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Mechanism decoded by which olive oil protects against cancer



Researchers at UAB, led by Dr Eduard Escrich, lecturer of the Department of Cell Biology, Physiology and Immunology, have discovered a mechanism by which virgin olive oil, in contrast to other vegetable oils, protects the body against breast cancer. The researchers decoded a complete cascade of signals within breast tumour cells activated by virgin olive oil, and concluded that benefits include decrease in the activity of the oncogene p21Ras, changes in protein signaling pathways, stimulation of tumour cell death and prevention of DNA damage. The study was carried out in an experimental model and researchers have already begun a new study with human cell lines.

Breast cancer is the most common type of cancer in Western countries. Research carried out with animal models demonstrate that a diet rich in fats is directly related to the incidence of cancer. Some types of fats however can play a protective role against the development of these

tumours. Such is the case of virgin olive oil, rich in oleic acid, a mono-unsaturated fatty acid, and containing several bioactive compounds such as antioxidants. A moderate and regular intake of virgin olive oil, characteristic of the Mediterranean diet, is associated with low incidences of specific types of cancer, including breast cancer, as well as with having a protective role against coronary diseases and other health problems.

The study carried out by UAB researchers decoded the mechanisms operating within the tumour cell and induced by the intake of olive oil, in comparison to those activated by corn oil, rich in n-6 polyunsaturated fatty acids, which increase the aggressiveness of tumours.

Scientists demonstrated that virgin olive oil is associated with higher incidences of benign breast tumours and at the same time with a decrease in the activity of the p21Ras oncogene, which spurs uncontrolled cell proliferation and stimulates the growth of tumours. In addition, olive oil suppresses the activity of some proteins, such as the AKT, essential for the survival of cells since they prevent apoptosis, the cell's "suicide" programme. Between proliferation and apoptosis in tumour cells, these effects tip the balance towards cell death, thereby slowing the growth of tumours.

Another result obtained by researchers is the protection of DNA in the cell nucleus. Cells from animals fed a diet rich in virgin olive oil contained less DNA lesions than those fed a control diet.

Scientists of the UAB Breast Cancer Study Multidisciplinary Group (GMECM) have spent over twenty years working to determine the effects fats have on breast cancer, and in particular the effects of virgin olive oil. Previous studies of the group revealed the beneficial effects of this component of the human diet on the clinical conduct of mammary tumours and on their histological grade (malignancy). Scientists also described several molecular mechanisms producing these effects and in 2004 the same group was the one to identify the four genes involved in the effects dietary fats have on experimental breast cancer. The mechanism recently discovered was published in the journal *Carcinogenesis*.

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