

A sherry a day or better genes — the secret to living to 110

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As with many of his generation, the war defined Ralph Tarrant's youth. When, a few years ago, a researcher came to sample his DNA, Tarrant recounted a story about how on leaving school at 13 he went to work in industry and help with the war effort.

In recalling this meeting James Clement, the researcher in question, feels the need to add a necessary clarification. The war effort Tarrant was referring to involved defeating not Hitler, but the Kaiser. It was the First World War.

In fact, by the time the Second World War came round Tarrant, who at his death in 2013 was Britain's oldest man, was middle-aged. Or at least he was middle-aged by the standards of people who expect to die at 80. For those who live to 110, he was still in the first flush of youth.

Clement has a mission: to change our view of middle age — and old age. Working with top geneticists he has travelled the world seeking out "supercentenarians", those vanishingly rare humans who make it past 100 — and 110. He hopes that by finding out their secrets all of us might, like Tarrant, consider the prime of our lives to be something that arrives not in our thirties and forties, but our sixties and seventies.

To achieve that goal this week his organisation, Betterhumans, is releasing the largest collection of supercentenarian genomes held in one place. Somewhere within the string of code held in their ageing bodies — a code that was discovered by science only when most of those supercentenarians were planning their retirement — is there a clue to how we can all have a long life?

Supercentenarians are used to being asked how they have stayed healthy so long. Every year since they reached 100 they will have been in their local paper on their birthday. Every year since they reached 110 they will have probably made it into a national one too. Their recorded advice ranges, variously, from eating raw eggs to eating beef stew, from having children to not having children, from being compassionate to honouring your mother (even if

she died in ripe old age 80 years previously).

| *The odd whisky is fine; smoking is OK as long as you stop by 70*

According to Tarrant on his 110th birthday, it's fine to have the occasional whisky, and smoking is OK as long as you stop by the age of 70. His fellow supercentenarian Dorothy Peel, whom Clement visited in Yorkshire, agreed that once old age arrived you should stop the cigarettes. She kicked the habit at the age of 103. In her view moderation was the key. She liked to start the day with a half-pint of sherry, but wouldn't touch anything stronger until late afternoon.

Three useful facts can be drawn from this. First, there is no particular reason to presume that very old people know the secret to their longevity any more than the rest of us do. Second, you can't tell anything of use from single cases. Third, supercentenarians are heartily sick of being asked the same questions every year.

Clement wants to change all that. He wants to show that there is a secret to long life and that these isolated cases do have something extremely useful to tell us — but you shouldn't ask the person, you should ask their genes.

□ The geneticist George Church has backed the project to seek out supercentenarians REDUX/EYEVINE

Clement, 61, is not a biologist, at least by training, but his project has been backed by some of the top geneticists in the world, among them George Church, from Harvard. It takes a particular sort of passion to seek out supercentenarians (at any one time there are generally fewer than 100 verified in the world), work to convince them to give you a sample (while dealing with overprotective relatives or, on one occasion, a niece who demanded \$5,000 for it), then hope that they don't die midway through the negotiations. They often do.

Clement began the project, though, because, put simply, he doesn't like old people dying. "I've always loved talking to older people," he says. "And I hated it whenever brilliant people I wanted to someday meet — Richard Feynman, Carl Sagan, Francis Crick — died." He also hated it when brilliant people he had met died. "My great-grandmother was alive until I started law school, and she had seen the Wright brothers fly their aeroplane and took a covered wagon from Ohio to the Dakotas in the early 1900s."

Each of our cells contains a genome, a sequence of genetic code billions of letters long. Within that code there are clues — if we only knew where to look — as to what will eventually get us. Some clues have been easy to find. There is a particular string of code called BRCA1, for instance, that makes women hugely more susceptible to breast cancer. It was finding that code that led Angelina Jolie to have a double mastectomy. Most clues are more subtle, though, a result of interactions across the whole ecosystem of genes.

□ Dorothy Peel on her 110th birthday CATER'S NEWS AGENCY

Conventional geneticists will tell you that in this case you need a vast amount of data to find anything at all, to separate the signal of longevity from the genetic noise that constitutes the natural variation in all of us. Most research attempting anything approaching this level of ambition looks at hundreds of thousands of genomes or more. For Clement and Church this is a problem. Because they don't even have hundreds.

The Office for National Statistics produces life-expectancy tables by age. So at the age of 0 a girl can expect to live to 83. If she reaches the age of 83, having shown that she can survive that long she can expect another eight years. At the age of 90 her life expectancy is 95. At 95 it is 98. Any woman who lives to 100 has a life expectancy of 102.

Yet that is where the table stops. There is little point in going much farther because after that life expectancy will, on average, be counted in months. The US Social Security service estimates that at the age of 105 a man's probability of dying that year is 45 per cent. At his 110th birthday it's 57 per cent. Each year after 100 is a flip of a coin.

□ Ralph Tarrant, Britain's oldest man until his death at 110 in 2013 GABRIEL SZABO/GUZELIAN

This means that even after this week's release there are just a few dozen of these genomes sequenced and available for researchers. Can they hope to find anything? Church thinks there is at least a chance they can, because he has a suspicion that the kind of change they are looking for might not be of the subtle ecosystem kind, but the single BRCA1 variety. "Often the causative DNA variation of an extreme trait can be guessed from just one example and then confirmed by genome editing and testing," he has said.

And there are clues from Clement's travels that there really is something unusual about supercentenarians. They are not just very old examples of normal humans, who eventually die like normal humans. When they go it seems to be without the decline that afflicts the rest of us — or indeed, in the case of Clement's two British samples, the lung cancer and liver failure.

"Some of the supercentenarians I've met were still riding bicycles at 106, driving their own cars until 108 and enjoying dancing and playing pool at 109," Clement says. "When the end came it was frequently because of their immune system giving out and their catching pneumonia. Instead of suffering with chronic illnesses, they often were very healthy, caught cold and died within a month of getting ill.

"It was truly wonderful to see people who were enjoying life, flirting with their nurses and even helping younger people in their nursing homes, at their age."

Is there something in their DNA that protects them from diseases of ageing, keeping them going until their body just gives up? If so, can we replicate it with drugs? That is one aim of the project. Another is to raise awareness of the lives of the extremely old — and their worth. "They reminded me how valuable everyone is and how much we can learn from older — and in many cases wiser — generations," Clement says. "I was surprised to learn that in the US the two groups that in the 1960s had most opposed the Vietnam War were people under 20 and people over 60.

"The older people would have been the ones who experienced World War One, and that war taught them that all wars were to be avoided at all cost — something that has been lost on later generations."

Not everyone feels the same. "One man told me that when he was admitted to hospital for a bowel obstruction in his late nineties the original doctor he saw said, 'Well, you're too old to operate on, so we'll give you palliative care and make your end as comfortable as possible. You've lived a long life for which you should be thankful.'

"Another doctor saw him and refused to give up, performed the surgery, and he recovered fully and lived another ten years — when I met him — in perfect health. These situations are really frustrating and I would love to help start a nursing home just for people who have made it to 106 or older and take care of them so that they can continue to enjoy life to its fullest."

Of course, eventually senescence gets us all. Ralph Tarrant did *The Times* crossword every day. He began the ritual in a time when even our setters would have balked at using obscure words such as "genome" and "sequencing". He continued it into an age when millions of us, including him, have the code that makes us human stored digitally and available for research by any scientist with an internet connection.

But finally, aged 108, he accepted he had to stop. Why? Not because his mind wasn't sharp enough. He just realised he couldn't read the clues any more. He moved on to a puzzle with larger type.