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Natural product based anti-atherosclerotic therapy

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Atherosclerosis is the cause of more than 50% mortality in industrial countries. Atherosclerosis develops over many years, so the anti-atherosclerotic therapy should be long-term or even lifelong. Tachyphylaxis, long-term toxicity and cost amongst other issues may present problems for the use of conventional medications in the long-term. Drugs based on natural products can be a good alternative.

We have developed a series of natural compounds that are specifically designed to act at the vessel wall and modulate the atherosclerotic lesion. Clinical efficacy was determined in atherosclerosis regression studies with ultrasound examination of carotid arteries.

The AMAR study (Atherosclerosis Monitoring and Atherogenicity Reduction) was designed to estimate the effect of two-year treatment with time-released garlic-based drug Allicor on the progression of carotid atherosclerosis in asymptomatic men in double-blinded placebo-controlled randomized clinical trial. The primary outcome was the rate of atherosclerosis progression, measured by high-resolution B-mode ultrasonography as the increase in carotid Intima Media Thickness (IMT) of the far wall of common carotid arteries. The mean rate of IMT changes in Allicor-treated group was significantly different from the placebo group in which there was moderate progression. The results of AMAR study demonstrate that long-term treatment with Allicor has a direct anti-atherosclerotic effect on carotid atherosclerosis. These results encouraged clinical trials of two other drugs based on natural products, including: Inflaminat (calendula, elder and violet), possessing anti-cytokine activity and the phytoestrogen-rich drug Karinat (garlic powder, extract of grape seeds, green tea leafs, hop cones, β-carotene, α-tocopherol and ascorbic acid), designed for postmenopausal women. As in the AMAR trial Inflaminat caused regression of carotid atherosclerosis while Karinat prevented its development.

As a promising anti-atherosclerotic drug, we consider natural products that can inhibit sialidase activity. It was discovered that atherogenic modified low-density lipoprotein with low sialic acid levels circulates in the blood of atherosclerotic patients. The desialylation of lipoprotein particles is the key atherogenic modification that causes the accumulation of cholesterol in arterial cells. We developed two garlic-based and pollen-based drugs that inhibit sialidase activity in the blood.

It should be noted that the anti-atherosclerotic effects of drugs based on natural products are not inferior to the effects of such drugs as statins and calcium antagonists. Thus, natural products can be considered as promising drugs for anti-atherosclerotic therapy.

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