

Understanding food

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Summary

Innovations often comes from thinking about a problem in a different way. Innovators are often so deeply immersed in the technology that they are not effective is making the message clear so it may not be adopted.

But there are some entrepreneurial thinkers who will take the time and effort to understand the thinking, test it for themselves and be very effective in the adoption process.

Aft a period the thinking becomes widespread and a ne paradigm is born.

Let me tell you a story about food.

The word crisis means something bad happening fast. There does not appear to be a word for something bad happening slowly, so I am going to make one up insidium.

So we are not suffering from a health crisis, but a health insidium, meaning people's health is slowly getting worse. It starts with deficiencies in our food system, but is effectively masked by a highly manipulative disinformation campaign, so most people don't care and will just be carried along by the flow.

Even statements like 8 million people per year suffer an unnecessary diabetic amputation, costing \$40,000 a time and clogging up our health system, have no effect.

I call those people who stand by and watch the puddings; they agree that things should change, but creating change is not for them.

But there are people who go under various names who will take action to change the system. They go under various names, entrepreneurs, pioneers, free thinkers, activists, trouble makers or misfits, depending on what side of the fence you are sitting.

This story starts with a group of free-thinking activists who totally changed an industry, sadly not the food industry.

This story is not for the pudding but the free-thinking activist who thinks that all people should have access to food that will keep them healthy and are prepared to act.

Blocked arteries

In 2000, my arteries were almost blocked. I had tried a stent and went to the hospital to have it checked. My surgeon said it had not worked, your arteries are almost completely blocked, you need a triple bypass, and we operate tomorrow or you will die.

They call that 'surgical persuasion'.

The operation worked fine, but it is not something I would want to take up as a hobby.

Five years later, I was fine but getting a bit podgy around the tummy as tends to happen with sixty-five-year-old men, so I decided to go on a diet.

The gaunt creature

In a way, it worked as I did lose weight, but one day I caught sight of some horrible-looking, miserable, gaunt creature in a mirror. It had a face so shrunken that it was clearly from some wartime concentration camp.

Looking around and not finding anyone standing close by, I realised the unthinkable, that creature was me.

I had no energy, my long-standing wife said that I had become so grumpy and temperamental that I was impossible to live with and worst of all, I still had a podgy tum.

I was a pesky kid, I always wanted to know how things worked until my mum would scream in desperation, 'because mum says so', and that is how I ended up an engineer.

I wanted to understand how the body decides how much fat to store and where to put it. I looked at everything I could read to find an answer, became totally in awe of the sophistication of biochemistry and the wonders of modern machines like mass spectrometers, electron microscopes and the wizardry of the chemist in being able to construct models of the most complex molecules.

Why we get fat?

But nowhere could I find a logical explanation of why we get fat and why the body decides to store fat in my tum rather than on my horrible, gaunt-looking face.

This matters.

Having the right amount of stored fat leads to a longer, healthier, and higher-quality life.

The wrong fat in the wrong place is the underlying cause of chronic diseases, blocking insulin in diabetes, blocking the arteries in heart attacks and the blood channels in the brain in strokes.

Apart from these serious medical issues, you just feel better at the right weight.

If mum had still been alive, I am sure she would have said, 'because that is just the way it is, now just finish off your Brussels sprouts before you leave the table'.

But sorry mum, the world of health is full of magic cures and potions that are supposed to make you fit and healthy, but the prime purpose of these magic cures, however cleverly they are marketed, is to transfer money from your bank account into theirs.

If we are serious about fixing our health, we need to understand how our bodies really work, and that is what this story is about.

But as this is a story, let us do a flashback as they do in the films. It was 1962, and I had just finished my engineering degree and was wondering what to do next.

Young greenhorn

At that time, plastics were still in their infancy before becoming the bete noir of environmentalists, and a whole new bunch of engineering plastics were being developed.

What a challenge for a young engineer to learn to use these engineering plastics, with their amazing ability to be moulded into complex shapes, but their frustrating tendency to creep, warp, and stress crack.

The mini-computer

Another ten-year jump forward, and I found myself a humble lecturer in plastic processing at RMIT University in Melbourne.

They had just installed the latest and greatest mainframe computer, operated by what must be the most frustrating of all inventions: punch cards, which I believe were developed to ensure the computer would never be adopted by the masses.

But I found that if I stayed back late, I could use the master console to write software.

Dazzling light bulb

This was a truly dazzling light bulb moment; computers were going to completely revolutionise the way engineers went about their business.

But it was equally obvious that I was not going to get far working until the small hours on the RMIT mainframe console.

This was at a time when Bill Gates still needed trainer wheels on his bicycle, but a new generation of mini-computers was just coming onto the market.

I had to have one; the only problem was that they cost about a third of my house's value, so there was a little problem with a second mortgage, and then I had to find one I could actually buy.

I may be a frustrating type, but I am persistent, and I think I ended up as the second purchaser of this new generation of mini computers to come to Australia.

And it was truly pathetic: the memory was so limited that writing serious software involved using overlays, a term long forgotten but which meant automatically writing data to disc to be used later, making the already slow computer even slower.

Plastic flow

Plastics are typically processed by injecting a hot molten plastic into a cold mould, and frequently the plastic would freeze before the mould had filled.

So I used my new toy to write a simulation of a hot plastic whose viscosity depended on temperature into a cold mould. Fortunately, a generous gentleman by the name of Newton had worked out how to solve simultaneous equations, but had never bothered to invent the computer so anyone could actually do it.

So I wrote a computer simulation, which I could use to run hundreds of simulations which showed me that the way engineers were thinking about plastic flow was just wrong.

The paradigm shift

It was obvious and the accepted belief that if you had problems filling a mould, then you made the flow channels bigger. Common sense - right.

No, wrong, you had to rethink and design the flow system to give a uniform flow front, and that meant making some of the flow channels smaller.

I bought an around-the-world ticket on American Express because I had no money left, and gave lectures to experienced designers, saying that the way they were thinking was the wrong approach and that they needed to fundamentally change how they thought about flow channels.

You have no idea how antagonistic the audiences were. I was almost booed off the stage. F'ing idiot from Australia with Kangaroos hopping down the main street, telling us old hands at the game that to fill a mould, they needed to make some flow channels smaller.

It wasn't the computer simulation, which wasn't an established technology yet, but some upstart telling them they were thinking the wrong way.

After the booing and heckling

Fortunately, in the audience was the odd entrepreneurial thinker who listened to the arguments with an open mind. No way did they believe me, but

- a) They had problem moulds that they could not fill
- b) They have tried everything they could think of to solve the filling problem, failed, and were desperate enough to try anything that had a chance of working.

And, fortunately for me and for them, it worked, and the company I had started in my back bedroom eventually grew and was sold for half a billion dollars, and I was selected by the Institute of Engineers as one of Australia's leading innovators.

But I had jumped off well before then to enter a new phase of my life, how to sustainably grow food which will keep us healthy, which I considered to be the greatest challenge facing us all.

The Intelligent Irrigation System

Access to fresh water is one of the great challenges facing all of us, so naturally I was anxious to develop technologies that would enable its more efficient use.

I developed the intelligent irrigation system, which was a self-learning software that, over time, learned how much water the plants were using and estimated future needs.

The point is, we need to understand how our bodies decide and regulate where and how much fat they store, and we don't have the answer.

But the intelligent irrigation system is a working example, which we can understand, of an intelligent system regulating a living organism, maybe plants rather than our bodies, but nevertheless a good model of how our bodies may be regulating how much and where we store fat.

At the very start, it has no data on current water usage, so it uses standard values based on traditional crop factors and applies the very first irrigation.

It measures soil moisture at various depths, evaporation, and rainfall, and so calculates the actual crop factor. It also requires predictions of future weather to estimate evaporation and determine the amount of water required for the next irrigation.

This is just a prediction, which will always have an error, and it will use that error to provide a better prediction next time, hence the name predictor-corrector scheme.

All this data is saved, so over time, the system learns.

A better life

The amount of fat we store is decided by our mind, our subconscious brain. It has a set point and will always try to bring our fat level back to it.

It does this by sending signals to the gut to produce a range of hormones that either make us crave food or feel full and satisfied.

We assume this set point is set at birth, with the baby deciding when it is hungry, when it will search for mum's breast and when it is full, it may stare into mum's eyes to keep her attention while throwing the unwanted food out of the pram.

As we grow and for the rest of our lives, we will note how much and what kinds of food we eat, and what effect they have on our bodies.

This is analogous to an intelligent irrigation system, which continuously monitors the plant's water needs and consumption.

But the set point will change over time. If there is a shortage of food or even a specific nutrient, it will raise the set point.

We could say with good reason that it is all in the mind. At the end of World War II, there were widespread food shortages in the Netherlands, leading to widespread starvation. After the war, when food supplies returned to normal, many people who had been starved put on large amounts of weight.

There was no physical reason, as there was now an abundant supply of food.

The fear of a lack of food was all in the mind, but it was still real and caused an obesity epidemic.

And it is still happening today, with a significant proportion of the population overweight because their minds receive signals that the modern diet is deficient.

Forget the eat less slogan, eat more, but the right sort of food.

To do that, we have to convince our mind, our subconscious brain, that there is no emergency, that there is no need to store a vast amount of fat in case things get bad, and that it is fine to be at a normal weight.

We can do that by ensuring we eat the foods that supply all the nutrients we need and, gently, very gently, switching from the nutrient-deprived foods our bodies have become acclimatised to and want to the full-nutrient foods it needs.

Food masochists end up fat. Be nice to yourself for once, and persuade rather than bully. Fat starts in the mind, it is our bodies insurance policy.

The whole basis of the Gbiota technology is to retrain the mind (our subconscious brain), so it sends the appropriate signals to the gut to produce the necessary hormones.

Any regular movement, not even vigorous exercise, will lower the set point.

It is continuously learning which foods satisfy and adjust hormone balance, so we crave them.

We may think we can override these hormonal signals by diet, eat less, exercise more, but this rarely works long-term. We have to train our subconscious brain, easy when we are young, but less easy, but still possible as we get older and the set point becomes more firmly ingrained.

Training comes from eating the right amount of the right food and regular movement.

A key factor is the balance in the food. For most of the time that humans have been evolving, we have eaten food grown naturally. Natural foods are not necessarily good, but they do mean there is a wide variety of foods, leading those who eat them to live longer and healthier lives.

By studying the various diets across the globe and time, we can learn what foods are beneficial.

We can see that foods that contain a broad spectrum of minerals, vitamins and phytonutrients are beneficial.

However, the population has exploded, increasing from 2.5 billion in 1960 to over 8 billion now. This has required a similar increase in food production, achieved through better genetics and fertilisers.

But this has changed the balance of our foods, making them more energy-dense and with a lower ratio of beneficial nutrients needed to replace body parts as they age and wear.

This has resulted in a corresponding increase in set points and the amount of fat commonly stored.

The Gbiota technology was developed to improve the balance of our foods by adding essential minerals, vitamins, and phytonutrients. It is not intended to replace the bulk of our foods, which provide us with energy, the sugars and fats in our modern diet, but to supplement the modern food system with the missing minerals, vitamins and phytonutrients.

It is based on using volcanic rocks, which naturally contain a much broader spectrum of minerals than chemical fertilisers, and on growing selected plants under controlled conditions to contain the required trace minerals, vitamins, phytonutrients, and microbes that are essential for health.

Volcanic rock not only offers a broader spectrum of minerals than chemical fertilisers, but is also inexpensive, widely available, and free from the political fragility of petrochemicals.

It does, however, require the microbes to make the minerals bioavailable, but breeding the beneficial microbes is part of the gbiota technology.

We do this by controlling the conditions so the beneficial microbes outcompete and outbreed the harmful microbes.

By 'conditions,' I mean the balance of nutrients, air, and water. Controlling conditions is an engineering rather than a microbiological issue. As luck would have it, I am an engineer and have spent a lifetime working out how to control the conditions.

Engineers design machines, and every machine has a controller. Some make the toast pop up when it is a nice brown; others ensure that the rocket you just fired up goes to the moon rather than zaps off into outer space to find a planet where people don't kill each other on an industrial scale as they do on Earth.

Best of luck, fellas, if you find one, just drop me an email with Google Map directions.

If you are prepared to join a social movement to make food that will keep people healthy, why not drop me an email at colin@gbiota.com