Immune suppression through cyclic plant peptides

March 1 2012

A team of researchers at the MedUni Vienna, together with scientists from the University Hospital of Freiburg, has decoded a mechanism in cyclic plant peptides, known as cyclotides, from the family of coffee plants (Rubiaceae) that could open up new possibilities for immune suppression.

Under the leadership of Christian Gruber from the Centre for Physiology and Pharmacology at the MedUni Vienna, it was discovered "in vitro" that cyclotides can suppress the division of T-cells, which play the role of "killer or helper cells" in the human immune system, but does not destroy them. This anti-proliferative effect of the cyclotides could, for example, be harnessed in inflammatory diseases such as rheumatoid arthritis, various immune diseases or organ transplants.

The team of researchers investigated around 500 of the 250,000 or so flowering plants that are known worldwide in a project supported by the FWF. Numerous types of coffee plant, violet plant (Violaceae) and legumes (Fabaceae) were “positive”. They can each contain up to 70 different cyclotides, with the ones that have now been investigated suppressing the growth of T-cells. The results of this study have now been published in the *Journal of Natural Products*.

Cyclotides, which are small, ring-shaped protein molecules, have the advantage that they are extremely stable and orally available, and therefore do not need to be given intravenously. The most well-known drug that is already used in immunosuppressive therapy is cyclosporine, a peptide isolated from fungi. Says Gruber: “This agent has the disadvantage, however, that it can cause numerous side effects – particularly to the liver or kidneys. Our discovery may well open up a new, less toxic way of suppressing the immune system.” This hypothesis is now to be pursued and investigated in more detail with in vivo studies.

More information: Do Plant Cyclotides have Potential As Immunosuppressant Peptides?; C. Gründemann; et al. DOI: 10.1021/np200722w; *J.Nat.Prod.*, January 24 2012.

Provided by Medical University of Vienna