THE TIMES
Monday March 6 2017
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Could saunas and pinot noir hold the key to anti-ageing? (yes, if you have the right genes)

When Dr Sara Gottfried found she was ageing rapidly, she decided to take a close look at her DNA. She tells Helen Rumbelow what she discovered

In a highly competitive guru market Sara Gottfried had reached the top. A doctor trained at Harvard and the Massachusetts Institute of Technology, she had two books on healthy living in the *New York Times* bestseller lists and was regularly photographed in her San Francisco home as the bodacious pin-up to which we should all aspire. She looked amazing for 44 and practised what she preached: good diet and exercise. She was even a yoga teacher when she wasn't in full-time medical practice. Then, with some anticipatory smugness, she took a test to show how fast she was ageing. After all, she was doing everything right.

"It came back that I was 64. I was ageing horribly." Was she shocked? "Totally. I thought I was healthy."

Her latest book, *Younger*, catalogues the research into genes that has changed her entire medical approach in the five years since that fateful day. Bottom line: the simple diet and exercise advice universally given will be looked back on as being like some medieval doctor trying to cure an ague with a leech; sort of well-meaning, but blunt. Gottfried instead healed herself by trying to preview the individualised, personal DNA-based medicine of a few decades hence. Her book attempts to offer you the health advice your grandchildren's generation will take for granted. She says: "It felt urgent. It felt like I had a choice."

Saunas are thought to activate the longevity gene FOXO3
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Reading it is to wonder if you have landed somewhere between the future and cloud cuckoo land. Which is exactly where Californian medical science always is; easily mocked before we all adopt it a few years later. And let's just voice what we're all thinking: there is usually nobody more humourless and self-obsessed than a Californian health guru. I set up the Skype call to Gottfried with a heavy — and probably fat-clogged — heart.

Her book describes her lifestyle, and it's one that, between meditation, saunas and supplements, would test the patience of the average Brit, not to mention their credibility at the pub. Involved are collagen lattes, which are the first thing I "bring up". I tell her they sound like something served in a zombie café. "You have to try it," she says, before adding: "It's mostly tasteless."

Gottfried is a hoot, though. Before long she is doing a blood sugar test for me live on camera, like the medical equivalent of a web-cam striptease of her cellular health. "This is such an exciting build-up," she jokes as the gadget ("only a few dollars, recommended") waits to ping her excellent result. Before long she is joshing with me about my wrinkles — "Oh, you just need a collagen latte" — and we're getting on fine. She is serious about the medicine, but not everything. "Take calorie restriction: it prolongs life, but who wants to live like that? I'd like to grow younger still, but in a fun, playful way," she says.

She wasn't feeling like that after her first telomere test. Telomeres are strands at the end of our chromosomes that correlate with lifespan. They start off long and trailing in childhood, and shorten by about two thirds over our lifetime; if your telomere candle is burning down, you are running out of time. You can get a private telomere test in this country, but

very few do. That, Gottfried is sure, will change.

"After my test I did what I usually do with fear. I went to the research." What she found was that medicine needs to be targeted not just at growing your telomeres, which can be measured very precisely, but also at your unique genetic make-up. The first study she drew on showed that women with "high perceived stress" were ageing faster (according to their telomeres) than their peers.

Gottfried realised that, although her career as a hormone specialist, and her home life as a wife and mother to two children, wasn't outlandishly stressful, it was to her. It was, she says, "an 'ah-ha' moment".

In the introduction to her book she writes: "In medical school I drank gallons of coffee, hardly slept for a decade, and then I had two kids, need I go on? Then in my forties I navigated the challenges of crazy work hours, grief, breast lumps, ageing parents, tight clothes, travel and stress. Eventually I learnt that there is a lesson in my battle with age and that my mess is my message."

Gottfried deduced that she had a genetic weakness to stress, which meant that good diet and exercise wasn't nearly enough. Her chosen lifestyle was aggravating this vulnerability daily. "I had a high set point of stress without realising it, until the telomere test came back," she tells me. "I worked too much, didn't sleep enough. At

Dr Sara Gottfried: "My motivation is not a fear of death, it's more a fear of missing out on a full life"

44, I was in a failure state. I was lean, but had pre-diabetes, mostly because of stress. I had the kind of stubby telomeres that are associated with cancer, Alzheimer's and lots of horrible things. There's a metabolic and health span cost to this failure; my cost was 20 years of rapid ageing."

Gottfried immediately went about changing her life. She no longer practises full-time, and "sleep and meditation are non-negotiable". She even meditates with a headband gadget, called Muse, that signals when brainwaves are calming. I managed to find this ridiculous and tempting.

"Of course I knew the benefits of meditation, but I didn't do it regularly. It's that gap we just talked about between knowing what's best for you and actually doing it. Telomeres are simply an intermediate marker, not 100 per cent accurate, of health span, but it was enough to light a fire under my butt."

What about everyone else? How are we to know where our genetic weaknesses are? Since the telomere test, Gottfried has delved deep into her genetic profile, right down to knowing that she has a defect of a gene called CYP1A2, which is responsible for metabolising caffeine, an explanation of why her morning espresso made her so jittery throughout the day. It won't be long, Gottfried writes, before "most of us will be running around with our own genomes printed on smart cards in our wallets". Maybe in one or two decades, she estimates, this will revolutionise our everyday life choices.

Until that day, Gottfried has set about creating a protocol for patients that would do everything to repair telomere length. A lot of it is the basic stuff we know about: sitting less, being sociable, eating your veg. The science is evolving fast, but she doesn't think "we'll ever disprove certain truths, like 'eat more vegetables', or the role of exercise, meditation, sleep, and stress". To this list of certainties she adds — surprisingly — saunas.

"I certainly never got taught about saunas in medical school," she says, "but the sauna data is revolutionary." She was so convinced by the research data on long lifespan in sauna enthusiasts — saunas are thought to activate the longevity gene FOXO3 — that she built one on her deck for her and her

husband. "That's another huge change; we go four or five times a week because we like it so much."

However, "the pendulum swings on things like eggs, red meat, beer and gluten". One reason she thinks science is unclear on so much about diet is that we are just discovering that what works for some does not work for others. She claims that 90 per cent of signs of ageing and disease are down to how we play our particular set of genetic cards. So far we have been playing blind, but we are almost at the point where we can curate our life to match our genes more intentionally. Because so much of ageing and disease is about inflammation, Gottfried uses the term "inflammaging".

"What creates inflammation in your body is not what inflames me and vice versa," she says. "Individual testing experimentation is really crucial. The book is about your DNA and how to express it the best way possible."

She takes as an example the French diet, so long lauded for its health benefits. However, she says, this very diet — rich in delicious red wine and cheese — may be adding years on to the French but be dangerous for someone without genes typical of the race. "Few people know that genetic studies show the average French person is better at detoxing alcohol than the average American, for instance. Nearly half of Americans have a defect in the detox gene MTHFR."

This leads to the question: how do you know? If you don't have the money for the tests, aren't you still in the dark? Gottfried advises two things. First, healthy blood sugar tests (regularly, with your own gadget) and a small waist measurement are a rough and ready indicator of telomere length. Second, experiment on yourself. "People like me have a greater risk of heart disease when they drink coffee, she says, but those without her faulty gene "receive a longevity benefit". Truth be told, she didn't need the genetic test; she knew from how much better she felt giving up caffeine. She advises patients to try it and chart how they feel.

Similarly for alcohol; there is a longevity boost for some who can handle it, but Gottfried's tests show she has the faulty detox gene MTHFR, which is why just one glass was leaving her feeling sluggish and bloated the next morning. Some people have a gene variant PPARγ, which makes you more likely to gain weight if you eat meat rather than fish. Overeaters have an array of possible genes governing their appetite. If we are prepared to be brutally honest about how our bodies feel on different regimens, there are probably few surprises in a genetic test. "There is a central tension here," she says. "What steps would help most people age more slowly and how do you individualise for genetics? No one size fits all, despite creating a protocol."

She advises people to set "age goals", very similar to weight-loss targets. "I like to imagine myself in 30 years. I want to make choices now that are kind to the 80-year-old Sara." But, I say, every time I write an article on healthy living, at least some readers respond that they would rather enjoy themselves now and to hell with the "muesli" brigade. How much of this obsession with being younger is part of a fear of our inevitable mortality?

"My motivation is not a fear of death, it's more a fear of missing out on a full life, as defined by time to be with my kids and husband for decades to come, time to be of service. I have a great-grandmother who died in her sleep at 97. She was a powerful legacy for me. She came to my wedding, danced with every guy there, flirted with them. I loved her. That's how I want to age at my great-grandkids' weddings.

"Unless you can present the value in your choices and how they affect your future, most people won't change. So I would say to those *Times* readers, have wine if you want it, but if you want to dance with your great-grandchildren, limit it to two glasses a week. That's been shown to have the best impact."

The most persuasive part is a number you can't argue with. Gottfried re-tested her telomeres recently; how long before people do that regularly? She is now a "biological" age of 52. "I've closed the gap by 17 years."

***Younger* by Sara Gottfried (Penguin, £14.99) is out now** ■