

Mushrooms hold key to longer life?

NUS research shows compound found in mushrooms extends lab worms' lifespan by two days

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Research into ageing at the National University of Singapore (NUS) is bearing fruit.

Among the more than 200 ongoing studies across the NUS campus on all aspects of ageing – from the body's physical decline to the economics of ageing – is one centred on a compound known to occur naturally in mushrooms and other foods.

The compound, known as ergothioneine, could possibly lengthen human lifespan, ward off Alzheimer's disease and prevent harmful free radicals from accumulating in the body.

Ergothioneine has so far been proven to act only

in laboratory worms and cell cultures, but the results have been so encouraging that tests on humans will soon begin.

Professor Barry Halliwell, the Tan Chin Tuan Centennial Professor of Biochemistry at NUS, has been looking into the role of free radicals and antioxidants in human diseases. He said there are thousands of non-nutrient compounds in human foods, but most are either rejected by the body or metabolised immediately.

Ergothioneine stands out because it is picked up by certain cells and taken selectively into body tissues without being metabolised, suggesting it has a usefulness, he said.

The compound was discovered more than 100 years ago, but little is known about what it does in the human body.

Prof Halliwell's study tested the effects of ergothioneine on *C. elegans*, a 1mm roundworm widely used in research.

When introduced into the worms, the compound



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was found to increase their lifespan by an average of two days. This worm generally lives only 26 days.

Ergothioneine was found to inhibit the accumulation of beta-amyloid, a key protein found in the brains of those with Alzheimer's disease.

To study this property, the scientists used worms with human genes transferred into them to trigger the production of beta-amyloid.

Depending on the dosage of ergothioneine given, the protein deposits in the worms were reduced by 50 per cent to 60 per cent. This batch of worms lived an average of two days longer than those not given the compound.

Another group of worms was given a chemical that caused them to produce free radicals, by-products created when the body processes oxygen and which damage cells and raise the risk of disease.

With this batch of worms, ergothioneine seemed to have a protective function against the damage caused by the free radicals, said NUS research fellow Irwin Cheah, who is also involved in the study.

The next step for these NUS scientists is to move up the food chain – and test the effects of ergothioneine on free radicals in human volunteers.

Preliminary results are expected in a year, said Prof Halliwell.

"Until then, by all means eat mushrooms if you like them, but don't expect them to stave off dementia," he said.

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HIGHLY CITED BIOCHEMIST

Professor Barry Halliwell, 62, is deputy president (research and technology) and the Tan Chin Tuan Centennial Professor of Biochemistry at the National University of Singapore (NUS).

The reputed biochemist is acclaimed for his seminal work on free radicals and antioxidants in biological systems.

His research focuses on the role of such compounds in human disease, particularly Alzheimer's and other brain disorders, as well as the ageing process.

His interest lies in identifying the most important antioxidants in the human diet, and in developing new ones.

This could play a significant role in treating human diseases and understanding how diet might cause or prevent them.

Prof Halliwell is listed by leading information company Thomson Reuters as one of the world's most highly cited researchers in three areas – biology and biochemistry; neuroscience and behaviour; and pharmacology and toxicology.

He was conferred a Lifetime Achievement Award by the Society for Free Radical Biology and Medicine.

This is an international professional organisation of scientists and clinicians with an interest in the research and medical applications of free radical chemistry, redox biology and antioxidants.

His laboratory has the most citations worldwide in free radical research; at NUS, which has more than 2,000 labs, his lab is responsible for 6 per cent of the university's citations.

Last year, he was given the National University Health System Outstanding Researcher Award.

This year, he was given the NUS Outstanding Researcher Award, in recognition of his having consistently achieved research excellence and positioning NUS at the forefront in his area of expertise.