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# On the brink of immortality or the musings of madmen?

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NEW AGE: Scientists believe our understanding of growing old can be redefined. Picture: Dallas Kilponen

**Forget the Botox and the knife, science is daring to think the unthinkable. Humans could be forever young, Danielle Teutsch reports.**

As Sydney plays host to one of the biggest conferences yet on ageing, a small group of maverick scientists on the cutting edge of anti-ageing research are daring to do the impossible: dream of a time when our bodies can be forever young.

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In what amounts to scientific heresy, this group is convinced that ageing can not only be slowed down, it can be stopped - or even reversed.

While they stop short at claiming they can defeat death, they believe there is no fixed upper limit to longevity either.

Dr Michael Fossel, the editor of the *Journal Of Anti-Ageing Medicine* and clinical professor of medicine at Michigan State University, considers that anti-ageing science is at the same point we were at 130 years ago, before the discovery of microbial disease.

Until now, the scientific community has accepted ageing as an unstoppable, complex process with multiple causes, and concentrated on treating related diseases, such as osteoarthritis.

This, says Fossel, is like treating polio by using an iron lung.

"What we're doing is akin to concentrating on a vaccine," he said.

His evangelical zeal is shared by Dr Leonid Gavrilov, from the Centre on Ageing at the University of Chicago, who scoffs at such a notion as a finite life span.

"There's no biological time bomb inside us," he said. "Ageing is due to progressive accumulation of random damage, that can be modulated by

simple intervention."

He points to the massive increase in the survival rates of Japanese women in the last 50 years. Only 1 per cent used to live to 100, whereas now 10 per cent live to be centenarians.

"That's just from general improvements in health care. So imagine what could happen if we work with specific interventions."

These "specific interventions" are where anti-ageing science really takes off on some interesting tangents.

Fossel believes the root cause of ageing is actually cell ageing, or more specifically, the shortening of telomere, the extra DNA we all have at the end of each chromosome. The enzyme telomerase can replace this telomere, thereby rendering the cell immortal.

Practical application to humans is still a long way off, for financial and regulatory reasons. But Fossel believes it could get us closer to our goal of living long, healthy lives without the decrepitness of old age, before we finally "drop like rocks".

Another scientist, Dr George Roth from the National Institute of Ageing in Baltimore, is looking at a way of mimicking the effect of starvation on the human body - one of the only proven ways to prolong life - without

the unfortunate side effects such as infertility.

The Danish Centre for Molecular Gerontology's Dr Suresh Rattan believes the way forward is hormesis, exposing cells to low doses of temperature shock and stress to make them stronger and improve their functional ability.

Other anti-ageing gurus say the answer lies with injections of the hormones DHEA and testosterone, nutritional supplements, anti-oxidants, replacing worn out organs with new ones using our own stem cells, or genetic engineering.

But there are plenty of sceptics at the conference ready to cut down these theories.

University of South Australia professor of ageing Dr Gary Andrews says getting a positive result in a laboratory, at a molecular or cellular level, does not amount to a longevity breakthrough.

"They are all just little snippets of a complex picture," he said.

Australian biologist Dr Robin Holliday is even more blunt about the prospect of stopping the juggernaut of old age.

"Pigs might fly," he said.

"Ageing is multi-causal. It's built into our bodies. Things eventually go

wrong. The brain has very limited capacity for repair. So has the heart. There's damage to DNA, proteins, membranes . . . it's a tall order to stop all that [being damaged]."

Ironically, the very reason humans have long lives compared to rats is the same reason why we age.

Rats breed fast and die young. We, like whales, breed slowly and die more slowly, thus experiencing the phenomenon of old age.

In crude evolutionary terms, we only need to live until about 50, which gives us enough time to mate, breed, and raise offspring. Any extra years we get are a bonus.

"In the whole evolutionary picture, the fact that we live as long as we do is pretty remarkable," Holliday said.

And then there's the question of whether we do actually want to live longer.

Even Fossel concedes that a sudden increase in life expectancy would cause "catastrophic" social problems. Aside from the population explosions, there would be the prospect of centenarian despots still wielding power, and baby boomers staying in their jobs for another 50 years, refusing to step aside for younger generations to come through.

There's also the danger that science

could succeed in keeping our bodies alive well beyond 100 years, without ensuring that degenerative brain diseases like Alzheimer's are halted as well. Who wants to have the heart of a 30-year-old, but no mental capacity?

"We should probably focus on how to get the maximum out of the years of life that are there for us," Andrews said.

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