New aging cause revealed by test tube

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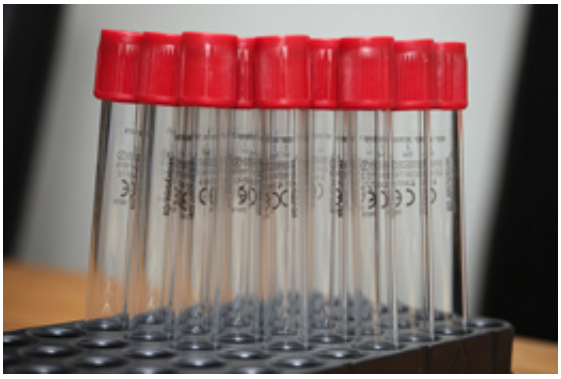

Credit: Hakan Dahlstrom, flickr: http://www.flickr.com/photos/dahlstroms/

(PhysOrg.com) -- Chemists from The Australian National University have discovered a new way that ageing-related diseases can progress, opening up new preventative and treatment possibilities for conditions such as heart disease and Alzheimer's disease.

Led by Professor Chris Easton and Dr. Dannon Stigers from the ARC Centre of Excellence for Free Radical Chemistry and Biotechnology at ANU, the researchers have used the test tube to simulate the living body, and revealed a new process through which ageing related diseases may develop. Their work has been published in a recent edition of The Royal Society Chemistry journal, *Chemistry Communications*.

"Remarkably the good old test tube has given us a fantastic window from which to look into the basic processes necessary for life and it has

changed the way we think about how ageing related diseases develop," said Dr. Stigers.

It had been assumed that lifestyle choices such as diet, exercise, and smoking caused some people to develop ageing related illnesses more rapidly than others. Poor lifestyle decisions increase exposure to free radicals which can damage proteins in the body leading to their accumulation and eventual disease. However, in this study the researchers were able to observe proteins being made with their building blocks already damaged, indicating there are two possible pathways to age-related disease development that can be exploited for future treatments.

"We are not saying that a healthy lifestyle is not important to prevent early onset of age-related disease, but we now need to acknowledge that it may not be enough to advise people to eat the right foods and exercise regularly," said Dr. Stigers.

In their test tube of life, the researchers added all the necessary machinery to make proteins, including both damaged and healthy protein building blocks, and a type of biological proof-reader that ensures proteins are made with only the healthy building blocks. They then looked to see if any of the damaged building blocks made it into the finished protein.

"We were surprised to find that the damaged building blocks were able to effectively compete for incorporation into the final protein even when our proof-reader was present," said Professor Chris Easton.

"It may seem subtle but from a treatment perspective the difference between preventing a protein from being damaged and dealing with one that is made from damaged goods is vast. This is a significant break through and one which we hope will prove revolutionary in terms of

tackling age-related diseases," he added.

Provided by Australian National University