controlled BSL but the values are not yet so extreme as to be considered diabetic.

For Dr Peter Garcia-Webb, a diabetes expert and chemical pathologist currently in charge of biochemistry at Western Diagnostic Pathology, Perth, pre-diabetes is often a frustration because it offers a chance to treat the condition but, repeatedly, it won't be discovered until the patient complains of symptoms and discovers they are fully diabetic.

"Pre-diabetics have been shown to be more responsive to treatment," says Dr Garcia-Webb, "and as rate and severity of side effects are proportional to how well controlled the disease is, this group have the best chance of avoiding any complications – but only if they know they have the condition. Pre-diabetes is an invaluable warning. If you lose weight, modify your diet and get a little exercise you can put the dreaded day off for a while or perhaps completely."

The oldest glucose test for diabetes mellitus was to taste the urine of patients for excess sweetness – mellitus is Latin for "honeyed", while diabetes is Greek for "to go through". Testing for diabetes today is, thankfully, far less personal and far more accurate. The first test will involve fasting for 12 hours before a small blood sample is taken and sent to the pathology laboratory. The blood is first spun in a centrifuge to separate the red blood cells from the plasma that is to be tested for dissolved glucose.

An enzyme that combines with glucose to form a particular colour is added to the plasma and is then measured. While much of this work is conducted by a technician, pathology laboratory protocols require any abnormal results to be assessed by a pathologist. The pathologist will look at such results in the context of the patient's age, sex, history and other results, and will either add a comment to the report or call the patient's doctor to discuss the matter and possibly arrange further testing. In a growing number of labs, including that of Dr Garcia-Webb, another stage has been added to the reporting process, with an artificial intelligence program scanning the results and other information about the patient to ensure no abnormalities have been missed.

If the BSL in your first sample is between 3.6 and 5.5 millimoles per litre, you are unlikely to be diabetic. If BSL is greater than 5.5mmol/L, you will need a

Should I be tested?

If you answer yes to two or more questions, ask your doctor about being checked.

You are most at risk of developing Type 2 diabetes if you:

- Are over 55 years of age
- Have high blood pressure
- Have high cholesterol
- Are overweight
- Have one or more family members with diabetes
- Are always tired
- Have blurry vision
- Are losing or gaining weight without trying
- Are thirsty often and always have to go to the bathroom
- Have heart disease or have had a heart attack
- Have/had gestational diabetes
- Are over 35 years of age and are an Aboriginal or Torres Strait Islander
- Are over 35 years of age and from the Pacific Islands, the Indian subcontinent or a Chinese background



Supersize Me highlighted the growing problem of obesity for both children and adults in the USA today.

second test: an oral glucose tolerance test. Values between 4.5 and 5.5mmol/L may indicate pre-diabetes and your doctor may advise you to take the tolerance test.

For that test, you get to drink 75 grams of glucose after a 12-hour fast (it's OK, at least it's sweet) then have your BSL checked at one and two-hour intervals to see if your pancreas is capable of clearing the glucose from your blood. The tests are identical to the fasting glucose procedure, and your values should not exceed 8mmol/L for the first check and be within normal limits at the two-hour mark. A urine sample might also be collected but, thankfully, the presence of glucose can now be tested with a paper dipstick and not the dip of a finger.

Type 2 diabetics are usually prescribed oral forms of medication to help control their BSL, but rather poetically, the disease that too often arises as a consequence of putting too much in your mouth is best treated by putting in less. Yes, this really is a condition where you can, often, cure yourself - provided you know about it. The lack of awareness persists even beyond the pre-diabetic state. In addition to every diagnosed diabetic there is also an undiagnosed sufferer who may be developing complications they could avoid if they knew about their condition. Those in high-risk categories should not settle for one negative test but get tested at least every three years.

Types of diabetes

TYPE 1 DIABETES MELLITUS

(aka Insulin dependent, IDDM or juvenile onset)

The type of diabetes most people associate with the disease. The body's immune system attacks the cells of the pancreas resulting in decreased insulin production. Requiring daily injections of insulin, IDDM represents 10 per cent to 15 per cent of all cases of diabetes and usually shows up during childhood or the early teens but can occur at any age.

TYPE 2 DIABETES

(aka non-insulin dependent, NIDDM or adult onset)

Representing 85 per cent to 90 per cent of all cases of diabetes, NIDDM occurs when the pancreas fails to produce enough insulin or the insulin is not working effectively. There is some genetic inheritance but the greatest risk factors are lifestyle related, including unhealthy eating and lack of physical activity. Historically, it developed almost exclusively in adults over the age of 45 but it is increasingly occurring at a younger age.

Symptoms often go unnoticed for months or years as the disease develops and may include sudden weight gain or loss, excessive thirst, excessive urination, blurred vision, skin infections, slow healing, tingling and numbness in the feet. Occasionally, no symptoms are noticed at all. Controlled by diet, weight loss, exercise and oral medications.

PRE-DIABETES

Pre-diabetes is a condition where blood glucose levels are higher than normal but not yet high enough for a diagnosis of Type 2 diabetes. It is estimated two million Australians have pre-diabetes. Left untreated it may develop into Type 2 diabetes within five to 10 years. In addition to the risk of developing diabetes, people with pre-diabetes are more likely to have a heart attack or stroke.

GESTATIONAL DIABETES

Gestational diabetes is a form of diabetes that occurs in up to nine per cent of pregnancies in previously non-diabetic women. In the majority of cases the condition disappears after the birth. The incidence is as high as 20 per cent in some indigenous communities and it significantly increases the chances of developing Type 2 diabetes later in life. It also increases the risk of pregnancy complications.

DIABETES INSIPIDUS

Not actually diabetes but a separate, uncommon disease that mimics the diabetic symptoms of excessive thirst and urination. Usually caused by a hormonal imbalance that stops your kidneys from concentrating your urine.

So, before you dunk your deep-fried Mars bar in that bowl of maple syrup, pause and think about your pancreas Go gentle; it's been working pretty hard lately. If that doesn't get you to toss the bar aside and step off on a brisk walk, think about this: my budget's pretty tight for the next year or two and I'm not sure I can afford for you to get sick. 🔥

GPs NOTE: This article is available for patients at <http://pathway.rcpa.edu.au>

For more information about diabetes contact Diabetes Australia on 1300 136 588 or visit their website at www.diabetesaustralia.com.au