

Cholesterol levels affect our body's capacity to receive medicines

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Researchers found that Fenofibrate, a drug used to reduce cholesterol levels in patients at risk of cardiovascular disease, is up to four times easier to deliver when the cholesterol concentration is at the levels of a healthy person than at levels 7-10% lower. They also found that cholesterol levels of a healthy person make it harder for the body to be treated by a number of medicines for other diseases than when the levels are lower.

The team simulated the human intestine of both men and women (the so-called "FASSIF-C"). They then tested how increasing the concentration of cholesterol in in vitro media influences how a number of drugs dissolve in the human bile and the size of particles that can be found therein. To study the intestinal particle structure the team conducted a combination of the complementary methods dynamic light scattering and small-angle neutron scattering. They could thus take advantage of the sensitivity of neutrons to different isotopes. The latter experiments at the Heinz Maier-Leibnitz Zentrum (MLZ) in Germany were funded through the NMI3 Access Programme.

Fenofibrate was the only drug whose delivery was easier with the increase in cholesterol concentration to the levels of healthy people. In two other drugs tested, the opposite happened. Given that these tend to dissolve in the lipids rather than in the cholesterol, when the scientists increased the concentration of cholesterol, this induced a decrease of the solubility of Danazol, a drug used to treat endometriosis. For Griseofulvin, an anti-fungal drug, the solubility was reduced to as much

as half. As for Carbamazepine, a drug for epilepsy, the solubility was not affected. They also concluded that the higher the [cholesterol concentration](#), the smaller was the particle size of the vesicles in the media.

This study is an important step in [drug](#) delivery studies.

More information: Pooneh Khoshakhlagh et al. Fasted-State Simulated Intestinal Fluid "FaSSIF-C", a Cholesterol Containing Intestinal Model Medium for In Vitro Drug Delivery Development, *Journal of Pharmaceutical Sciences* (2015). [DOI: 10.1002/jps.24470](https://doi.org/10.1002/jps.24470)

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