

Oatmeal, healthy bugs and a happy heart

Scientists at the Science Foundation Ireland–funded APC Microbiome Institute in Cork have confirmed that gut microbes play a role in heart health. They also demonstrated that we should consume porridge regularly to get the benefits of oat beta glucan for heart and gut health!

The study, published today, found that consumption of oat beta glucan not only lowered blood cholesterol in mice, it also helped keep body weight down and benefited the gut microbiota, the community of microbes living in the intestines. Oat beta glucan altered both the composition and functionality of the gut microbiota. The level of butyrate, a type of fatty acid produced by gut bacteria which has been previously shown to protect against diet-induced obesity in mice, was elevated in this study. Oat beta glucan also acted as a prebiotic, and increased bacteria in the gut which are being explored by others to treat obesity.

Plant stanol esters, which too were tested in this study, were found to be the most effective in lowering blood cholesterol and helping to avoid plaque build-up, but caused the greatest weight and adiposity gains and adversely affected the gut microbiota composition of the mice.

“These results show we need to consider effects on the microbiome when treating cardiovascular disease through either food or medication” said Prof Catherine Stanton, leader of the research at the APC Microbiome Institute and Teagasc Food Research Centre, Moorepark, Co. Cork. “The message is to take porridge regularly to reduce your risk of cardiovascular disease whilst also protecting your gut microbiota.”

Cardiovascular disease is currently responsible for approximately 30% of deaths annually across the globe. Diet and exercise are known interventions to prevent or slow down the development of atherosclerosis but it has become evident that our gut bacteria also contribute.

In the study mice were fed a high fat diet together with either a food supplement or medication over a period of 24 weeks. The food supplements used in the study were plant stanol ester (the plant equivalent of cholesterol, currently added to some foods) and oat beta glucan (found in porridge). The drug used was Atorvastatin, one of the ‘statin’ group of drugs. The particular mice used are susceptible to the build-up of cholesterol in their arteries because they are apoE^{-/-} deficient.

Atorvastatin and plant stanol esters are known to reduce levels of ‘bad’ cholesterol (low-density lipoprotein, or LDL) and triglycerides in the blood, while increasing levels of ‘good’ cholesterol (high-density lipoprotein, or HDL). They are used to treat high cholesterol, and to lower the risk of stroke, heart attack, or other heart complications in people with type 2 diabetes, coronary heart disease, or other risk factors. In this study, mice treated with

Atorvastatin had similar physiology to the mice treated with oat beta glucan (reduced body weight and percentage body fat).

“There is established epidemiological data supporting the role of specific food constituents including oat beta glucan and plant sterols in cardiovascular health. The current study suggests gut microbes as an additional important player in the interface between our environment and cardiovascular health” said Professor Noel Caplice, Professor of Cardiovascular Science and Director of the Centre for Research in Vascular Biology, UCC. “Specifically it shows that certain foods may facilitate weight loss as well as encouraging growth of beneficial microbes in our intestines. Understanding this balance between food, gut bacteria and health may have implications for development of a range of new food and therapeutic products targeting cardiovascular disease, the principal cause of death in men and women in the developed world.”

“As a population, we all consume a range of food and pharmaceutical ingredients which impact directly on our health. This study now highlights the importance of considering interactions between the gut microbiota and novel supplements or therapeutics, which may indirectly affect our health” said Dr Paul Ryan, first author on the research publication, published today in the journal *Microbiome*.

Full reference

Paul M. Ryan, Lis E. London, Trent C. Bjorndahl, Rupasri Mandal, Kiera Murphy, Gerald F. Fitzgerald, Fergus Shanahan, R. Paul Ross, David S. Wishart, Noel M. Caplice and Catherine Stanton (2017) ***Microbiome and metabolome modifying effects of several cardiovascular disease interventions in apo-E^{-/-} mice*** *Microbiome* DOI 10.1186/s40168-017-0246-x
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