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Meredith A J Hullar
Fred Hutchinson Cancer Research Center, USA

Fermented meats and implications in human health: The microbiome connection

Fermentation has been used as a method of meat preservation in many cultures. Fermentation of meat and fish results in hydrolyzation of proteins making them more digestible, altering the composition which aids in use of indigestible components, and in some cases, acting as a source of beneficial bacteria introduced during the fermentation process. The addition of salts, nitrite, or nitrate influences the preservation process partially through altering the microbial community involved in fermentation. A recent review of the epidemologic literature shows convincing evidence for a positive association between processed meat and colorectal cancer; and probable association for salted/fermented fish and nasopharyngeal cancer. Molecular approaches, that do not rely on culturing bacteria, have shown that the composition and alpha and beta diversity of the microbiome changes in relation to meat consumption. Curing agents, as well as, hydrolized protein can be metabolized by human gut bacteria to compounds that are associated with increased risk of disease. N-nitroso compounds (NOC), which are carcinogens, are formed endogenously from nitrate and nitrite used in the curing process. Upon ingestion of fermented meat products, hydrolyzed proteins are metabolized to polyamines putrescine, tyramine, histamine, and cadaverine in the human gut. Putrescine, tyramine, and cadaverine have been shown to potentiate histamine toxicity. Microbial metabolism of sulfur amino acids and sulfated sugars found in fermented meat products are metabolized by human gut bacteria to hydrogen sulfide which may be genotoxic. These studies suggest that gut microbial metabolism of fermented meats may influence human disease risk.

Biography

Meredith A J Hullar has completed her PhD from Harvard University and Post-Doctoral studies in Civil and Environmental Engineering at University of Washington. She is currently a Senior Staff Scientist in the Cancer Prevention Department in the Division of Public Health Sciences at the Fred Hutchinson Cancer Research Center. Her research focuses on the role of the human microbiome in human health as influenced by the microbial metabolism of diet.

mhullar@gmail.com

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