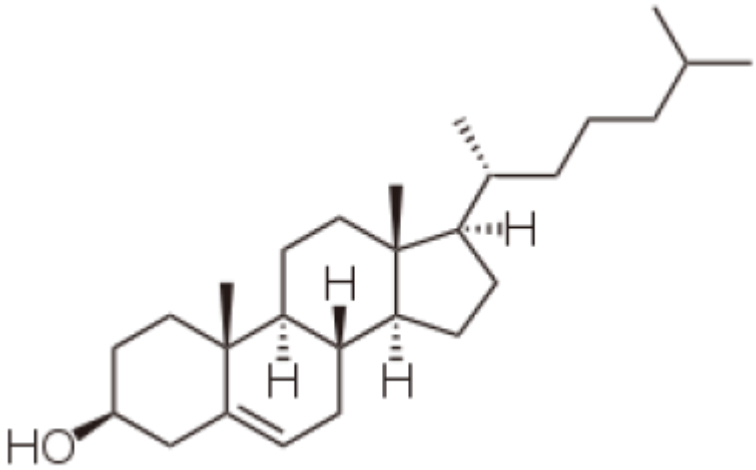
Cholesterol



From the Ancient Greek chole- (bile) and stereos (solid) followed by the chemical suffix -ol for an alcohol, is an organic molecule. It is a sterol (or modified steroid), a type of lipid molecule, and is biosynthesized by all animal cells, because it is an essential structural component of all animal cell membranes; essential to maintain both membrane structural integrity and fluidity. Cholesterol enables animal cells to dispense with a cell wall (to protect membrane integrity and cell viability), thereby allowing animal cells to change shape and animals to move (unlike bacteria and plant cells, which are restricted by their cell walls).

In addition to its importance for animal cell structure, cholesterol also serves as a precursor for the biosynthesis of steroid hormones and bile acids.

Cholesterol is the principal sterol synthesized by all animals. In vertebrates, hepatic cells typically produce the greatest amounts. It is absent among prokaryotes (bacteria and archaea), although there are some exceptions, such as Mycoplasma, which require cholesterol for growth.

François Poulletier de la Salle first identified cholesterol in solid form in gallstones in 1769. However, it was not until 1815 that chemist Michel Eugène Chevreul named the compound “cholesterine”.

Hunjadi et al. investigated whether Matcha Green Tea Powder modulates the HDL function and thereby influences the atherogenic process in an animal model with a strong influence on humans situation.

After a pretreatment phase based on a standard diet, ten female NZW rabbits were fed a high-fat diet for 20 weeks. The treatment group was additionally administered 1% matcha during the whole experiment. Long-term matcha treatment led to lowered HDL cholesterol, impaired cholesterol transport manifested by reduced in vitro cholesterol efflux capacity, reduced CETP-mediated cholesterol ester (CE) transfer between HDL and triglyceride-rich particles, and reduced macrophage-specific in vivo transfer, where we observed increased absorption of cholesterol in the liver but a decreased secretion into bile. Pulse wave velocity, assessed by nuclear magnetic resonance, was increased in matcha-treated animals, and a similar trend was observed for atherosclerotic lesion formation.

Long-term matcha green tea treatment of hypercholesterolemic rabbits caused impaired reverse cholesterol transport and increased vascular stiffness, and susceptibility for atherosclerotic lesion development. [1)].

Cholesterol complications

Cholesterol complications

1)

Hunjadi M, Sieder C, Beierfuß A, Kremser C, Moriggl B, Welte R, Kastner C, **Mern DS**, Ritsch A. Matcha Green Tea Powder does not Prevent Diet-Induced Arteriosclerosis in New Zealand White Rabbits Due to Impaired Reverse Cholesterol Transport. Mol Nutr Food Res. 2021 Aug 14:e2100371. doi: 10.1002/mnfr.202100371. Epub ahead of print. PMID: 34391214.