Human 'shock absorbers' discovered

February 14 2012

Professor Tony Weiss, from the School of Molecular Bioscience, leads and coordinates the research team who made this groundbreaking discovery

(Medical Xpress) -- An international team of scientists, led by the University of Sydney, has found the molecular structure in the body which functions as our 'shock absorber'.

The discovery of the previously unknown part of the molecule will be applied to the researchers' work on designing improved versions of a human blood vessel and on repairing skin damage, including burns.

The research can be applied to treating cardiovascular disease and

emphysema.

The findings are published in today's edition of the Proceedings of the National Academy of Sciences (*PNAS*).

"This exciting discovery answers the mystery of how our bodies accommodate our living tissue without it being torn to shreds by its interaction with so many moving parts," said Professor Tony Weiss, from the University's School of Molecular Bioscience, who leads and coordinates the research team.

The team dissected a key part of the molecule in elastin, the protein that keeps tissues such as skin, lungs and blood vessels elastic during normal processes such as body movement, breathing and blood circulation.

Using a high-powered combination of synchronised X-ray beams and elastin synthesis tools, the team discovered that human elastin contains a molecular bridge or 'shock absorber'.

"This tiny shock absorber neatly connects specialised molecular parts: one part is dedicated to elasticity and another part dedicated to binding living tissue," Professor Weiss said.

"It performs the same function for humans at a molecular level as shock absorbers do in a car; we can enjoy a smooth ride because they keep the body of the car from being violently rattled by the movement of the wheels."

The team now has sufficient information to change just a billionth of a metre of the molecular bridge, which would result in dramatic changes to the elastin.

The abnormal protein produced an elastin which looks and behaves

differently to normal elastin.

"This finding will benefit our work on designing artificial blood vessels that use replicas of human elastin, to repair and replace human blood vessels, with implications for the treatment of cardiovascular disease," Professor Weiss said.

"In the future it may have applications in treating emphysema, which is caused by destruction to lung elastin."

The research was conducted as part of the University's new centre that aims to reduce the personal and social burden of obesity, diabetes and cardiovascular disease worldwide by transforming the way people eat, work and live.

The fact the team is composed of leading researchers from Australia, the United Kingdom and Europe, with access to a variety of exquisite hi-tech tools, means the research can use their collective input.

"An important part of this outstanding work was also done by Giselle Yeo, a superb student in my lab," Professor Weiss said.

More information: www.pnas.org/

Provided by University of Sydney

provided for information purposes only.