Exercise may slow DNA ageing

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AS if gray hair, brittle bones and wrinkles weren't bad enough, scientists say that as you age the very DNA in your trillions of cells starts to fray, unravel and disintegrate.

Now there may be something you can do to slow the inevitable - exercise.

A new study hints that fitness buffs appear to have ``younger'' DNA than the chronically sedentary. The finding could help scientists understand the effects of exercise and aging at a molecular level.
In theory, it might also motivate people to get off the couch.

``This is a provocative paper and an interesting piece of research,'' said Jack Guralnik, an epidemiologist at the National Institute on Aging who wrote an editorial that accompanied the research report in the Archives of Internal Medicine.

He cautioned, however, that the old chicken-and-egg question - does exercise preserve healthier DNA, or does healthier DNA enable people to exercise more? - has yet to be answered.

``People who choose to exercise are different in so many ways from people who don't,'' Guralnik said.

The study's authors examined just the ends of DNA strands. Called telomeres, these act something like the plastic caps on shoelaces, preventing the DNA in chromosomes from unraveling.

Previous research has shown that older people have shorter ends than younger folks. Indeed, biologists say they shrink every time a cell divides.

How, exactly, does this lead to overall decrepitude? Eventually it stops your cells from dividing and replenishing themselves, said Emmanuel Skordalakes, a researcher at the Wistar Institute in Philadelphia.

``When the telomeres become short, then you start cutting into actual chromosomes where there are genes essential for our body,'' he said.

To prevent the fraying DNA in all those aging cells from seeding malignant tumors, Skordalakes said, the body turns them dormant. ``Your body shuts down more and more cells every day and you become old.''

Not everyone's DNA ages at the same rate. Some people may start off with sturdier telomeres than others, or perhaps longer ones, Lynn Cherkas, the new study's lead author, said in an interview from London, where she is an epidemiologist at King's College.

To try to separate the influences of heredity and lifestyle, she studied twins. Analyzing a British database containing more than 2,401 sets, some fraternal and some identical, she

found the heavy exercisers had relatively long telomeres - comparable to those of couch potatoes 10 years younger.

She defined the heavy exercisers as those who put in more than three hours a week running, cycling, pumping iron or other vigorous activity. Sedentary twins put in less than 16 minutes a week on average.

What she found most compelling, however, was the results of her comparison of 67 pairs in which one exercised much more than the other. Among those, the exercising twin had longer telomeres than his or her more sedentary counterpart.

How exercise might achieve such an anti-aging feat remains a mystery, though it may become clearer in the future as scientists at Wistar and elsewhere continue investigating the workings of telomeres.

They do know that while our bodies lose telomeres over time, an enzyme called telomerase helps reset the clock in embryos. That allows babies to be born young.

Tinkering with nature may alter that reset: A few years ago scientists discovered that Dolly the sheep and some other cloned animals had unusually short telomeres, as if they had been born old.

OK then, why not just take telomerase injections? Well, for one thing, they might encourage abnormal cells to divide out of control.

``Telomerase is a marker for cancer," said Wistar's Skordalakes.

``We're trying to understand how the enzyme works in detail so we can design drugs to stimulate telomerase activity and not to cause cancer," he said. ``It's a very fine line."

As a follow-up study, Cherkas said she's tracking the same twins and their telomeres over a period of 10 years.

And Guralnik said that while Cherkas had examined telomere length in white blood cells, he'd also like to see a range of follow-ups - to investigate whether, for example, the exercise effect applies to telomeres in brain, liver, skin and other cells.

``We have a lot to learn," he said.

Of course, scientists already have a strong case that exercise can stave off many of the ailments associated with growing old, as opposed to the condition itself, Guralnik said.

``Exercise is one of the best ways for people to postpone some of the negative outcomes of aging."