

Effect of different micronutrient combinations on the optimization of tissue stability: Production of collagen type IV

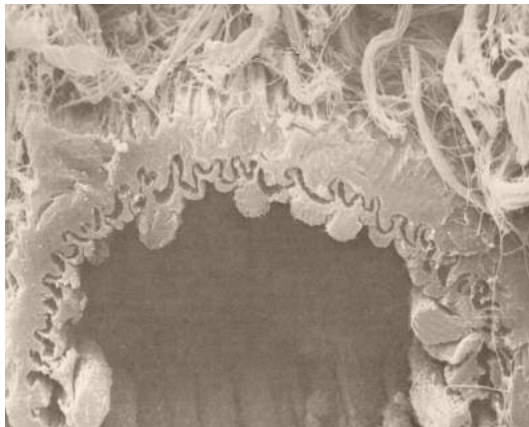
This study tested the effect of micronutrients in stimulating the formation of collagen molecules in the cells of the human arterial wall (smooth muscle cells and fibroblasts). Among other things, type IV collagen molecules formed by these cells are required for the production of the so-called basal lamina, i.e. the layer of connective tissue separating the bloodstream from the blood vessel wall (see graphic).

In contrast to the experiments with collagen type I (see previous pages) this test series did not investigate the production of collagen proteins, but the activation of the collagen production in the nucleus (gene expression).

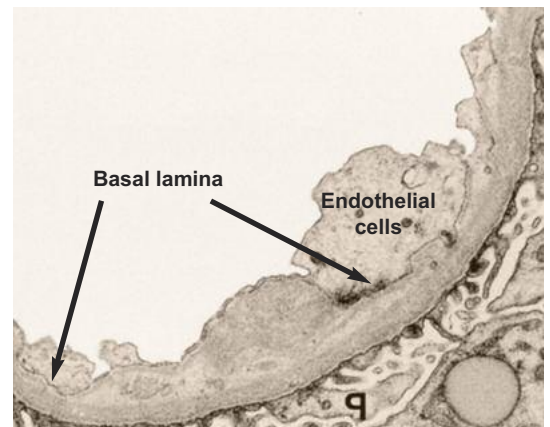
Again, the dosages used in the tests corresponded to the daily allowances. In the adjacent graph, the control value (without the addition of micronutrients) is again represented by the zero line. The columns above the zero line show that the tested micronutrient combinations were able to stimulate collagen production in the cell nucleus (gene expression). Conversely, the column below the zero line signifies an inhibition of gene expression - and, thus, a reduced formation of collagen molecules.

This test series provided further evidence of the unfavorable effects of the comparative combinations. The mean value of these products showed a clear inhibition of the expression/production of type IV collagen stability molecules. Since this type

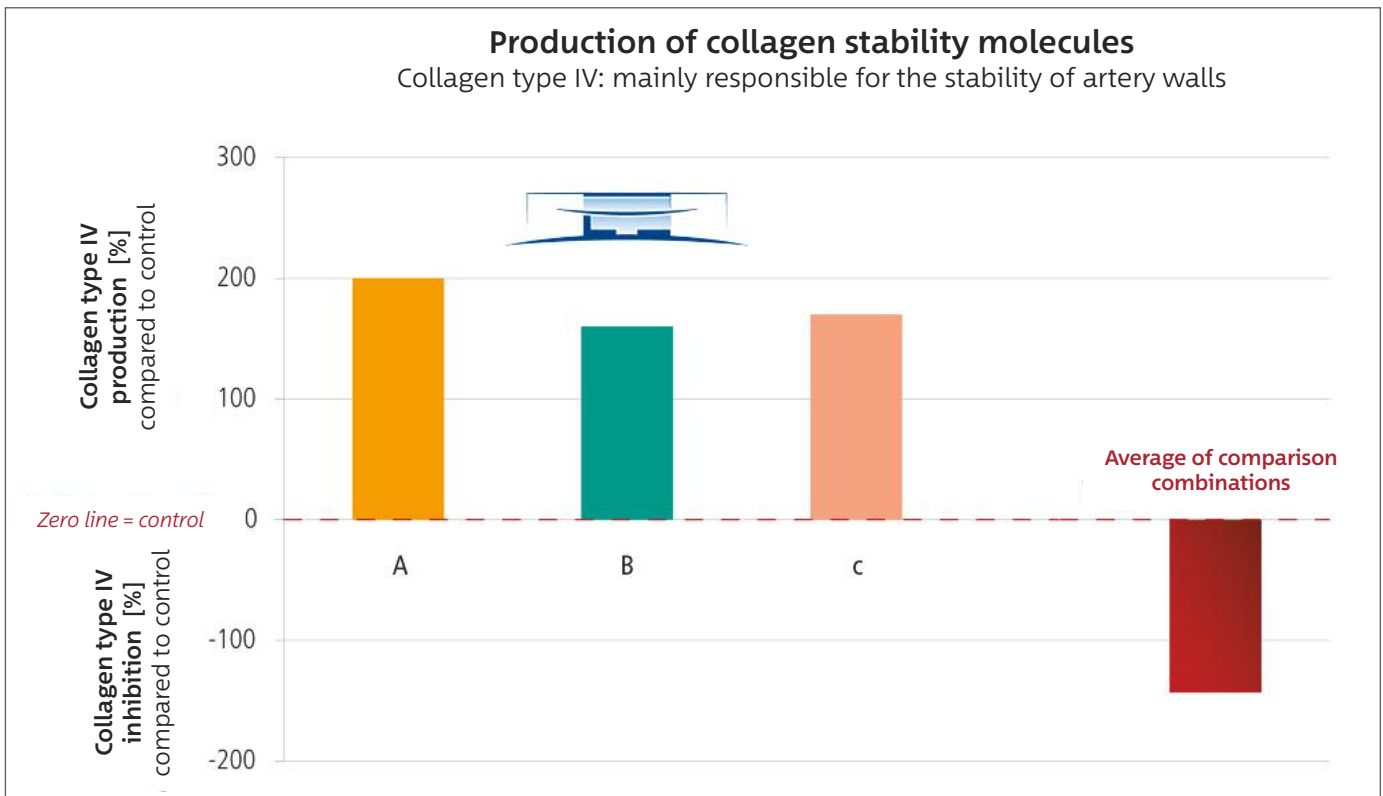
Collagen type IV plays a key role in stabilizing the human blood vessel pipeline, which is about 100,000 kilometers long. Among other things, it is responsible for the production of the so-called basal lamina, i.e. the connective tissue layer that separates the bloodstream from the blood vessel wall.



This cross section of a larger artery shows the importance of connective tissue molecules (especially collagen) for the stability of the arterial wall as a whole.



This cross section of a smaller blood vessel shows some endothelial cells, i.e. the cell layer lining the blood vessels. Directly below this cell layer is the basal lamina (arrows).



Tested micronutrient combinations composed of:

A: Different vitamins, minerals, trace elements, amino acids and phytochemicals

B: Vitamin C, E, B6, D, folic acid, lysine, proline, copper, betaine, chondroitin sulfate, acetylglucosamine, pycnogenol

C: Vitamin C, lysine, proline

of collagen is mainly responsible for the stability of the blood vessel walls, the possible consequences are obvious.

In contrast, by using the scientifically developed combination of micronutrients, collagen type IV formation was stimulated by 160% to 200% (columns A to C) as compared to the control (zero line).

The possible effects on the cardiovascular system, which may occur when the production of important stability molecules is inhibited by the regular use of untested micronutrient combinations, is obvious. Ultimately, the stability of the arterial walls is a crucial prerequisite for the prevention of arteriosclerosis.

Once again, these results confirm the importance of basic research for the development of effective food supplements.