

Breasts age faster than other parts of a woman's body

Hannah Devlin Science Editor

Women may already have suspected as much, but scientists have now confirmed one of life's unfortunate facts: breast tissue ages quicker than other parts of the body.

By studying chemical indicators embedded in our DNA, scientists produced a biological clock showing that cells in some parts of our bodies age faster than others.

Based on these genetic biomarkers, the study found that healthy breast tis-

to age more quickly, but Professor Horvath believes that it could be due to hormone exposure during puberty, pregnancy and breast-feeding. The study did not include male breast tissue to test this hypothesis, however.

Only a single sample of male genital tissue was included in the 8,000 samples: it did not appear to have aged any faster or slower than average.

The research, published in the journal *Genome Biology*, analysed samples of 51 types of tissue and cells throughout the body. The clock was based on testing subtle changes to the genome, called DNA methylation, where methyl compounds attach to the double helix structure without altering the letters in the DNA sequence. The process occurs throughout life, and by testing methylation levels at 353 markers and taking a weighted average, Professor Horvath found that he was able accurately to predict the age of tissues.

However, certain tissues, notably heart tissue and female breast tissue, appeared to be at the extremes in the rate at which they aged.

The study also found that cancerous tissue appeared about 36 years older than healthy tissue. Professor Horvath added: "If a woman has breast cancer, the healthy tissue next to the tumour is an average of 12 years older than the rest of her body."

The study also found that the process of ageing was not constant, with a much quicker "ticking rate" during the first year of life and puberty, and slowing to a constant rate when we reach the age of 20.

36

years that cancer adds to tissue age

Source: *Genome Biology*

sue appears, biologically, about two to three years older than a woman's chronological age by the time she reaches middle age.

Heart tissue, however, appeared to age much more slowly and was estimated to be about nine years younger, on average, than most tissues by the time people reached their sixties.

Steve Horvath, a Professor of Human Genetics at the University of California, Los Angeles, who led the research, said: "My goal in inventing this clock is to help scientists to improve their understanding of what speeds up and slows down the human ageing process." The research could not explain why breast tissue appears

Why answering the call of nature is all in the timing

Tom Whipple Science Correspondent

There are the Laws of Motion. There are the Laws of Electromagnetism. Now physicists have added a new fundamental rule to the pantheon of their subject: the Law of Urination.

Scientists from the Georgia Institute of Technology have studied the micturition habits of a range of mammals and come to a startling conclusion: all mammals greater than 1kg take the same time to wee.

From a cat with a bladder the size of an ice lolly to an elephant with one the size of a wheelie bin, mammals heavier than a kilogram all seem to take about 21 seconds to relieve themselves.

The research, published online on Arxiv, involved the careful study of 11 animals across the mammalian range.

Patricia Yang, a PhD student, undertook the work. "Most of the research before this has been on humans and animals smaller than humans," she said. "We wanted to produce a scale from small to large."

She expected to find that elephants took considerably longer. But, to her surprise, they did not.

The reason seems to be because everything scales up, along with the bladder. "Size matters. An elephant has a large bladder, and also has a urethra with dimensions comparable to a household pipe," Ms Yang said. It is not just its width that is crucial, but its metre-long length. "Gravity pulls the fluid down at the bottom of elephant's



urethra. The flow rate increases as urine travels down. For medium-sized animals like dogs, they have shorter urethras and get less boost from gravity. In general, the urethra scales up as animal size and this is why elephant and dog empty their bladder in the same time," she said.

It is only when animals get smaller than a kilogram, and urine emerges as drips, that this law breaks down.

How does one build on this result? Ms Yang is new to her laboratory, where you do not have much say in your first research subject.

"It wasn't that popular a project in our lab," she said. "I would love this to be considered the start of my career."



The men to blame for the offside rule

In a London pub one Monday 150 years ago eight men wrote the rules of football. At the Freemasons' Tavern on October 26, 1863, were Arthur Pember, Ebenezer Morley and Charles Alcock, whose portraits are held by the England players Steven Caulker, Alex Oxlade-Chamberlain and Jermain Defoe.

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