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## **NUS Researchers Report Potential New Treatment for Leaky Gut Using Milk-derived Extracellular Vesicles**

2023-04-17

Milk-derived extracellular vesicles (mEVs), a type of natural nanoparticles present in bovine and human breast milk, are reported to restore gut barrier integrity, prevent leakage of bacterial toxins into the blood stream, and alleviate gut and liver disorders.

The intestinal or gut barrier is crucial for nutrient absorption and preventing harmful substances from leaking into the bloodstream. Under diseased conditions, the disruption of the gut barrier may increase its permeability and result in a “leaky gut”.

The “leaky gut” syndrome has been associated with many diseases, including inflammatory bowel disease and non-alcoholic fatty liver disease. Both diseases are highly prevalent in the general population, but treatment options for these two highly common diseases are limited. Repairing the leaky gut is thus a potential strategy for the treatment of these diseases.

At the same time, milk plays essential roles in the development of the intestinal barrier and gut immune system. Both human and bovine milk are rich in extracellular vesicles (mEVs), which are nanosized particles containing beneficial components that can improve gut immunity and quality of gut bacteria.

However, it is unclear whether mEVs protect the gut barrier and treat the leaky gut.

To this end, Assistant Professor Jiong-Wei Wang from the Nanomedicine Translational Research Programme and Centre for NanoMedicine at the Yong Loo Lin School of Medicine, [National University of Singapore](#) (NUS Medicine), in collaboration with Professor Huaxi Yi from Ocean University of [China](#), led a research team to investigate the potential treatment effects of mEVs on the leaky gut. This study is published in [Science Advances](#).

The treatment efficacy of mEVs was demonstrated in laboratory models. After orally administering mEVs to the models, the researchers observed that the mEVs prevented the leakage of gut bacterial toxins into the blood stream, effectively averting toxin-induced liver damage.

“A leaky gut is a common effect of many diseases. However, whether the leaky gut is a symptom, or a cause of those diseases, remains debatable. Our research shows that treating the leaky gut with mEVs can ameliorate both inflammatory bowel disease and nonalcoholic fatty liver disease, two types of diseases that are seemingly unrelated,” said Professor Wang, the lead author of this study.

According to the research team, a human adult may need to drink 1 litre of milk a day to achieve therapeutic effects on the aforementioned disease conditions. The mEVs are thus more beneficial for individuals with lactose intolerance.

Currently, the researchers are exploring the mechanisms underlying the treatment effects. The team is also working with doctors to explore clinical trials with patients in the near future.

Read the [original article](#) on National University of [Singapore](#) (NUS).