Non-Alcoholic Fatty Liver Disease (NAFLD) is a collective term for chronic liver disorders, in which a fattening of the liver is observed that is not generated by excessive alcohol consumption. It may cause liver fibrosis ( stiffening of the liver tissue), liver cirrhosis ( inflammation and death of liver tissue) as well as liver cancer ( tumorigenesis in the liver). During the last decade, the number of NAFLD patients in Western society, especially in the population group aged 40 to 50 years, has risen sharply. About one third of all Europeans are affected. The underlying causes are thought to be today’s lifestyle (a lot of sugar and fat in the diet) as well as a lack of exercise. This leads to obesity, cardiovascular disease and diabetes type II, eventually resulting in NAFLD.

A recent study with obese NAFLD mice showed that spermidine leads to regeneration of damaged liver tissue. In the experiment, two mouse groups were kept on a high-fat diet, resulting in obesity and “NAFLD liver”; one of the groups was additionally given spermidine. The group with additional spermidine supplement not only had a healthier liver, but in addition, spermidine led to a weight reduction of the strongly obese mice, despite continuing to be fed a high-fat diet. Further, the sugar tolerance (glucose tolerance) and insulin levels (insulin sensitivity), which worsen as a result of a high-fat diet and may lead to complications such as type II diabetes, were also improved by spermidine. The researchers were able to show that spermidine intervenes in the regulation of lipid metabolism of the liver, thus lifting the imbalance caused by a high-fat diet. Another research group has now confirmed the protective function of spermidine on liver tissue and also shows that the induction of autophagy (self-cleaning process of the cells) by spermidine plays a major role in this scenario. Along with these research reports, it has also been shown that liver regeneration in models of liver transplantation could be improved by spermidine supplementation.

Gao et al; Spermidine ameliorates non-alcoholic fatty liver disease through regulating lipid metabolism via AMPK; 2018; BBRC

Liu et al; Spermidine confers liver protection by enhancing NRF2 signaling through a MAP1S-mediated non-canonical mechanism; 2019; Hepatology

Okumura et al; Oral administration of polymanines ameliorates liver ischemia/perfusion injury and promotes liver regeneration in rats; 2016; Liver Transplantation