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Mono-colonization with *Lactobacillus acidophilus* NCFM affects the intestinal metabolome in mice

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Mono-colonization of germ-free (GF) mice enables the study of specific bacterial species *in vivo*. *Lactobacillus acidophilus* is a probiotic strain, however many of the mechanisms behind its health-promoting effect remain unsolved. Here, we studied the effects of *Lactobacillus acidophilus* NCFM™ (NCFM) on the intestinal metabolome (jejunum, caecum, and colon) in mice by comparing NCFM mono-colonized (MC) mice with GF mice by a non-targeted metabolomics approach using liquid chromatography coupled to mass-spectrometry (LC-MS). The study adds to existing evidence that NCFM *in vivo* affects the bile acid signature of mice by deconjugation and dehydroxylation of bile acids. Furthermore, we confirmed that carbohydrate metabolism is affected by NCFM in the mouse intestine. Especially, the digestion of larger carbohydrates (penta- and tetrasaccharides) was increased in MC mice. Interestingly, we also found vitamin E (α-tocopherol acetate) in higher levels in the intestine of GF mice compared to MC mice, suggesting that NCFM either metabolizes the compound or indirectly affects the absorption by changing the metabolome in the intestine. The use of NCFM to increase the uptake of vitamin E supplements in humans and animals is a highly relevant topic for further research.