New Study Suggests Human Gut Bacteria May Aid in PFAS Absorption

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A recent study published in *Nature Microbiology* by researchers at the University of Cambridge revealed that certain human gut bacteria may have the capacity to bioaccumulate per- and polyfluoroalkyl substances (PFAS) and could potentially aid in their excretion from the body. These findings represent a novel scientific development in the ongoing effort to understand and mitigate the effects of PFAS exposure.

PFAS are a large class of synthetic chemicals used in a wide range of consumer products, including non-stick cookware, waterproof clothing and food packaging, due to their resistance to heat, water, and oil. However, these compounds are highly persistent in the environment and the human body, and certain PFAS have been associated with adverse health outcomes such as reduced fertility, developmental delays, and increased risks of cancer and cardiovascular disease.

University of Cambridge researchers identified specific bacterial strains within the human gut microbiome that can absorb and internally store PFAS. In animal models, mice that were colonized with a group of 20 human gut bacterial strains showed increased fecal excretion of PFAS compared to germ-free mice. Laboratory experiments demonstrated that certain bacterial strains could bioaccumulate between 25 percent and 74 percent of PFAS within 24 hours of exposure. One species, *Bacteroides uniformis*, exhibited rapid adaptation, which allowed it to improve its growth rate 46-fold under repeated PFAS exposure.

However, not all PFAS compounds responded the same way in these experiments. Longer-chain PFAS, such as PFDA, were more readily bioaccumulated than shorter-chain types, and sulfonated PFAS appeared to behave differently than carboxylates. Mechanistic investigations indicated that bacterial efflux pumps and intracellular aggregation contributed to the observed effects.

Although the findings are promising, the study did not measure PFAS levels in blood or assess health impacts in humans. As such, the increased excretion observed in mice may not directly translate to similar outcomes in people. The authors noted that further research, including human cohort studies, is needed to determine whether increasing levels of PFAS-accumulating bacteria in the gut can significantly reduce PFAS burden or mitigate associated health risks.

To explore these possibilities, the lead researchers from this study co-founded Cambiotics, a startup supported by Cambridge Enterprise, with the goal of developing probiotic products designed to enhance the presence of these beneficial microbes in the human gut. Such interventions are still in development and not yet commercially available.

While microbial bioaccumulation research is in its infancy, it may apprise future litigation and regulatory developments. As courts and regulatory agencies continue to assess potential risks associated with PFAS exposure, scientific findings such as these could influence discussions about exposure pathways, mitigation methods and long-term health impacts. Although the study does not offer an immediate remediation strategy, it contributes valuable data to the growing body of knowledge surrounding PFAS and may eventually support the development of new tools for risk management and consumer protection.