**Fountain of Youth, with Caveats**



Walt Disney wanted to live forever. He believed science would someday figure out how, so he chose to have his body preserved when he ‘died’. Have you ever wondered if people could actually live longer? Can life be extended? Maybe forever?

Well, scientists have just discovered that proteins, called sirtuins, actually regulate aging in roundworms and fruit flies! These proteins were named for the yeast protein Sir2, the first member of this family discovered. Increasing levels of sirtuin, SirT1, prevents mice from developing heart problems and fatty livers, even when fed high-fat diets. Could this extend life?

Similarly, mice fed something called resveratrol had comparable gene activity as mice fed only every other day. Eating less often keeps mice healthier, almost like slowing the aging process. Overall, the resveratrol-treated mice had better bone health, heart functioning and improved coordination compared with other mice their age. While resveratrol did not prevent or slow down cancer in the mice, it is a powerful protector of the heart and other organs. Also, resveratrol mimics, or copies, the effects of eating fewer calories. Eating less may slow the chances of getting cancer.

Unfortunately, "the health benefits resveratrol gives these mice are not the things they are dying of," de Cabo says. The same is true for sirtuins. Mice generally die of cancer, not heart disease the way humans do. The mice don't live longer when given these probably because they have not been confirmed to fight cancer directly, even if they may slow the chance of mice getting cancer.

To extend human life-span, scientists will have to develop a way to prevent cancer more actively because "humans, like mice, under normal conditions do develop cancerous tumors as a consequence of aging," Prolla says. But he is optimistic. "I have no doubt the aging process will be understood at the molecular level and we can do something about it," Prolla says.

By Tina Hesman Saey July 3rd, 2008

**Scientists Hope to Lengthen Dog Years**



A drug that helps people after organ transplants has extended the lives of fruit flies, worms, and mice! The next step is to see what it will do for our pets. Drugs that extend the life span of animals might even help postpone age-related diseases such as Alzheimer’s, heart disease, and cancer in people.

Scientists are currently studying a group of 20 dogs in Seattle. The dogs, all house pets over six years old, are subjects in a trial of a drug called rapamycin. The way the drug works is not completely understood, but it’s been used for years to prevent rejection of transplanted organs. It has lengthened the life spans of diverse species: worms, fruit flies, and mice.

In fact, rapamycin is one of several anti-aging drugs that may end up in human trials in the coming years as researchers improve their understanding how people age. However, there are side effects: at high doses, rapamycin can raise blood sugar and thereby increase the risk of diabetes. It causes mouth lesions known as canker sores.

Still, researchers remain optimistic about rapamycin because it extended mouse life spans between 9 percent and 14 percent, and it worked whether mice began getting the drug during middle age or very late in their short lives. Moreover, it prevented cardiovascular damage and memory loss. That suggests that it might lengthen the period in which people are healthy and functional rather than drawing out a period of decline.

Essentially, over time the human body degenerates, and eventually dies. This degeneration can’t be stopped altogether, but researchers have found surprising ways to slow it down in yeast cells and other living things. One common thread seems to be calorie restriction. Eat less. Live longer. The effects of these new drugs mimic, or copy, the benefits of calorie restriction.

Another possible life-extending drug comes from an ingredient in red wine, called resveratrol, and looks like a better anti-aging strategy than starvation. Based on his research, Sinclair co-founded a company called Sirtris Pharmaceuticals, which was bought for $720 million by GlaxoSmithKline in 2008. But no one has shown a connection between resveratrol and human life span yet.

The only other substance that has recently generated as much excitement among aging researchers is the diabetes drug metformin. It’s had only small, modest effects in mice but has already shown promise in humans. [According to a 2014 study](http://www.ncbi.nlm.nih.gov/pubmed/25041462) that followed 7,800 diabetics, those on the drug not only lived longer than other people with diabetes, but they lived slightly longer than nondiabetic control subjects (people who did not even have diabetes). Researchers believe that it’s less likely than rapamycin to have problematic side effects but also less likely to show dramatic results.

Researchers continue to test on dogs. So far the owners have reported no notable side effects, Kaeberlein says. “The last thing we want to do,” he says, “is harm people’s pets.”

by [Faye Flam](https://www.technologyreview.com/profile/faye-flam/) October 22, 2015

Video: <http://www.history.com/news/the-myth-of-ponce-de-leon-and-the-fountain-of-youth>

**Prompt: You have read a novel that explores the idea of extending life. These two sources consider the science behind life extension. Explain how life can be extended, and possible drawbacks of doing so.**

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P

Do What

Expl how extend/drawbacks

Chems siri2, rapa, metf, degeneration, mimics eat less, diab, lesions, immunity, tested on humans?

O

T: fascinated life ext, all time. scientists extend life in animals, drawbacks – tamper?

I: chemical (sirt2, nv something, rapamycin, metformin) slows degeneration, mimics eating less….

D: what about natural ways? this is mimicking eating less. why not just eat less?

I: Risk diabetes, lesions, immune system, dog q at end…

D: may not even work, are these risks worth tampering with nature?

I: No connection to humans yet

D: Seems like a long way to go - is this worth harming animals’ natural course?

E: Offer hope but in meantime, natural steps might be better. Stay healthy and eat less. animal testing for greater good?

W

People have probably been fascinated by the idea of extending life all through time. While scientists may have actually found some ways to extend life in animals, the drawbacks make one wonder how much we should tamper with nature. Scientists are looking at chemicals such as sirtuins, resveratrol, rapamycin or metformin in a search for ways to slow “the aging process.” These don’t extend life, but seem to slow the processes that lead to the end of life, such as heart problems. The have a similar effect as eating less would have. Why take a chemical rather than simply taking the natural route of eating less directly to achieve these benefits? In fact, there are known drawbacks such as increasing risk of diabetes, lesions, and impairing the immune system. There may be even more so scientists closely monitor pets taking these because they don’t want to “harm people’s pets.” Given that these may not even work, they have know side effects and there could be more, tampering with nature seems risky without a lot of promise for gain yet. Finally, there is not connection yet that shows these chemicals can actually extend human life. There may not even be a connection. It appears as if there is a long path ahead. One has to wonder whether the drawbacks of this unnatural process are worthwhile, especially considering this may never even help humans extend their natural life. These advances offer hope, but maybe we are investing in research down the wrong path. Perhaps looking for natural ways to extend life would be a better path to explore. These chemical mimic gains made if we eat healthier, so why not invest instead in ways to help people follow such practices, and avoid the potential harm to animals done in taking the easier route of a pill.

**Prompt: You have read a novel that explores the idea of extending life. These two sources consider the science behind life extension. Explain how life can be extended, and possible drawbacks of doing so.**

Can life be extended?

Everyone wants to live forever, but is it even possible? Although life could be extended there are drawbacks and consequences for attempting to become immortal. Mice fed with resveratrol, almost a life extension drug, had comparable gene activity as younger mice regarding bone health, heart functioning, and improved coordination. However, since mice generally die from cancer, this drug had no effect to their life. It is as if fate does not want us to help mice, and the consequence is that mice die normally, and we waste resources while attempting to help a creature that fate wants to eliminated. Another drug, rapamycin, an anti-aging drugs may end up in human trials since it had some success with non-humans. However, the consequences include side effects, such as raising blood sugar, canker sores, and increasing the risk of diabetes. Although rapamycin might help us, it is as if the medicine, on balance is not worth it, because it could actually hurt us and can possibly make us die faster. Although life could be extended the consequences are dangerous. People can harm themselves and others when trying to find a way to extend life. Why risk greater harm when the possibility of life extension may not even exist?

 --Rayken Zhuang