G-Biota - Our gut biology and reversing diabetes

Colin Austin **7th March 2017**

Synopsis

We look at the various methods to manage diabetes - high carb, high fat, high fibre and fasting. These may control the mechanics but they miss the importance of gut biology which control how our bodies function. We look at the fast expanding science of gut biology and pragmatic ways to improve our gut biology by diet.

Xiulan's diabetes

In this article I want to show how important gut biology is to health and look at practical ways to improve gut biota.

Xiulan (my wife) went through a very bad patch with her diabetes - she began to lose her eyesight and consequently fell down some stairs and broke multiple bones in her foot which after the operation started to turn black.

We struggled hard to reverse her diabetes and thought we were doing a great job but then her blood sugar readings shot up. I guessed that this was an indirect result of the heat wave we are experiencing. I understand that we have both brown and white fat and that the brown fat is burned up to heat the body when it is cold so it is expected that sugar levels will rise in a heat wave.

Seeking professional advice

But to be sure we went along to a diabetic expert where I talked about our efforts to reverse diabetes but was told that diabetes was not reversible so Xiulan would need to go onto more powerful medication and would soon need insulin injections and would probably die prematurely.

I have been studying diet and diabetes for the last eight years since Xiulan was first diagnosed and there is a spectrum of qualified medical doctors and researchers who have field experience that diabetes can be reversed by diet.

The basic principles of managing diabetes apply to all non-communicable deceases - heart attacks, strokes, obesity etc. which now comprise the largest source of illness worldwide.

A Global issue

This is obviously an important issue for billions of people and health services around the world so I decided I should write up how I interpret the diabetic situation.

Internet marketing whiz kids say that content should be simple and updated regularly. Well let me square with you - I am not particularly bothered about internet rankings. My primary interest is finding a cure for my diabetic wife - but I am happy to share my finding with others if they are interested.

Despite any advice from the marketing whiz-kids this is going to be a long and serious document as I puzzle my way through a mass of contradictory information and will not be the short spectacular collection of three word catch phrases that the wiz-kids marketers seem addicted too.

What actually is type 2 Diabetes

A common view is that it is elevated blood sugar levels which lead to a range of problems such as amputations, blindness, elevated cholesterol, obesity etc. Typically the aim of the medical treatment of diabetes is to control the blood sugar level which leads to blindness and amputations but high blood sugar is really a symptom of diabetes - not the core of the problem.

The generally accepted view is that this core of Type 2 diabetes is the fat level in the muscles cells increase to levels which block blood sugar entering the muscles under the influence of insulin - insulin resistance.

The low fat solution

The classic proposed solution to insulin resistance - which was initiated by Ancel Keys way back in the 1950's - has been to adopt a low fat diet on the expectation that if less fat is eaten then the fat in the muscles will dissipate.

This all sounds totally reasonable apart from a couple of problems.

There is an intrinsic assumption that eating less fat will lead to less fat in the muscles. This is an assumption which may or may not be true but is lacking substantiating facts. There was a similar assumption with cholesterol - cutting back on eggs which contain cholesterol was supposed to reduce blood cholesterol. But this does not necessarily happen.

The low fat solution has been widely promoted and adopted - supermarkets are full of low fat products which people buy with enthusiasm. However the incidence of non-communicable NCD's decease has grown exponentially.

Non Communicable Deceases - NCD

For thousands of years humans have suffered from deceases caused by bacteria and viruses. Bubonic plague, malaria, polio, flue and even the common cold have wrought suffering and death on humanity. NCD's did occur but were relatively uncommon and their importance was simply dwarfed by the rampant infectious deceases.

But we have been incredibly successful in gaining some protection from these infectious deceases while NCD's have simply exploded to become the biggest killers. They include diabetes which is my immediate interest but also include heart attacks, strokes, Alzheimer's mental health and many other deceases.

Diet seems a key player.

Challenging the low fat believe

The low fat approach has been challenged by alternative approaches - some like the high fat approach - is in direct opposition. This is generally called a low carb diet but there are several low carb diets so I call this the **high fat diet**. The proponents argue that the low fat method inevitably leads to high carbohydrate intakes which are rapidly broken down into sugars which in turn lead to an insulin surge which makes people hungry so they eat more carbohydrates.

The high fat - low carbonate brigades argue that insulin spikes are the real problem.

The excess of carbohydrates is converted into fat which is stored in the liver and muscles which make diabetes worse. I have observed that diabetics on a low fat high carbonate diet seem to have enormous appetites.

Another group argues that the diet should be low in both fats and carbohydrates and the energy and minerals derived from a largely plants based diet. While fruit and vegetables are carbohydrates they are slower acting than processed carbohydrates. One key benefit is that a high veg diet contains a lot of fibre which slows the sugar spike and appears to be the major benefit of a high fruit and vegetable diet so I call this the **high fibre diet**.

I have tried a high fibre diet and I certainly lost weight and felt healthier but honestly I found it a bit boring and was often tempted to sneak a bit of chocolate.

Yet another group argue that insulin like alcohol and drugs can become addictive so there should be periods of low or zero food intakes so no insulin is produced. This has two benefits - it may reduce the fat level in the muscles and also give the pancreas a chance to recover from the excess demand for insulin so the beta cells which produce the insulin can recuperate.

Excessive insulin is claimed to lead to pancreas burnout with the destruction of the beta cells which produce the insulin. This burn out has been claimed to be irreversible but recent research on mice has shown that - with fasting - beta cells can recover.

I have experimented with fasting - I do not have diabetes (that is why I can experiment on myself before persuading Xiulan to adopt a particular method) so maybe my motivation was a bit low so I was not so enthusiastic about adopting severe fasting. However I did find that having a late breakfast and an early dinner - which gave me a fasting of between fourteen and sixteen hours seemed just as effective (but maybe slower) than more extreme fasting.

Proponents of intermittent fasting say that you can be pretty relaxed about what you eat during the eating period as long as you are strict on the fasting phase. Again they argue the fasting does not have to be every day - five days a week is fine. I find this is very socially acceptable enabling me to have red wine and chocolate periods.

I have no problems keeping to this slow intermittent fasting schedule which is now part of my routing.

Who is right?

With all these contradictory approaches the question is who is right?

These various conflicting ideas are being promoted by qualified and experienced doctors who produce evidence to support their ideas.

The existence of these conflicting ideas has a demoralising influence on diabetic sufferers so they are discouraged from taking any positive action. This psychological factor should not be underestimated.

While my aim is to try and form a view on the right course of action for a diabetic this cannot be done without first looking at the immense change in our food supply.

The food revolution

Our food has changed more in the last fifty years than in the last 10,000 when there was a similar dramatic changed from a hunter gather to an agricultural system.

We may talk about technical revolutions like the electronics mobile phone which have occurred over the last few decades but there has been a major revolution in agriculture which has been increasing in productivity by several percent year in and year out.

Food hygiene has also improved dramatically. In my childhood farms were pretty dirty places (at school I worked on a farm to get enough money to buy my first sports bike - so I know).

Supermarkets - with their mass of processed foods are highly controlled. Even produce is subject to an intense cleaning

process with triple washing in acid solutions to kill of all pathogens like E-Coli.

But these improvements in productivity and hygiene have had some costs to the beneficial biology which has been part of our traditional diet.

Farm soils have changed dramatically. In the past soils contained minerals and biology but intense agriculture has removed much of these natural benefits which have been replaced by carefully controlled fertilisation regimes to replace the nutrients important for food production - however there is no economic incentive to replace the trace minerals which are essential for our health but not for the plants.

Trace minerals like chromium and vanadium are essential for removing sugar from the blood.

Probably more important is the reduction in beneficial biology - which is really the theme of this article. Vegetables grown in biologically active soil are covered in beneficial bacteria.

Living plants have mechanisms for protecting themselves from these bacteria but when the plant dies the bacteria will start to decompose the plants.

This is exactly what happens to beneficial bacteria in our guts which should be being continuously upgraded when we eat fresh raw biologically active produce.

But this active biology will also reduce the shelf life of fresh produce which is crucial for the Supermarkets as the time from farm to purchase can be extend. Supermarkets have invested heavily in research to keep their produce **looking** fresh for as long as possible.

Superimposed on these changes are the technologies of selective breeding and GMO's. All these massive changes in our food system have made it very difficult to evaluate how to fight NCD's.

Today's cabbage is not the same as a cabbage fifty years ago so even if we were to eat the same nominal food as before there would have been a significant change in our diet.

But we don't eat the same food - our diets have changed dramatically - we eat far more meat - particularly chicken - and the consumption of dairy products - particularly cheese (the base ingredient for pizza) has exploded.

There used to be a joke that the number of economic theories equalled he number of economist plus one. It seems the same joke could be applied to the number of dietary theories.

So how do we find out which diets are good and bad?

Analysing dietary data - the observational approach

The classic method is called observational. Imagine a tribe of primitive people wondering across the landscape and one healthy - but hungry - member of the tribe spies an attractive looking mushroom which looks singularly good to eat so he gulps it down and in a couple of hours is dead.

The rest of the tribe will now become pretty cautious about eating that particularly type of mushroom which will - over the generations - acquire a pretty poor reputation. This is how much of our folklores about native plants have evolved. It may not be very scientific but over thousands of years has formed a complex web of know how.

The benefits of many - but not all - traditional herbs have now been established by modern science.

We still use the observational method - in fact Ancel Keys used this method to form his views on fat by studying the Mediterranean diet.

In more recent time the study of 'blue zones' has received much attention. Blue zones are regions of the world where people live not just long lives but remain fit and healthy to a ripe old age.

Researchers hope that by studying the health and longevity of these blue regions of the world that they can learn which diets lead to good health.

This may all sound good however the French Paradox shows that no one can be sure whether these health benefits are due to diet or something else. According to all the expert analysis the French diet is terrible and they should all be dropping dead of heart attacks in there thirties.

This simply does not happen - the French live longer and have fewer heart attacks than other European nations. Is this because of their diet and how they eat or despite their diet?

The big advantage of the observational method is that it cheap and gives a lot of data - the snag is no-one can be sure whether the data is correct of not.

Scientific or not much of the current views held by the establishment are based on these observational analyses. This does not mean they are right - it simply means they may be right - but they could also be wrong.

Analysing dietary data - the doctors clinic

Many of the challenges to the conventional views have come from practicing doctors. These are not quacks (yes the diet industry abounds with quacks selling dubious products - I try and avoid these) but fully qualified and dedicated doctors. Many describe their work as functional medicine. I am not sure that I understand what this means but I certainly don't want to be treated by dysfunctional medicine.

Each clinic is based on a certain theory on how to reverse diabetes, may be high carb, high fat, high plant, fasting etc. Each clinic can produce many case histories - often in the thousands - of successful reversals which they use as testimonials.

I have no doubt that these are honest case histories which at least shows that diabetes is reversible (in some situations).

What we do not know is the failure rate - neither do we have direct comparisons between methods.

A big advantage of these clinical trials over the simple observational study is that the patients are carefully monitored under medical supervision and there is little if any marginal cost.

For that we need the double blind placebo trials.

Analysing dietary data - the controlled experiment

The double blind placebo method is the classic gold standard for scientific research. Trials are set up - often involving thousands of people - and over long periods of time. In the most convincing trial groups are switched treatments each group may receive multiple treatments which minimise variations between people.

This adds credibility to the results - however these tests are very expensive and only investigate limited factors which form part of the planning of the experiments. They miss out on the serendipity factor which makes science fun (and much more productive).

The problems start when the results are subject to the rigorous statistical analysis as the correlation factors are general very low may be 15 to 20% which may be statistically significant but is not really very impressive.

Let me put this into perspective.

The statistical aeroplane

Aeroplanes are remarkably reliable - the probability of you arriving at your destination can be as high as 99.999% (may be late but you have an incredibly high probably of getting there).

But let as look at what air travel would be like with similar probabilities to diabetes research. You arrive at say Sydney airport where there is a giant screen with a list of destinations and the probability of arriving. Chicago has a 13% chance of arrival, Los Angeles is a bit better at 16% but London is only 11% and Beijing only 9%.

You go the check in and the assistant tells you that there is a special on Auckland which has had a run of 22% probability of arriving. You ask the assistant what happens to the planes that don't arrive and she says she has no idea - they just arrive somewhere else - safe and sounds but no one knows where.

No doubt you take the sensible decision and decide to drive to Coffs Harbour instead.

My family is a family of engineers, my dad kept Beaufighters flying in the war. (Twin engine plane that could take off with a full bomb load in the high Atlas mountains in the North Africa campaign), my uncle was the village blacksmith and my son and daughter are both engineers.

So let me tell you an inside story about engineers - despite the high image of making marvels we have no idea what we are doing - we have a high level of ignorance.

But we have a deep understanding of probabilities so when we design something we choose the most likely to work. Engineers talk of safety factors but the truth is they are really ignorance factors. The key skill of an engineer is to guess what will work - not unlike practising doctors.

99.999% reliability

Modern aeroplanes are incredibly complex machines but the reasons we have been able to achieve such high reliability is that we have been learning how to make and fly them for over a hundred years so we have already made the common and not so common mistakes.

But let us have a little thought experiment with a different result.

I am going to pretend to be chief engineer of an aeroplane company and am called into the boss's office to explain why our planes only have a 15% chance of reaching their destination - he says this is having a serious impact on sales and I need to fix it.

I explain all the tests we have done and tell him our planes are incredibly airworthy and hardly ever crash - despite thunder storms and hurricanes - they just don't seem to arrive where they are supposed to.

He tells me I am missing something and I need to review everything again and that my employment contract is up for review.

I check and double check all the results and can find nothing whatever wrong so I check my bank balance to see how long I can last without a job.

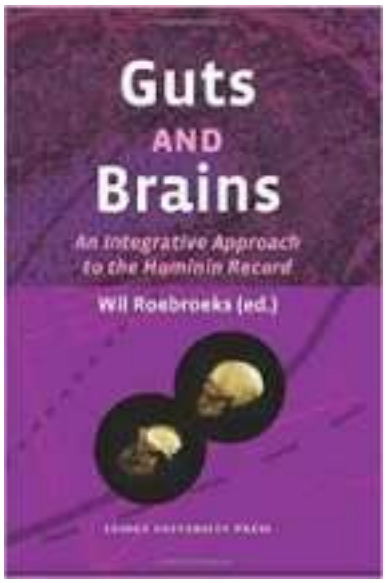
Feeling very depressed I go home where my grandson is having his bath - he is happily playing with his boat which bobs around in the water - never sinking or having any problems - just like my aeroplanes but then I notice that his little boat never gets anywhere and has no control over the direction.

The next morning a burst into my bosses' office to tell him I have found the answer. We need to fit our planes with a rudder so the pilot can control the direction rather than just hoping they arrive at the intended destination by chance.

Now this may seem (and probably is) a remarkably silly story but it seems to me entirely analogous with what is happening with diabetes research.

Vast amounts of money and time have been spent on excellent high quality research on diabetes and diet but this has looked upon our bodies as some mechanical system - we eat X and Y happens.

Our smart guts



But in reality we have a highly sophisticated intelligence system - a combination of our cranium and gut brains - which working together in unison control how our bodies work.

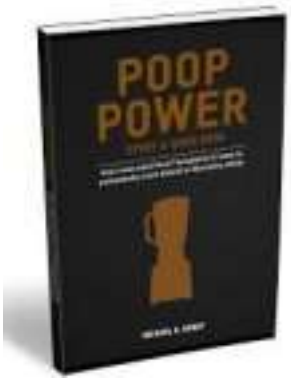
I call upon my engineering background and experience with probabilities to come to the conclusion that we are most unlikely to reverse diabetes if we do not sort out our gut bacteria. Our gut bacteria play a role just as important as a rudder in an aeroplane.

This is not saying that getting the right balance of fats, carbohydrates, minerals etc. is not important - they are just as important as wings and engines are on an aeroplane - they provide the energy and nutrients for the system (our bodies) but the control system (our gut brain system or the rudder) must be working correctly.

Investigations into our gut biota.

The progress in understanding our gut biota is truly astounding. Every month there is a new book published about our guts - at the end is a sample from my Kindle library but there are many more excellent references.

While the identification and understanding of the roles and functions of the various species is progressing at a rate of knots there is one topic which seems a bit of a black hole - practical ways to manage our gut biology.



It is true that there are some proven methods - such as faecal transfer which is unlikely to replace taking the grandkids to the beech as a national pastime.

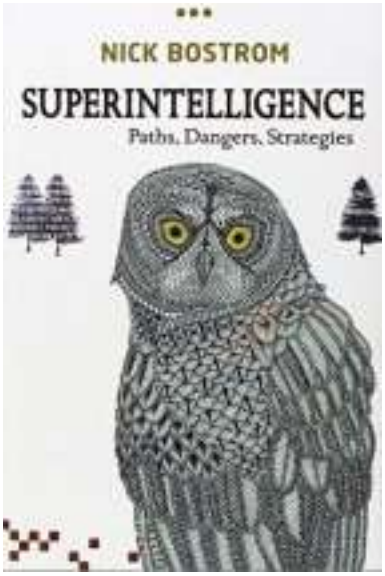
But there is also the scale of the problem - can we really imagine a billion people lining up for faecal transfers?

There are of course pro and prebiotics which are readily available commercially. I have tried these on myself and found absolutely no difference - but that is not a scientific test.

But I do read that experts in the field make the point that the commercial probiotics only contain a limited range of species in comparison with the thousands of species that live in our guts and that they do not contain the spores for the bacteria to reproduce on an ongoing basis.

I simply do not know but it is not looking so good to me so maybe we need another approach.

Changing our gut biology to improve our health



In my article about the next big thing - http://www.waterright.com.au/revolution.html I prophesized that our new understanding of gut biology would revolutionise how we thought about health.

I could have discus the mechanical operation of our gut biology - the way it digests our food, trains our immune system, produces vitamins we cannot make ourselves. But there is one overriding factor - our guts have intelligence which control how our bodies work.

I am going to avoid getting into a debate about whether our guts have genuine intelligence - which really means the ability to analyse a completely new situation which has never been encountered before - or is just some super control system in charge of running our bodies.

Rather I want to focus on the empirical art of changing our gut biology to improve our health.

Improving our guts

If it were as simple as going to the Chemist shop and buying a bottle of pro-biotics (containing the beneficial biology) and eating a few pre-biotic foods to feed them it would have become standard medical procedure long ago.

There is no such thing as an ideal gut biology - the guts biology of people from different parts of the world - eating very different diets and with varying genetics - have been

analysed in depth and there is no such thing as a single ideal gut-biota. Healthy people from different regions of the world have very different gut-biota determined by local conditions - but they all seem to be working perfectly well.

There is more to improving our gut-biota than eating pills containing a few beneficial strains.

Our intelligent guts (and the unicorn)

The interesting feature of our gut biology is that every individual cell can detect and communicate with all the other cells. This seems to be the feature of intelligent systems.

Take a very simple on-off thermostat - a pretty crude controller and not intelligent. Go upmarket to the type of controller found in a power station - as the temperature the controller will sense that it is approaching set point and cut back on the power to avoid overshoot. But that can lead to the set point never being actually being reached so another mechanism cuts in which gradually lands the temperate at exactly the required set point. It may appear smart and do much better than a human can do but the intelligence comes from the designer.

It may be smart but is not intelligent.

If a unicorn came galloping into the control room and started pushing all the wrong buttons the control system - however smart the design would simply collapse.

Now what would happen if you are I were walking along a road and we were confronted by a unicorn? Probably the first thing is to vow to cut back on the red wine but when we actually decided that the unicorn was for real our intelligence would cut in - hopefully before we wet our pants.

Now unless your life has been much more eventful than mine neither of us has ever seen a unicorn so this is a totally new experience. This is where real intelligence cuts in.

We start to collect information and see what we know about unicorns. First it is big and has a very long horn which if pocked through our tummies would be the last thing we remembered - so we understand that unicorns are potentially very dangerous.

So next we would look at its face - particularly its eyes - to see if we could guess whether it was cross - or frightened - or friendly. Subconsciously we are making the assumption that a unicorn will have similar expressions to something we are familiar with - a horse.

If all looks OK we may hold out our hand and see if it licks or bites it.

But what are we really doing? We are going through a learning process to discover how to manage this unexpected situation.

And that is a bit like what our gut-biota does - but we should not look at our gut-biota as some separate organism like out liver our lungs. Rather we should think of us and our gut-biota as super organisms - a combination of us and our gut-biota which works as a combined super organism - which works together as one system to learn and then manage how we work.

For science and the medical profession to work we need to look at individual parts of the body work but when looking at an intelligent super organism we must also look at how it works as a total integrated system.

My time machines

If we take a trip in my time machines (I have just charge the batteries so we are OK and won't get stuck) we would see that early man had a pretty varied existence - there were sometimes when life would be good with plenty of food and people were generally healthy.

Our gut bacteria were very varied and we could eat a whole range of foods. But the good times were broken up with terrible times with most people dying very young - which makes me a bit cynical about the benefits of a paleo diet.

It's great that Google Translate has introduced prehistoric languages - now I can chat quite happily to the ancients - before I had to communicate by making little sketches with a pencil and paper. That really scored a hit with these ancient locals which went off to paint all sorts of pictures on any available rock face.

But on a geological time scale we recently developed agriculture which provided some form of food security. We started to live in cities which on average increased our wealth and gave us a bit more food security but our food quality actually decreased and infectious deceases became much more common.

But our gut biology - as part of this superorganism changed to fit the new way of eating with a more limited range of foods with a consequent reduction in the variety of our gut biology. That's what gut biology does - it learns and changes - so we end up preferring the new diet.

But as science developed we gradually overcame the infectious diseases and made some so called *improvements* to our food - the modern diet - full of fats and sugars and lacking in nutrients - but above all tasty. As expected our gut biology has changed to adapt to the new diet so we now find ourselves in a new situation with NDC non communicable deceases replacing the old scare of infections.

We need to change our gut-biota - but how?

Changing gut-biota

It may seem that it should be easy to change gut-biota. We are learning about it at an incredible rate - there is almost a new book published every week. The last one I read was;- The Human Super-Organsim: How the Microbiome is revolutionising the pursuit of a healthy life by Rodney Dietert.

This and similar books follow a pattern - they start with a very impressive review of the current state of the art of gut biology - a technology which is rapidly progressing.

You get all excited looking for the bit we are all interested in - practical ways to improve our gut bacteria - then they fall in a heap with a very unimpressive list of options - taking probiotic pills in which the active bacteria is likely to be killed off by the acid in your stomach. Then there is the totally un-reassuring suggestion of letting your dog (if you have one) lick your face - not exactly reassuring.

They do try and redeem themselves by showing just how effective and reliable faecal transplant technology really is. As there over a billion people around the world suffering from some form of non-communicable decease associated with poor gut bacteria my only comment is that the plot of a billion people having someone else pooh poked up there bums sounds like a theme for a Monty Python sketch.

Our intelligent guts

Scientist seem to be making great progress on identifying the various species in our guts - working out what they do - and classifying them as good or bad.

However simply changing our gut biology from baddies to goodies is a mechanical approach which misses the key point that our gut acts as an intelligent system.

We are still struggling to understand how intelligent systems work but we do know that they consist of a massive number of individual cells - which individually are pretty stupid - but they can communicate with each other and in some way can alter the behaviour of other cells so the system as a whole has intelligence. This is how our brains, computers and many insects like ants and bees are collectively intelligent while a single ant or bee is pretty stupid.

The intelligence in our guts - through the myriad of nerves and hormones can end up giving us a craving for certain types of food - such as an addiction to ice cream, pizzas or chocolate - which may or may not be good for us.

Even if we were sure we knew what foods were good for us (which we don't) simply telling people they should eat X or Y is not really effective - our gut intelligence has a nasty habit of taking control.

I don't know how the intelligence system in our gut biology actually works - but I do know how computers work so we can try and work out what is happening by playing a thought experiment.

Thought games at a party

Let us image we are at a party with all sorts of delicious food. I decide that despite all the goodies on offer I will just eat from the salad bar. How do I do that?

At this time my gut biology is probably in passive mode so my conscious brain is in control and I can resist all the other goodies which my eyes see but that information is not as yet sent to my gut biology.

Then a really attractive young lady in a very slinky figure hugging satin dress approaches me and offers me a slice of cheese cake. My gut biology now begins to engage and sends out some testosterone - the 'go for it' hormone. I apologise saying I am on a diet - my conscious brain is still in charge.

She takes my hand and says that she knew I was coming and spent the whole afternoon making the cheese cake so won't I try just one little slice. Look she says this one has your name on it - and sure enough there is a slice with Colin written in icing on it. Reluctantly I take it and eat it.

Now what is going on in my biology? We can be pretty sure my body is being flooded by hormones which are taking control of my body.

Now if you are reading about gut biology and how the individual cells communicate you will pretty soon learn about the common ones, like ghrelin and leptin which are the key one controlling appetite but the more I read the more I understand there are hundreds of hormones - I have no idea what they do and I wonder if anyone does and how may more there are we know nothing about.

But this is a thought game so I ask is it likely there is a **single** bacterium which responds to a pretty girl holding you hand, a bit of flattery, an appeal for empathy and a desire to eat cheese cake which can override my conscious brain.

My engineering instinct - which cuts in when I no idea of the answer - says that concept is ridiculous - I look for another explanation.

A much more feasible explanation is that there is a whole bunch of species at work - all communicating with each other like in a computer - and sending a patchwork of hormones and electrical signals up and down my Vagus nerve which makes my hand reach out and eat the cheese cake.

Complexity

So what is the punch line from the thought experiment? What we need is a highly complex gut biota - this is very different to many of the commercial products which are often carefully bred version of a single species - they may be of some benefit in digesting our food but they are not providing the intelligent gut which seems critical for a functioning gut.

So that give me an engineering style challenge - I have no idea of all the different species needed (and probably could not pronounce their names if I did) so how do I go about creating the needed complex gut biology.

Practical ways to change Gut Biota

Go back thirty or may be even fifty years - well within my life time and Non Communicable Deceases NCD were simply not the problem they are now - so presumably our gut biota was then much healthier. But we do know that people living in undisturbed rural environments have a much healthier gut biota - so why can't we learn from them and adopt some of their ways but interpreted with the benefits of modern technology?

This is the approach I have adopted.

I start with a growing bed which incorporates some of the features of traditional growing - specifically by improving soil biology. This can be done by a combination of inoculation, growing plants (like sunflower) which are known to form symbiotic relations with soil biology and above all feeding the biology by having zones of decomposing organic material which is the food for soil biology.

Plants grown in these conditions will have an active biology which if eaten fresh should act as a probiotic for our guts.

Growing plants that will make us healthy is not that difficult - growing them on schedule to provide a consistent daily dose is not so easy. To be honest that means I have failed - I either have a massive surplus which I have to throw away or I am several days behind in my plants maturing.

The method used throughout the world by traditional people is to use fermentation to preserve fresh produce. This is probably more than a convenient way preserving food - it allows the biology to reproduce to form a super probiotic.

Having a few jars of fermented vegetables in the back of the garage to give a daily dose for when the crops are just not quite ready is very pragmatic - believe me.

Learning from wicking beds

When I first started to promote wicking beds some twenty years ago I was a bit over enthusiastic and unfortunately the technology became corrupted. This was not really a big deal as wicking beds were really for amateur gardeners.

Reversing diabetes is a much more serious issue so I want to avoid my previous mistakes so I won't be publishing details of this growing system on a willy-nilly basis but will set up a mailing list of people who are seriously interested in this technology. Please email me to go on the list. colinaustin@bigpond.com

Below is a quick flier I made to summarise what I am trying to set up.

G-Biota ™

Changing our gut biology to improve our health

Gut biology digests our food, trains our immune system, produces vitamins we cannot make ourselves but above all our guts have intelligence which control how our bodies work. Our guts affect our moods and particularly what foods we crave.

How do we change our gut biology to improve our health?

If it were as simple as going to the Chemist shop and buying a bottle of pro-biotics (containing the beneficial biology) and eating a few pre-biotic foods to feed them it would have become standard medical procedure long ago.

There is more to improving our gut-biota than eating pills containing a few beneficial strains. Every individual cell can detect and communicate with all the other cells so they work as a total system.

Our gut biota was once very varied as we ate a whole range of foods. The modern diet is full of fats and sugars and lacking in nutrients. Our gut biology has changed so now we crave these nutrient poor foods.

Here is a little flier I made up which hopefully gets to the issue quickly.

We need to change our gut-biota - but how?

We need to eat food which is biologically active and full of the needed minerals.

G-Biota is fermented vegetables which have been grown in biologically active and mineral rich soil beds. The beds are regularly flooded with a biologically active tea made by water peculating through decomposing organic material and minerals so the plants are already biologically active.

After picking they are washed, air dried and then fermented to enrich the biology which will regenerate and feed our gut biology.

In its raw form it is somewhat bitter but when mixed with fruit yogurt and maybe a few grapes it has a pleasant sweet and sour taste.

It is recommended to consume a small bowl of this G-Biota and yogurt most days.

We are currently looking for growers and producers.

For more information contact colinaustin@bigpond.com 0411 595 086

Further information

I have spent many hours reading the mass of literature of health, diet and gut biology. Here are some of the better references

Low Fat

Type 2 Diabetes | Nucleus Health
https://www.youtube.com/watch?v=OXAe3eOjqCk&t=63s

Jason Fung
https://www.youtube.com/watch?v=4oZ4UqtbB_g

How To Reverse Type 2 Diabetes At Home
https://www.youtube.com/watch?v=ETDlnvY5StY

T. Colin Campbell
https://www.youtube.com/watch?v=owhXsFvnMC8

Low carb

Reversing Type 2 diabetes starts with ignoring the guidelines | Sarah Hallberg | TEDxPurdue
https://www.youtube.com/watch?v=OXAe3eOjqCk

How to Cure Type 2 Diabetes Diet Doctor
https://www.youtube.com/watch?v=zjUdtK6ukqY

A New Nutritional Approach to Type 2 Diabetes - Dr. Neal Barnard
https://www.youtube.com/watch?v=lLqINF26LSA

How to Control Blood Sugar In Type 2 Diabetes Naturally
https://www.youtube.com/watch?v=G3g2ZXTYhW0

What I Would Eat if I had Diabetes? Eric Berg
https://www.youtube.com/watch?v=NQXGXfpV9d0

How to Reverse Diabetes Naturally - New 2016 Diabetes Knowledge Nguyen Diep
https://www.youtube.com/watch?v=mFhPNtL8jq8

How To Cure Type 2 Diabetes Fast- Is This The Easiest Way?
https://www.youtube.com/watch?v=aQGboRkLBoo

The Two Big Lies of Type 2 Diabetes Jason Fung
https://www.youtube.com/watch?v=FcLoaVNQ3rc&t=586s

Curing Type-2 Diabetes by Juicing Bitter Melon.
https://www.youtube.com/watch?v=ZqQe26hNF1s

Reversing diabetes type 2
https://www.youtube.com/watch?v=Plg2NXrOrKs

5 Steps to Naturally Reverse Type 2 Diabetes!
https://www.youtube.com/watch?v=LzocqmiaO-s

Healthy Eating with Type 2 Diabetes
National Center on Health, Physical Activity and Disability (NCHPAD)
https://www.youtube.com/watch?v=XOZ-Yco3Ykw

Eat Good Fats | Diet Program
https://www.youtube.com/watch?v=5Zdbub7tzEg

Dietary Fats: The Good the Bad and the Ugly
University of California Television (UCTV)
https://www.youtube.com/watch?v=qwSMgZYAaZU

5 High-Fat Foods That Are Actually Super Healthy
https://www.youtube.com/watch?v=Yj2iUd9LbXE

Enjoy Eating Saturated Fats: They're good for you. Donald W. Miller, Jr., M.D.
https://www.youtube.com/watch?v=vRe9z32NZHY

Healthy (Nutrient) Wealthy and Wise: Diet for Healthy Aging - Research on Aging
University of California Television (UCTV)
https://www.youtube.com/watch?v=LpYwcTFVnv8

Dr David Katz
TEDxMindStreamAcademy - Dr. David Katz - The Road to Health
https://www.youtube.com/watch?v=mIGbucJC7Kk

Eric Westman, MD, MHS -- LCHF Treatment of Diabetes
https://www.youtube.com/watch?v=iBLCi0KbYkM

Fat v Carbs with Jamie Owen BBC Documentary 2016
https://www.youtube.com/watch?v=9F8qXxjdh-4

Low Carb Diet: Fat or Fiction?
https://www.youtube.com/watch?v=8GUIBNKnT1M&t=9s

Fighting Fat With Fat | Nick Murphy | TEDxSyracuseUniversity
https://www.youtube.com/watch?v=uRN9P0dOI6E&t=12s

Reversing Fatty Liver in 2 Weeks
https://www.youtube.com/watch?v=DFRuonulrRI

Reversing Type 2 diabetes starts with ignoring the guidelines
https://www.youtube.com/watch?v=87v3Q1ybihU

Sugar and sweeteners. How toxic is sugar
https://www.youtube.com/watch?v=dBnniua6-oM

The Best Diet for Type 2 Diabetes
https://www.youtube.com/watch?v=9jwAGunPFXo

Vegan

Secrets to Reversing Type 2 Diabetes with Dr. Gibson (And Mastering Type 1 Diabetes)
I Love Nutritional Science: Dr. Joel Fuhrman at TEDxCharlottesville 2013
https://www.youtube.com/watch?v=E4katnfHzXA

A fasting-mimicking diet may reduce disease risk factors and reverse diabetes
https://youtu.be/SCoXSzOAYaU

Mark Mattson pt1
https://vimeo.com/152237714

Tackling diabetes with a bold new dietary approach
Neal Barnard
https://www.youtube.com/watch?v=ktQzM2IA-qU

The Myth about Blood Sugars and Diabetes
Dr Berg
https://www.youtube.com/watch?v=P7fHYSyvxU0

The Starch Solution John McDougall
https://www.youtube.com/watch?v=4XVf36nwraw

Gut Biota

Dr. Emeran Mayer: "The Mind-Gut Connection" | Talks at Google
https://www.youtube.com/watch?v=f-hUanaLrJg

Mind-altering microbes: how the microbiome affects brain and behaviour: Elaine Hsiao at TEDxCaltech

Genome Editing with CRISPR-Cas9
https://www.youtube.com/watch?v=2pp17E4E-O8&t=2s

Healthy Gut Healthy Body: Intestinal health & chronic disease
https://www.youtube.com/watch?v=j1gk9QYvCN0&t=34s

The Brain in your gut
Heribert Watske
https://www.youtube.com/watch?v=bkeBjP_9ZR4&t=123s

How to Control Blood Sugar in Type 2 Diabetes Naturally
https://www.youtube.com/watch?v=G3g2ZXTYhW0&t=14s

How to Get Rid of Type 2 Diabetes within 19 days
https://www.youtube.com/watch?v=pvSn_nSmStM&t=14s

How to Heal Your Gut
https://www.youtube.com/watch?v=4wxrTYLZjsE&t=52s

Power Foods for the Brain
Neal Barnard
https://www.youtube.com/watch?v=v_ONFix_e4k&t=117s

Probiotics (University of Reading)
https://www.youtube.com/watch?v=hob9WqWi9i8&t=52s

Probiotics Gut Flora
https://www.youtube.com/watch?v=mioR_WrkRaU&t=1883s

Recipe to Loosing weight
Anna Verhulst
https://www.youtube.com/watch?v=KfK3eK-kOQA&t=84s

The Calorie Deception
https://www.youtube.com/watch?v=5F5o0a4p_3U&t=67s

The Gut Brain
https://www.youtube.com/watch?v=mioR_WrkRaU&t=1883s

The gut flora You and your 100 trillion friends
Jeroen Raes
https://www.youtube.com/watch?v=Af5qUxl1ktI&t=69s

The strange location of your second brain
https://www.youtube.com/watch?v=mioR_WrkRaU&t=1883s

Kindle books on Gut Biology