Whither ageing?

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Myths and stories warn against the folly of resisting ageing. So is current research into ageing flying in the face of ancient wisdom?

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Since the earliest days of human culture, writers have urged caution on those consumed by their own desires. Icarus achieves his dream of flying, but gets too close to the sun, and plummets to his death behind a trail of feathers and melted wax. Midas gets his gold, but at what cost. And eternal youth? Arguably this is the ultimate human dream; from the very dawn of human storytelling, *The Epic of Gilgamesh* describes Gilgamesh's vain search for immortality in ancient Babylonia.

What do the wise old Greeks have to say about this? Well, Eos, the Goddess of the Dawn, became smitten with Tithonus, a noble and good-looking young Trojan. After some years of bliss, the beauty of Tithonus started to fade, and a desperate Eos begged Zeus to grant him eternal life. Zeus assented, but unfortunately the sly old fox omitted to confer eternal youth. A desolate Eos watched Tithonus grow more and more decrepit, decade by decade; finally, she ended his torment by turning him into a cricket. Since then the croaking voice of Tithonus has sung to us on summer nights, a reminder of the hubris that it is to seek immortality.

Hubris? Over the last decade biogerontology, the science of ageing, has developed at an increasingly rapid pace. In experimental organisms, at least, maximum lifespans are constantly being pushed back. What would the ancient Greeks have made of this, one wonders? Certainly, tradition tends to view with suspicion the search for cures for ageing. In his Travels, Gulliver is lucky to escape Tithonus's fate. Tempted by the immortal Struldbrugs, he almost sups their elixir – only to realize at the last moment that they are all blind and wretched.

Tithonus and Gulliver remind us that extending lifespan would be unwise without extending youth (or 'healthspan'). Indeed, most research is geared towards maintaining health during our allotted span, including old age, rather than extending life. But there is a paradox here. The principal risk factor for most diseases of later life is, in fact, ageing itself. As has been observed of cancer: "advancing age is the most potent of all carcinogens."

In this sense, ageing is not simply 'getting older' but a biological process affecting our cells and tissues. One surprisingly difficult question to answer is why we age at all – some simple creatures such as sea anemones don't. Probably, a combination of factors is important, particularly damage to our DNA and other cellular material by things like free radicals (reactive molecules derived from oxygen). The impact of this damage is felt in different ways, generating the plurality of symptoms seen in the diseases of old age.

One could argue, therefore, that we would be better off tackling the root cause of many diseases rather than trying to pick them off one by one. Arguably, seeking to treat Parkinson's disease, rather than its main cause, ageing, is a little like carefully removing the cholera bacterium from a polluted water system, rather than purifying the whole supply.

Strangely, though, we seem to be reluctant to consider research whose primary aim is to increase longevity in people. Disapproval in the past, as expressed through classical literature, may simply have been trying to salve the bitter inevitability of ageing and death. Perhaps the wisest response to this aspect of the human condition is denial, and then stoical resignation.

Today, popular attitudes to life extension range from extreme antipathy to fanatical enthusiasm. In part, this may be because life extension is seen less as a cure for any

illness and more as a form of human enhancement. In medical ethics the distinction is sometimes drawn between the use of medical technologies to *treat* illness and their use by people who are not ill to *enhance* desirable characteristics. So cardiac surgery is medical, and cosmetic surgery is enhancement.

So-called enhancement technologies raise troubling but at times fascinating ethical problems, not least because it may not be clear where the boundaries lie. Medical versus social use of Viagra would be a good example. Arguably, while curing the diseases of ageing is a treatment, extending lifespan is an enhancement. So, in ethical terms one may view retardation of ageing as primarily a medical technology – a treatment of the diseases of ageing – but one which draws an exotic and problematic form of enhancement – life extension – in its wake.

But what of Tithonus? Recent studies suggest that we should not worry too much about him: Cynthia Kenyon in San Francisco has produced nematode worms with a sixfold increase in lifespan, and the little worms wriggled around zestfully almost until their last breath. Nature, it seems, is kinder than Zeus.

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