Lycopene could have a role in the prevention of obesity-associated inflammation.

Lycopene, the pigment which gives it red colour to tomatoes and other fruits, and is found in large quantities in tomato products, has been known for many years for its antioxidant properties but many studies now focus on its anti-inflammatory properties. Scientists from the INRA research institute in France have shown evidence of this anti-inflammatory effect in fat and adipose tissue. This property would enable to reduce the inflammatory state associated with obesity which favours the development of type 2 diabetes.

As well as its role for the storage of lipids, the adipose tissue secretes a large quantity of proteins called adipokines (including cytokines and chemokines) which play a role in the general physiology of the body. Obesity, characterized by a massive development of the adipose tissue leads to low grade inflammation notably due to an increased production of cytokines and chemokines. This inflammatory state would contribute to the development of insulin resistance at the origin of type 2 diabetes.

Recent studies have shown that a high consumption of lycopene was associated with a smaller waist size and a lower weight. This would suggest it could have an effect in the metabolism of the adipose tissue. As lycopene is mainly stored in the adipose tissues, researchers have developed the hypothesis that lycopene could reduce the production of cytokins and chemiokins by the adipose tissue which would reduce the risk of developing pathologies linked with obesity.

To test this hypothesis, researchers at INRA in Marseilles grew explants of adipose tissue from mice fed a lipid-rich diet in the presence of lycopene. This incubation enabled to show that the lycopene is capable of reducing the production of pro-inflammatory cytokines and chemiokines in the adipose tissue.

The effect of lycopene in the adipocytes and pre-adipocytes, the two main types of cells in the adipose tissue, was evaluated. It emerges that both cell types respond to treatment by lycopene by a reduction in the expression of cytokines and chemiokines. The same results were observed with cultures of human adipose cells.

This is the first time that researchers have shown the anti-inflammatory effect of lycopene on adipose tissue. These results enable to explain, at least in part, the beneficial effect of lycopene notably to limit the prevalence of pathologies linked with obesity such as insulin resistance which is a risk factor for cardiovascular diseases.

These results funded by the European Union as part of the LYCOCARD research project were recently published in the *Journal of Nutritional Biochemistry*. The LYCOCARD research continues until the end of March 2011. For more information please visit [www.lycocard.com](http://www.lycocard.com)

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