

Dodging diabetes

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Part 1 Diabetes - the global epidemic

Diabetes is a good word - I pinched it from Rob Thompson author of Sugar Blockers - one of the better books on diabetes. I use it as an umbrella term for all those diseases connected with diet - diabetes, obesity, heart attacks, strokes, dementia, irritable and leaky gut, Crohn's, lupus, celiac diseases etc. A pretty miserable bunch which has now reached epidemic proportions causing great personal suffering and costing the global health system trillions.

It is not just the current scale - which is bad enough - it is that despite all the money and research being thrown at it and the work of the best brains in the medical profession - it just keeps on expanding out of control.

But just look at a typical scenario which occurs every 90 seconds in Australia - some poor unsuspecting person goes to the doctor on what they think is a routine check-up. The doctor - hopefully gently - breaks the news that they have type 2 diabetes and goes through the options.

Diabetes is a chronic - long term, irreversible disease. The effect is high blood sugar and sugar is a large molecule which will block off blood vessels so you can go blind and have your feet and arms amputated. (To emphasize the point she may show the Monty Python sketch in the Holy Grail of the limbless torso trying to defend the bridge.)

But don't worry - we have pills which will control your blood sugar so that won't happen. Of course it will get progressively worse so you will need stronger and stronger pills and will eventually have to go onto insulin injection and will die young probably from a heart attack. (Believe me this happens).

Oh and by the way you need to watch your diet and cut down on your calories.

When the poor patient recovers from the shock he thinks that may be it is not too bad, just take a pill every morning and prick his finger every morning to check the blood sugar - otherwise just carry on life as normal.

Now I - and many well qualified doctors say this is not a true reflection of the situation - diabetes can - in many or most cases - be reversed.

Part 2 Current dietary theories

Dietary theories can be grouped into three main categories. The oldest and most widely accepted is that fat is bad and should be avoided, the opposite theory is that fat is good and we should minimise carbohydrates and sitting in the middle are the various versions of vegetarian diets.

Fat is bad

The proponents of the 'fat is bad' theory argue that high blood sugar levels are just a symptom of diabetes and the real cause is insulin resistance. Fat blocks insulin so sugar can no longer enter the muscles and organs leading to a high blood sugar - leading to major health problems.

It is widely agreed that excess insulin is a dominant cause of obesity and that even if we have some insulin resistance our bodies will try and produce yet more insulin to get rid of the excess blood sugar. Doctors like Jason Fung argue that excess levels of insulin actually lead to greater insulin resistance leading to an exponential increase in insulin resistance.

Carbs are bad

Gary Taubes and Nina Teicholz argue that the fat is bad theory is based on poor science and people do not get fat (and insulin resistant) simply because they eat too much fat. Rather something in our bodies decides that we need to store energy so much of the food we eat is converted to fat and stored leaving us hungry - so we eat more. (Unfortunately they don't expand on what causes our bodies to become obsessive about storing fat.)

But the result is that any food we eat is obsessively stored as fat and is not converted into available energy so we end up hungry and eat more - in other words we do not get fat because we eat too much but we eat too much because we are getting fat.

This has led to the rapidly expanding adoption of the keto diet which - in its extreme form - means eating minimal sugars or carbs.

Both camps agree that there is not much difference between eating sugars and carbs as our bodies rapidly convert carbs into sugars (and sugars into fat).

The low fatters strike back

The low fat brigade seems to accept that the keto diet works in the short term leading to a loss of weight and for diabetics lower blood sugars.

They however argue that this high fat diet is actually increasing the fat content of our muscles and organs so we are in fact becoming more insulin resistant but as we are not eating any carbs or sugars that there is an apparent improvement in blood sugars.

But - and here is the sting - the keto diet is difficult to sustain and people will eventually revert to eating some carbs. As soon as they start to eat any carbs the increased insulin resistance will become apparent and blood sugars and weight will escalate.

They argue that as it is difficult to stick to a strict low carb diet any perceived benefits are a short term myth.

The vegetarians

The vegetarian brigade has two main arguments. They say that fruit and vegetables contain many phytonutrients and minerals which are essential for health. This seems to be accepted by all groups however there has been many research programs which show that the nutrients in modern fruit and vegetables have dropped dramatically. It is sad but very few people seem bothered about the way our food is grown.

A second argument put forward by a small number of the vegetarian brigade is that sugar spikes following a meal are the real problem and these can be blocked by the components of certain types of fruit and vegetables. This not only lowers the blood sugar spike which is beneficial but also lowers the insulin spike which follows the sugar spike which could be even more important. Vegetarians are really slow carbers.

This is a combination of Robert Thompson sugar blockers theory and Jason Fung's argument that excess insulin causes insulin resistance.

Fibres, both soluble and insoluble, are promoted as key sugar blockers. I have yet to find any opposing views although the ketone brigade are strangely silent on this while their diets contains both minimal carbs and fibres so are presumably not considered any issue.

So no doubt you are wondering which team I am going to barrack for.

Life should be fun

All of these three dietary philosophies mean giving up a major food group, fat, carbs or a bit of both.

This is getting to the key of the problem which is that while there are diets which will reverse diabetes they lead to a pretty miserable life.

This is a decision which resonates with me. My wife is Chinese and I am part of a Chinese community so visit China frequently. Now whatever your views on the Chinese are - one thing that is undeniable - is that they can make the most superb food. Every region - even every town - has their own speciality which just tastes divine.

Now I go out as part of my family group - what am I going to do - sit in the corner - feel miserable - and watch them eat or join in the fun?

Hey I am 78 - I have a finite time left so I want to have fun. If there was no alternative I would probably rake up the internal discipline and be good and eat a restrictive diet but does this really make sense.

People - particularly the Chinese - have been gorging on feasts for centuries without any health problems - almost the contrary - their health despite their feasting has been in the top rung.

Is it not more sensible to try and work out what they are doing right which enables them to eat this way?

Key points so far

Whether we like it or not the situation on the street is that doctors are promoting a pill based solution to diabetes. I am sure they understand that this is only treating symptoms.

A minority of qualified doctors say that diet offers a way of reversing diabetes but they cannot agree on what is the right diet which puts many people off the dietary approach - they just don't want to get involved in the controversy.

Even if that does not put them off they are faced with the reality that the diets being promoted are pretty miserable - missing out on all the nice foods - so many people take the view that the sacrifice is not worth the rewards.

Give them their dues - many doctors have prepared recipes to make their diet look more appetising but here in lies the snag - these recipes are still pretty boring in comparison with the simply delicious Chinese banquets that the Chinese have been eating for centuries with no apparent harm - it seems something is not quite right here.

These comments are simply a review of current views - now we have to move on to decide what to do about it.

Part 3 Searching for the real truth

I spend much of my life reading about diet and health and never know whether what I read is true or false so let me just talk about the wonders of the internet and the Google syndrome.

Think of any idea, however stupid, and you can Google it and find evidence to support your nonsense - this is extremely dangerous if you actually want to find out the truth.

If you happen to like 'chocolate and red wine' or a less likely combination 'pork crackling and pomegranate fruit' you can google health benefits and come across hundreds of reputable papers supporting this view. You can 'prove' virtually any preference this way - which means that the 'proof' is useless.

You need to conduct an alternative search - like in court of law - and search for health hazards of chocolate and red wine or pork crackling and pomegranate fruit - actually read what the papers say then try and form an informed opinion - not that easy.

If possible the conclusion can be cross checked against common sense and experience.

For example there is plenty of so called 'evidence' presented by the experts that cheese and rice are causes of the current diabetes epidemic. True or false?

No here is the snag - the French have been eating cheese and the Chinese eating rice for thousands of years without problems. Unless something significant happened to cheese and rice in the 1980's (bit silly) it is therefore extremely unlikely that cheese and rice are actually the cause of the current epidemic.

So far I have managed to live my life without much contact with the law and lawyers - although I do appreciate lawyer jokes. But I do have to admit (somewhat grudgingly) that they do seem to have developed some pretty good techniques for unearthing the truth with remarkable little evidence.

This seems a particularly useful skill with diabetes which is riddled with contradictory information.

One piece of evidence I gathered from the web is that even fifty years ago just one in a hundred people would suffer from diabetes. One advantage of being old (I am 78) is having memories that date back well before the epidemic started.

As a kid I certainly was well aware of all the infectious diseases - in fact it was the custom back then that if a neighbour's child caught chicken pox or mumps or whatever that I was taken round to their house so I got the infection over once and for all. Bit primitive - but diseases like mumps in particular are just a bit of an inconvenience to a four year old but can be serious when older - apparently causing something that was referred to as sterility and impotence - which meant nothing to me as a four year old but I appreciated when I became a randy teenager.

But I never heard of diabetes (or the other diseases in the group), true when I was a kid many of the older ladies were fat but diabetes - I never heard of it.

So the fact that we are dealing with modern diseases passes the common sense test.

Let's look at history.

There have always been overweight people, King Henry the Eighth was monstrously fat, as was Friar Tuck of Robin Hood fame and also Siddhartha Gautama - a name you may not instantly recognise but was the founder of Buddhism and as you know from the many statues of Buddha was not impoverished in the chubby department.

Globally diabetes now affects about one in three people and in some places like the South Pacific Islands one in two. This is amazing as South Sea Islanders were once superb specimens of humanity. (And maybe ate Captain Cook for dinner.)

So something has seriously changed so before I go of searching for some high tech solution I want to ponder about this change.

Of course the South Sea Islanders were reputed to be cannibals but my theory is that the only people they ate (if they ate anybody) were missionaries who tried to talk them out of their ancient tradition of polygamy - so I am going to discount this bit of folk law.

Overeating and under exercising

Is it also possible that the epidemic is simply that we are eating more and exercising less? This is a plausible theory we need to test.

It is absolutely true that people used to be much more physically active, walking or cycling was the normal mode of transport - but we have been a car and suburb based society for over fifty years - well before the current diabetes epidemic (and anyway I think there is sense in the saying you cannot walk off a bad diet).

So it seems that our modern diet is the culprit - but could it be that we are simply eating more? Another reasonable theory we need to examine.

One advantage of being old is that I have memories going back well before the diabetes epidemic and can remember how - as a kid - my family ate. I can also look at traditional cultures where I have had some contact.

I know that South Sea Islanders have a long tradition of feasts - simply eating huge amounts of food. I have been going to China ever since Deng Xia Ping opened up the country which is going back almost forty years - well before the diabetes epidemic and almost every Chinese I met then was skinny.

This is all observational but I see no evidence that we are simply eating more now than in the past.

I feel our eating patterns may have changed - we now eat on a more consistent pattern where in the past every day meals were more humdrum interspersed with major feasts linked to some form of social celebration wedding, funerals or harvest festivals etc. but I doubt if that is a significant factor.

The Chinese have always had a strict limit on the number of feasts - using the simple restriction of only feasting on days which end in 'y' (or Tien in Chinese).

But all these factors are miniscule in comparison with the way we now grow and prepare our food - which can only be described as a total revolution - specifically the widespread use of herbicides, insecticides and above all anti-biotics for farm animals.

What the experts say

So let's chat about what the experts say about diet.

Let me tell you the truth - I spent many hours a day reading about diet and health but they (that's the 'they' as in they should do something about something or other) put me into a strait jacket as I tend to go berserk over the pseudo-science.

I know I am now ancient but once I was a knobbly kneed school boy where sadistic school masters attempted to force ideas on how science works into my head claiming there were fundamental laws of physics which needed to be obeyed.

I reach a peak of berserkivity when I read about the calorie balance. Calories is a form of energy which comes in many varieties, true we can have radiation energy, kinetic energy from high speed yellow utes but when we talk about food we mean chemical energy which is released by a chemical reaction varying from an explosion to the heat in my compost pile or the warm glow after a big meal.

But this energy is a property of a mass, a hunk of something - you simply can't have calories or chemical energy floating around in the ether. So we don't eat calories we eat food which contains calories or energy.

Only some of this energy is released when we eat something. We have readily available or high quality energy which is easily released but some remains as lower level or quality energy.

The ease of releasing energy is measured by the concept of entropy which is really just a measure of the availability of energy - but the mass does not change (although some is converted to carbon dioxide). Our bodies are not run by the process of changing mass into energy like in an atomic power plant (hopefully) but by changing the chemical state and hence quality of energy of our food.

The concept - which seems embedded in the dietary literature as a fundamental law of the universe - is that we eat a certain amount of calories (which is wrong we eat food which contains a certain amount of available energy) and that if we do not burn of this energy (by doing some violent exercise or thinking - which burns a lot of energy) then the excess energy will end up as fat around our tummy.

This is pseudo-science of the highest order. First we do not store energy we store fat which contains energy and we store this fat because our bodies have taken a decision to store fat not because there is an excess of energy.

Energy - quantity and quality

Let us say that we have a solar panel which is collecting energy from the sun at a nice steady uniform rate.

In the first experiment I shine this radiation onto a boiler which makes high temperature and pressure steam which drives a turbine to make electrical energy. You

have to admit that this electrical energy is useful - and it is useful because I have created a high temperature (high quality energy).

In the next experiment I shine the same amount of radiation into a large lake and manage to raise the temperature of the entire lake by 0.5 degrees. It is the same amount of energy as before but is pretty useless (low quality energy) - barely improving a quick swim.

Energy has two dimensions - a quantity (as measured by calories or joules) and a quality which can be measured by entropy (a concept only developed to confuse first year engineering students).

If I pedal a bike to the top of a hill I am converting chemical energy (food) into potential energy. If I let the bike roll back down the hill using the brakes to control the speed I am converting the potential energy - which started off as chemical energy - and I end up with heat on the brake pads which is totally useless (same energy different quality).

If I am lucky enough to have an electrically assisted bike (which is a really great technology) I can convert this potential energy into electrical energy which I can store in a battery to use for the next hill. (That is why electrically assisted bikes are so great).

I have preserved the quality of the energy.

Cabbages and cheese cakes

What all this got to do with food? In the literature you will find the calorific value of various foods - you will also see they use calories as a measure of the quantity of food - for example you can have a hundred calories of cabbage, cheese cake, bread, sugar or whatever.

The argument is that all these food - with the same calorific content - will have exactly the same effect on the body - and it is just not true because the quality (entropy) of the calories vary.

The quality of the energy in a cabbage is pretty poor so is very slowly released - which is great for our bodies which have evolved to handle poor, slow release, energy food so we have a nice steady stream of energy which may last for many hours to keep our body working.

The problem is that in nature there is a remarkable shortage of 'cheese cake' trees where our ancestors could just go along and just pick off a slice of cheese cake - so our bodies have never evolved to handle this spurt of high octane food and hasn't the faintest idea what to do with it.

So it does what kids do when mum comes home and finds they have been knocking of the cheese cake - they hide it under the pillow hoping she does not notice.

That makes a mess of the pillow and inside our bodies it makes an equivalent mess so we can end up getting fat.

If you don't like all this theory stuff do a practical experiment. (I am all for practical experiments which disprove silly theories). Buy a set of good scales and for a week just eat cabbage, then next week just eat cheese cake with the same calorific value.

Then email me your weights and show me that you have proved that the basic laws of thermodynamics which have been around for a couple of hundred years are all wrong.

(In Rob Johnson's book on sugar blockers he argues that eating a cabbage just before the cheese cake will slow down the release of energy from cheese cake so it causes less of a mess - give him his due he actually has more appealing recipes that cabbage with cheese cake).

The idea of an energy miss-balance leading to people becoming fat is just too simplistic to be useful.

Still not convinced - here is an experiment for you to do on yourself

Getting back to our misunderstanding of bodily thermodynamics;-

What we really need is a simple experiment which everyone can do as many times as they like to show that this simple calorie theory is bunkum - and it is just so easy.

For the next week just glance down into the toilet and see how much poop you have excreted - (there is no need to weigh it unless you are hyper pedantic - the results will be painfully clear).

Now go out for one of those gorgeous Chinese banquets and stuff yourselves - like I do when I go to China. Next day have a look at the toilet bowl, you will be amazed - expect double the normal amount. That poop is full of energy - manure is burned in rural communities as a fuel. Poop contains a lot of calories.

This concept that you get fat because you eat more calories than you burn off as energy is just too simplistic to be useful - it is in fact highly dangerous which leads to many faulty conclusions.

Don't ask me how your body decides to excrete excess matter but the simple fact is it did. Your body has somehow decided it simply does not need this extra fuel and out it goes - down the big dark output pipe.

The punch line

The only conclusion that seems reasonable is that the diabetes epidemic is the result of a change in the type of food we are eating which is a direct result of the way we grow and process our food. (This is not a proof - it is what we call a working hypothesis - it fits all the known facts and when applied gives useful outcomes.)

It is easy to get riled up about the evil barons controlling our food industry but life is never that simple - we are now producing more than enough food for the entire world and even manage to waste some 30% of the food produced which we dump in land fill (terrible).

This is the result of the simply astounding - but unappreciated innovation and revolution in our food industry so I really have to have a little chat about the wonders and harm of technical innovation.

Part 4 The wonders and hazards of innovation

I am not a Luddite

OK I want to talk about the benefits and hazards of technical innovation. Yes there are hazards which I need to talk about - they are at the heart of the diabetes epidemic - but I don't want you thinking I am some anti progress Luddite. So let me say in my preparatory defence that my life's story has been one of innovation.

I was a pioneer of computer aided engineering, the company I started grew to become the leading exporter of technical software from Australia and I was recognised as a leader in my technical field - I sold the company (unfortunately for pocket money) when I began to get old so I could devote myself to technology in the environmental area but it continue to grow and was eventually snapped up by one of the US techno giants for half a billion dollars. Maybe I did something right.

I set up the Australian Innovation Centre to help young entrepreneurs develop their technology so I am not a Luddite - I am all in favour of technical innovation which can generate great wealth and improve life but society needs to recognise that innovation has a dark side which needs to be managed.

The dark side of innovation

To succeed any innovation must provide benefits otherwise it simply disappears from the records but typically the benefits are not for everyone. The plough was a probably the most iconic innovation but the benefits were far from uniform. It instigated a system of land ownership which benefited some (the new landowners) more than others (the peasants) - also the remaining hunter gathers were among the others.

Genghis Kahn is not often thought of as an innovator (he wasn't - his skill was applying his mates innovations) - and often the benefiter of an innovation is not the actual innovator - but Genghis certainly recognised the benefits of the reversed tension bow, the Mongolian saddle and stirrup's and organised mobile cavalry which gave his army an almost unstoppable advantage over any enemy who happened to get in its way - (who would not be classified among the benefactors of his mates military innovations).

The steam engine is an innovation which amplified the class divide subjecting displaced workers to an almost unbearable life while the factory owners enjoyed mansions and servants.

The modern deluge of innovation of the modern third industrial revolution has increased productivity and total wealth beyond belief but the benefits have not been uniformly spread among the population at large. The increase in wealth of the wealthy is almost unimaginable. The statistics are truly stunning with some of the richest 60 people in the world owning 25% of the total wealth.

But in many cases the poor have not benefited from this increase in total wealth (really meaning they lost out) which is leading to a level of political discontent which we see around the world with the refugee crisis, Brexit and political disasters like the Cambridge Analytically which is challenging the fundamental basis of our society.

These inequalities are amplified by the growth of the multi-national corporation which is often beyond the control of individual national governments.

In truth I can do nothing about this wider problem other than register my disapproval of the system and promote the concept that we need an improved mechanism for distributing the wealth generated by innovation.

But I can make some difference by focusing on a narrow target like how the food industry is causing the diabetes epidemic. My strengths lie in technology rather than political agitation.

There is a phrase I very much relate to 'evil flourishes when good men stand idly by'. This is phrase which dated back to the eighteenth century and the time of slavery and for the current era I need a * to say that men is a generic term which includes women.

Our modern food system has certainly increased the total production of food beyond expectations - the negative is that the food is typically lacking in key minerals, phytonutrients, fibre and most important biological life to sustain health.

It has put many small farmers out of business and put the remaining larger farms under the de-facto control of multi-national companies who generate great wealth for a handful of people.

TV science

I don't know how many pictures I have seen trying to explain how insulin works - nice little picture of doors, locks and keys and chewing gum blocking up the lock trying to explain how insulin works and how fat creates insulin resistance. All good stuff but it is just TV science - not that I have anything against TV science - I am a regular perver of Catalyst and the Science Show.

But it does not explain (or even prove) how fat blocks sugar or even more significantly how two thirds of the population can eat as much fat as they like and never get diabetes while one third do. This is this \$64,000 in combating diabetes and no one seems to know the answer (or Mr. Google has not been able to find it for me).

2/3 of people still Ok why?

It can all sound very depressing - one out of three people are suffering from diabetes - within a decade - at the present rate of increase that will be one out of two. But hey are we looking at these numbers in the right way. Currently two out of three people are eating what could be a terrible diet but don't have diabetes and are perfectly healthy. Should not we putting some effort into working out how these people manage it.

There are some people who are genetically predisposed to diabetes - there is no data available on how many but I would anticipate only a small percentage of diabetes sufferers.

While we can't change genetics the science of epigenetics looks at how genes are turned on or off so it is possible that some people with genetic disposition could be helped.

But my hypothesis is that our gut biology dominates our susceptibility to diabetes. (When I say hypothesis I really mean a working hypothesis - which says I can't actually prove it in scientific sense but it works - so go for it.)

After all if one third of the population is suffering from diabetes then that means by simple maths that two thirds are resistant. How do they do this - I would put my money on the gut biology which in reality controls how our food is processed within our bodies. So let's talk about how to bring about change.

Part 6 Options and action plans to combat diabetes

Option 1 rely on pharmaceuticals

Our current range of pharmaceuticals does not reverse diabetes - but when used as part of a well-orchestrated program - they do control blood sugar levels (which at least makes life tolerable meaning you won't die tomorrow.)

This may be marginally satisfactory for some but many people just don't manage the system adequately leading to blindness, amputations and early death. Governments do try and offer the appropriate support service to prevent this but the numbers show this is not working well in practise.

We have to say this is not the preferred option.

Option 2 Change diet

Advocates of the low fat, low carb and vegetarian diets all make claims that there particular diet can reverse diabetes.

There is sufficient evidence to confirm that these diets do what they claim for some people but it is debatable that any of these diets offer a universal solution.

There is a major problem here with self-selection. Much of the information coming from the medical profession is based on doctors running clinics which offer solutions based on one of the three schools of thought I have talked about, low fat, low carb or vegetarian (slow carbs).

They all claim to have successfully treated thousands of patients and reversed their diabetes. I believe that these are honest doctors doing the best for the patients and they actually are successful in reversing diabetes. (Unlike the scammers who proliferate on the internet selling wonder potions to get rich quick.)

But there is a natural selection going on here - people are different with some people being able to handle some foods like fats or ice cream but not raw onions (or whatever combination you like). Each person has to work out what diet will work for them.

This means that people need to shop around for a diet that works for them. It is inevitable that these diets restrict life style and require some commitment to adhere to.

We really don't seem to understand how individual bodies work - but that should not stop us. There is a nice phrase I like - science is the art of truth - engineering is the art of managing ignorance.

Is there a way we can better manage our ignorance?

Option 3 Change gut bacteria

Unhealthy food is everywhere. Even with the best intentions it is difficult to buy healthy food from the supermarkets (which dominate our food supply) particularly with the crotchety food labelling system. When traveling it is even worse - typically there is nothing healthy to buy.

But despite this some two thirds of the population remain healthy. How do they do this? The most likely explanation is that it is our gut biology which controls how our food is managed inside our bodies deciding whether to turn the food into energy, store as fat or dispose of down the dark tube. How do our guts take this decision?

Our intelligent guts

I have a hypothesis that this is decided by the cells in our guts communicating with each other, just like in a computer, to take intelligent decisions. But I can't prove it - as yet.

But what I do know - which has been confirmed many times throughout the world - is that changing gut bacteria - by that delightful process of a faecal transplant - can completely and reliably turn a fat person into a thin person. We don't understand the mechanics of how it works but we know for sure that it does work.

But, to be honest, I simply cannot see the Chicago commodity market setting up an operation for the trading of bulk poo.

But we do know for sure that diet can change gut bacteria and hence how it takes decisions even if we don't really understand how it works.

We can see this by observation - although I am no fan of observational trials.

Most people would know of someone who is overweight - but whatever they do - getting down to eating just two peas a day - they still remain fat. There are other people who are skinny - and would love to have a bit more flesh and curvature - but however much they eat they still stay skinny.

Why?

Diet - we have a lot to learn

Now as I have been allowed out of my straight jacket to write this I can have a brief spell of berserkivity about medical statistics. Engineers are trained in statistics early in their education; parts have to be made within certain tolerances with upper and lower limits. Every manufacturing process has a spectrum of errors and if a process is in control then this error range will fit comfortably within the tolerances.

It does not matter if you are making precision semi-conductors in Japan or chopsticks in some less developed country the same principles apply so if the process is in 'control' parts will roll off the production line with a reject part 1 in a 1,000 or 1 in 100,000 in Japan.

Samples will be taken to check the process is in control but maybe something makes it go out of control, in Japan this could be a speck of dust on the temperature sensor or in the chop stick factory the local chicken deciding to perch on the cutting head.

The engineer in charge is supposed to understand the process sufficiently well to get the process back under control. A production engineer would be looking for a correlation of 99.9% or better (or a new job).

99.9% is better than 15%

Medical statistics relating to diet seem to be totally different. It is common to see articles in which very small trends - such as 15% - are regarded as significant. In engineering terms that means that just 1 part in 6 would be within specification - not a good way to keep your job.

I should emphasize that this only seems to apply to diet and not to other branches of medical science. I have had major surgery on a number of occasions. In each case I have talked to the surgeon about probabilities of failure and am reassured when I hear of success rates of 98% or so. That tells me that the surgeon is in control of the process and the risk is acceptable.

When I see figures of 15% in diet that indicated to me that the process is out of control - there is some factor which is just not understood - the job is to try and identify what is the unknown issue - a piece of dust on the temperature sensor, a chicken on the cutting head or more realistically our guts acting as an intelligent system and taking wrong decisions - why we do not understand - as yet.

No one diet for everyone

Could it be that people simply handle food in different ways? We know that people genes vary we can't do much about that. But there is the whole new science of epigenetics - working out why some genes are switched on and off.

But it seems a reasonable to guess that the biggest variation between people is in the gut biology. This is good news as we can either start to tailor diets to suit people guts or may be better simply change people's guts.

Old cars

But I think it will be a long time before we can really understand how the intelligence in our guts really works - but time is critical, while you are reading this someone will have had their foot chopped off - so what do we do - now?

When I was young I was poor so could only afford old cars which I kept on the road by periodically taking them to bits and rebuilding. I really understood how those old cars worked. They were a pain to drive with crash gear boxes so I had to double declutch to change gear and they had chronic oversteer - it all required some know how.

Nowadays I open the bonnet of my car and feel totally intimidated - it is just a maze of microcomputers doing their things. But the fact that I don't understand it does not stop me driving it.

In comparison with the old cars it is a total doddle. If I wobble off course it beeps at me, if a car slow down in front it automatically slows down without me doing anything. I am told if someone walks out in front of me the car will stop far faster than I can manually. I know it works with cardboard boxes but am a bit short of volunteers to step in front of my car when doing 100 kph.

Double declutching - hill starts - forget about it - the continuously variable gear box handles everything for me.

So even though I don't know how it works I can still drive it with perfect ease.

I do not know how the computer inside my guts works - I would like to but - for now - I don't but that does not stop me from letting my guts take decisions for me.

Part 7 Decision time

The point of the Gbiota project is not simply to develop some fancy new way of growing food. That may be a good outcome from the Gbiota club but it is not the point - I have been successfully growing plants in my Gbiota beds and they are simple, productive and work well - (apart from those pesky insects).

The whole point of the Gbiota club is to show that eating plants grown in mineral rich and biologically active soil improves health is an effective tool against diabetes.

You may say that we should wait for the science to be established first. My comments is that there is very little scientific research on how the way we grow plants affects our health - we need to show it is important first.

This is the way science and innovation often works. James Watt did not revolutionize the steam engine because Carnot developed thermodynamic theory; quite the opposite Carnot developed thermodynamic theory because James Watt showed that the steam engine was important.

That is the way science and engineering have worked together for centuries - some enterprising engineer tries some new concept (dare I say gut feeling) and if it works science comes along works out why and typically improves it beyond recognition. The history of innovation is fun reading.

We have to show that the way food is grown is important for health and is a potential tool for reversing diabetes - that is what the Gbiota club is all about.