

High cholesterol diets modify gene expression in atherosclerosis

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Too much cholesterol in the blood, or high blood cholesterol, can be serious. People with high blood cholesterol have a greater chance of getting heart disease. High blood cholesterol does not cause symptoms, so many people are unaware that their cholesterol level is too high.

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
Scientists from the department of Biochemistry and Molecular Biology 1 of the University of Granada have proven that a high cholesterol diet causes changes in gene expression in chicken aortic smooth muscle cells at the early stages of an experimental atherosclerosis study associates cholesterol intake with the expression of genes codifying certain proteins even before the disease is detected on blood vessel walls.

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Experts from the University of Granada (Universidad de Granada) carried out research on atherosclerosis from its earliest stages to discover the origin of atheromatous plaques deposits gradually and irregularly formed in the main arteries, causing the narrowing of the blood vessel. Although there are many causes for this disease, UGR scientists focus on smooth muscle cells (SMCs) transformation into dedifferentiated and proliferative cells, which carry lipids in culture. In this sense, cells from animals fed with control diet represent a difference.

Experts carried out an early cell atherosclerosis experimental model with chickens, as birds develop atherosclerosis very rapidly: a 20-day high cholesterol diet is enough to generate atheromatous plaques in their arteries.

Experts obtained SMCs from arteries before the formation of the plaques. Ten days after the start of the high cholesterol diet – when atheromatous plaques are not still visible under electron microscopic – aortic SMCs are extracted and in-vitro cultured. Experts culture SMCs (obtained from animals without a cholesterol dietary supplement) and SMC-Chs (ex

from animals with cholesterol dietary supplement) under the same conditions. After analysis, scientists confirmed that regarding the samples (without cholesterol) modification took place in birds fed with a high cholesterol diet. Differences show that cholesterol changes in messenger RNA synthesis in proteins related to lipid metabolism proliferation and apoptosis (programmed cell death) and, therefore, that diet has an impact on gene expression.

Through other studies, these experts discovered that, whilst cholesterol causes change in gene expression, fish oil reverts such changes. In this case, scientists fed the animals a high cholesterol diet for ten days, then substituted cholesterol for fish oil (rich in omega-3 and omega-6 polyunsaturated fatty acids) for another ten days.

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