

<p>A. Andrew Luck-Baker investigates how and why we live as long as we do, and why different species have different lifespans.</p> <p>Why do different organisms have their own particular life spans?</p> <p>In Sequoia National Park in California, there are giant sequoia trees more than 3000 years old. They are among the most ancient organisms on the planet. In the animal kingdom, the greatest life spans have been recorded in aquatic creatures. One deep-sea clam called the quahog can live for as long as 220 years. Bowhead whales aren't far behind. Professor Jeffrey Bada of the Scripps Institution of Oceanography has used a molecular ageing technique on them and come up with a figure of 200 years.</p> <p>Why do these creatures live so long while others such as moths a few months, and mice a couple of years at the most. There are several theories – some competing, some complementary.</p>	<p>C. More complete explanations come from evolutionary theories of ageing. Over time, the cells and tissues of all organisms wear out and fail but some species have invested in robust biochemical defence and repair mechanisms, which slow ageing and draw out longevity.</p> <p>The other evolutionary strategy is to devote more of your resources to early and rapid reproduction, at the expense of your anti-ageing defences. There is a trade-off between fecundity and longevity.</p> <p>At the University of Idaho, Steven Austad and Donna Holmes have been investigating the factors which lead different animals to adopt their own particular balance between reproductive rate and life span. It turns out that the longest living species are those which are at a lower risk of death before they've had a decent crack at passing their genes onto the next generation.</p>
<p>B1 One is the 'rate of living' theory which says that creatures with fast-paced metabolisms burn out before those ticking over at more leisurely rates. In mammals for example, there is a general trend for larger species to live longer than smaller ones, because bigger ones have a slower metabolic rate.</p>	<p>D The ability to fly makes birds and bats much less vulnerable to being caught and eaten by predators than earth-bound animals. Their wings also enable them to escape from bad weather and local food shortages. The predation factor also helps explain why huge whales and thick-shelled clams have such long-live spans and why spikey porcupines are the longest living rodents. Well protected animals can afford to take the risk of more leisurely reproductive and ageing rates.</p>
<p>B2 However, frequent exceptions to the rule mean the tempo of life is not the whole explanation. Notable exceptions include birds and bats. Small bat species weigh no more than shrews yet a bat can live to 38 years and a shrew will die of old age well before its second birthday. Birds on average live three times longer than mammals of equivalent size.</p>	<p>E As for human longevity... We have an average lifespan four times what you'd expect for an animal of our size. According to the experts, the reason is our large brains and life as highly social and linguistic animals. Intelligence and communal life makes us good at coping with environmental threats and escaping predators, and makes it worthwhile to age slowly.</p>