

## **Modulation of bad cholesterol: what happens when patients with kidney disease receive omega-3-fatty acids?**

Just as oil cannot dissolve in water, so cannot fat dissolve in blood. In order for our bodies to transport cholesterol, which is made of fat (lipids), within our bloodstreams something is needed to carry it around. Therefore, lipids and proteins form molecules together called lipoproteins that can be transported to and from the cells of the body. The two most interesting lipoproteins are high-density-lipoprotein (HDL) and low-density-lipoprotein (LDL). The cholesterol within HDL is also referred to as the “good” cholesterol, whereas cholesterol inside LDL is called “bad” cholesterol due to its unhealthy effects on blood vessels contributing to cardiovascular diseases such as heart attacks and strokes. Furthermore, LDL is subdivided into three particles from LDL-1 to LDL-3 according to the size and compactness of the particles. The latter is also referred to as small-dense-LDL (sdLDL) and is believed to be the most dangerous of the three types of particles.

This type of particle is e.g. seen in higher concentrations in patients with kidney disease, receiving dialysis, whom already are at high risk of cardiovascular disease and are known to have a different pattern of lipids than healthy people.

Some attempts have been made to reduce the levels of sdLDL in other types of patients. Studies have used fish oil capsules that are rich in omega-3-fatty acids, which are known to have several beneficial effects on lipids and other risk factors of cardiovascular disease. The studies showed that these omega-3-fatty acids might also have a lowering effect on sdLDL.

Therefore, in our study we investigated whether it was possible to reduce the levels of sdLDL in patients with kidney disease receiving hemodialysis by supplementing them with omega-3-fatty acids. One hundred and sixty-one patients were divided into two groups receiving either fish capsules, containing omega-3-fatty acids, or olive oil capsules daily. The latter was used as placebo. The study went on for three months. Blood samples were taken at the beginning and at the end of the study in order to measure levels of sdLDL. Surprisingly, we found that sdLDL levels remained constant throughout the study period. There may be several explanations for this. One possibility could be that omega-3-fatty acids simply do not work on this particle in this particular kind of patients. This could be because of their characteristic lipid pattern may be too rigid to be modulated.

The answer for this question remains unknown, but omega-3-fatty acids may still possess other beneficial effects in patients with kidney disease receiving dialysis.

### **Publication**

[The Effect of n-3 Fatty Acids on Small Dense Low-Density Lipoproteins in Patients With End-Stage Renal Disease: A Randomized Placebo-Controlled Intervention Study.](#)

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