

Studies inherent the activity of *Bifidobacterium bifidum* PRL2010 on lipid metabolism *in vitro* and *in vivo*

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Background: Cardiovascular diseases are the most important cause of death in Western world and atherosclerosis represents an important risk factor. The atherosclerotic plaques develop in arterials wall and are composed mostly of macrophages engorged with cholesterol called foam cells. In the recent years, besides the classical pharmacological strategies to reduce cardiovascular risk, there are new approaches to decrease plasma cholesterol levels as the use of probiotic bacteria. Probiotics are live micro-organisms which, when administered in adequate amounts, confer a health benefit on the host. These bacteria could influence the cholesterol uptake in the gut since the sterol is stored and metabolized in bacterial cells. **Aim of the study:** We investigated the cholesterol lowering activity *in vitro* and *in vivo* of several gut bifidobacterial strains aimed to identify the bacteria with high cholesterol uptake. **Results and discussion:** We detected the cholesterol uptake of 17 strains of Bifidobacteria, after 3 h incubation with ³H-cholesterol into bacterial cultures. A significant uptake capacity is observed for *Bifidobacterium bifidum* PRL2010. Then we evaluated the cholesterol uptake trend of alive vs thermic inactivated *Bifidobacterium bifidum* PRL2010 for 28 h. The values of alive bacteria are between 0,101 µCi (t= 3 h) and 0,131 µCi (t=28 h), while those one of thermic inactivated are between 0,066 µCi (t= 3 h) and 0,093 µCi (t=28 h). Afterwards we analysed the change of lipid profile in ApoE^{-/-} mice after daily administration of 10⁹ cells of PRL2010 for 6 weeks. We observe a decrease of total cholesterol (- 27%) in the treated group, instead HDL and triglyceride did not change significantly. *Bifidobacterium bifidum* PRL2010 could be a potential nutraceutical tool to modify the cholesterol levels in the humans.