

Scientists discover the double life of proteins

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Scientists at The Australian National University are a step closer to understanding the rare Hartnup disorder after discovering a surprising link between blood pressure regulation and nutrition that could also help to shed light on intestinal and kidney function.

The team from the University's School of Biochemistry and Molecular Biology together with colleagues from the University of Sydney set out to study nutrient uptake in the intestine and discovered an essential role of a protein called ACE2 in the process. ACE proteins cut off a small part of a precursor molecule generating a hormone, which regulates blood pressure. ACE inhibitors are widely prescribed drugs that reduce the risk of heart failure and protect against the long-term effects of diabetes.

Two versions of the protein are known as ACE1 and ACE2. ACE1 is targeted by the blood pressure reducing drugs, but until now the role of ACE2 has been less clear. What the researchers found was a completely different role for ACE2 in nutrition.

“Protein forms up to 20 per cent of our nutrition,” said one of the authors of the report, Professor Stefan Bröer. “Before it can be used by the human body, protein is split into its subunits called amino acids. The amino acids are then removed from the intestine by specialised cells which are endowed with a large number of transporters moving nutrients from the intestine into cell.

“Instead of tailoring a specific hormone, ACE2 cuts into proteins

releasing amino acids from the intestine into cells. Additionally, we found that ACE2 was also important to endow the cell with transporters” he said.

The research shows that a failure of certain transporters to make contact with ACE2 can cause Hartnup disorder – where amino acid absorption in the intestine is impaired resulting in neurological problems and a skin rash in children.

The paper, published in *The Federation of American Societies for Experimental Biology (FASEB) Journal*, also highlights the variety of roles that proteins can play.

“The results demonstrate a connection between blood pressure regulation and nutrition and also show that proteins in the body can serve several functions. This explains why drugs can have surprising side effects if the target carries out several functions.

“The results of this study will help understanding intestinal and kidney function, which are affected in common disorders such as diabetes and celiac disorder,” said Professor Bröer.

Source: Australian National University

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