

# It's Now Likely That This Generation Will Never Die

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Today, we're continuing our series on the century's most hotly anticipated Biotech Breakthroughs. Forget the "Chess gives you cancer" lines; this is a comprehensive review of the trends affecting your wealth – and health. Today, it's all about the grim business of sickness and death. But look on the bright side – things are improving, and there's a lot of money to be made from this process.

## Universal vaccines

No likes the flu, and it's also a big killer of vulnerable people. Furthermore, every few decades, there are devastating pandemics. The 1918 Spanish flu killed more people than the First World War.

Of course, in the modern world, we have flu vaccines. However, these are only partially effective – as they only protect against specific flu strains. To get round this problem, it would be great to have a universal vaccine. Such vaccines would, in theory at least, work against every possible strain of flu. Sadly, such a product doesn't yet exist – but it soon might. Several groups around the world are working on solving this problem, so coming decades may bring us the first universal vaccines.

## Cancer

Cancer is a word that many of us are very afraid of. Fortunately, a range of radical new treatment approaches are becoming mainstream. These could be as transformational for medicine as antibiotics were in the 20th century.

Firstly, immuno-oncology is a new branch of cancer treatment. This is inspired by autoimmune diseases, in which the mistakenly tries to attack itself. Secondly, another approach is to trigger "cell suicide" – a process known as apoptosis. Finally, instead of targeting the plethora of cancer variants using a mushrooming selection of drugs, a new generation of treatments promises to target chemical features common to all.

*We've got an exciting interview on a breakthrough approach to cancer, coming soon. Keep checking your inbox.*

## Gene therapy and genetic engineering

Despite what you might hear from self-promoting fertility clinics, no is free of genetic diseases. With tens of thousands of genes in the human , it's inevitable that some of these don't work properly. Recent research has revealed that many "normal" people actually have serious genetic problems, which the somehow manages to work around.

Gene therapy is becoming a viable technique, for the treatment of a range of genetic diseases. Only recently, we've had news that sickle cell anaemia is now being successfully treated using this approach. There are many other diseases which can also be addressed in this way— cystic fibrosis being another. This field will only expand, as time goes on.

Germ-line genetic engineering is another promising treatment approach. In the last few weeks, we've had line news of CRISPR being used to modify human embryos. This application will become ever more widespread – and editing the human genome will soon be something we'll have to resolve, as a moral issue.

Check out our previous coverage of [genetics](#).

## The microbiome

Ever since Louis Pasteur began to unravel the mystery of pathogens, we've tended to see medicine as a fight against the bugs that live on or in our bodies. However, in recent years, it's become apparent that this is a dangerous way to think about our health and sickness. A human being is much more than just human cells: it also includes all the things that live on and in us. Without these, we wouldn't eat the same foods, or even think the same thoughts. Understanding this in depth will open up a huge range of new diagnoses and cures. Surprisingly, it appears that the microbiome has a close link with mental health, as well as more obvious links to obesity.

Check out our previous coverage on the [microbiome](#) and [parasites](#). We've also done relevant [interviews](#).

## Cybernetics and regenerative medicine

We're all familiar with the basics of cybernetics. Even if the most sophisticated such device you have seen is a hearing aid, it's undeniable that technological upgrades to the human are making a big difference to people. One great example is cochlear implants, which feature in popular online baby videos. However, the best therapy is not normally to supplement the human, but to replace failed parts of it.

In due course, we can expect to routinely recreate living pieces of the . This is already being done in particular cases – using collagen scaffolds to build organs, such as the windpipe. In time, we will learn to create much more complicated organs.

New organs could also be created biologically, not mechanically. We may be able to trigger the to regrow damaged parts. Alternatively, we could grow them outside the – either in labs, or in animals (xenotransplantation).

Check out our previous coverage on [artificial organs](#) and [regenerative medicine](#).

## Life extension

Ageing is presently inevitable. We will all get old, and ultimately die. However, this is not a universal trait in the natural world – and some animals never age. In fact, some actually get younger: they can revert to the juvenile state from the adult form. Freedom from ageing may conceivably come to humans – if we could only crack the mechanism behind it.

There are a range of therapies which have the capacity to fundamentally reverse ageing. These include treatments like blood transfusions (or drugs which mimic them). Transfusions rejuvenate the blood – and seemingly the , too.

However, there are more fundamental techniques on the horizon – such as removing senescent cells. These approaches could potentially reverse ageing more generally – and [Amazon's Jeff Bezos is an investor](#). This gives the terrifying possibility of a world in which the privileged never grow old or die. How would we cope, as a society?

I've often looked up into the night sky and wondered why we do not find aliens widespread around the universe – a puzzle known as the Fermi's paradox. One possible explanation may be that technologically sophisticated civilisations quickly discover how to prevent ageing. A society without ageing would almost certainly collapse quickly – entombed in a fatal population explosion.

Check out our previous coverage on [life extension](#).

We'll conclude tomorrow – but your feedback is always welcome: [andrew@southbankresearch.com](mailto:andrew@southbankresearch.com).

Best,

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