News Release

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Issued: 12 August 2009

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Radical wisdom for age-old question

Scientists from the ARC Centre of Excellence for Free Radical Chemistry and Biotechnology at The Australian National University have discovered a unique natural defence mechanism against ageing.

The team, led by Professor Chris Easton from the Free Radical Centre at ANU, have discovered that amino acids are working hard to protect our bodies from the ageing process caused by being exposed to free radicals and oxygen.

Free radicals – reactive chemical entities - and other oxidative species are well known to contribute to ageing, and are linked to many common diseases such as cancers, heart disease and neurodegenerative diseases.

“We have found that amino acids are remarkably resistant to damage by free radicals and oxygen,” said Professor Easton. “What many people don’t realise is that just by breathing in oxygen we are exposing our bodies to free radicals and oxidative stress which leads to ageing. But of course we need to breathe to stay alive, so it is one of the great paradoxes of life.”

The group have simulated in a test tube the exposure to hydrogen peroxide and oxygen the amino acids in our bodies would incur simply from continuing to breath and other normal biological functions, and were surprised to find a lower than expected level of free radical damage.

“Amino acids appear to be one of the most robust molecules that could have been used as the building blocks of life, far more robust than other common biological molecules like sugars and lipids,” he said.

“Thankfully, living things seem to have evolved to use robust amino acids to make up the proteins essential to life, and have their own set of free radical neutralising molecules called antioxidants.”

The team also found that some types of amino acids are more resistant to oxidative damage than others.

“When we compare the prevalence of different amino acids in proteins from oxygen breathing creatures to others, such as anaerobic bacteria, we tend to see the more resistant amino acids in aerobic organisms. So next time you look in the mirror, know that your body is looking after you, and that your own wrinkles could have been much worse,” he said.

The group intends to use this information to improve the performance of designer proteins used in industrial processes. Their work will be published in the upcoming edition of the Journal of American Chemical Society.

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