Polyamines transport by probiotics

P. Martinis[1], S. Grancara[1], M. Bragadin[2], M.A. Grillo[3], E. Agostinelli[4], E. Feller[5], A. Toninello[1]

[1]Department of Biomedical Sciences, University of Padua, Padua, Italy

[2]Department of Molecular Sciences and Nanosistems, Ca' Foscari University of Venice, Venice, Italy

[3]Department of Medicine and Experimental Oncology, University of Turin, Turin, Italy

[4]Department of Biochemical Sciences "A. Rossi Fanelli", Sapienza University of Rome, Rome, Italy

[5] "Centrale del latte di Vicenza", Vicenza, Italy

Polyamines, such as putrescine, cadaverine, agmatine, spermine, and spermidine, have been reported in a variety of foods, such as fish, meat, cheese, vegetables, and wines, where they are naturally present [1]. Moreover, they are essential components of all living cells where they exhibit different roles in cellular growth, normal function, proliferation, differentiation of immune cells as well as in regulation of inflammatory reactions. Thus, the regulation of polyamine levels from the diet is important to keep the function of various organs and their body pool is maintained by three sources: endogenous or de novo biosynthesis, intestinal microorganisms and exogenous supply through the diet. On the other hand, it is to note that the cell growth promoting effect may also be negative in relation to cancer development. In fact, it has been demonstrated that an increase in polyamine levels is also associated with enhanced cell proliferation as well as expression of genes affecting tumor invasion and metastasis [2].

Several studies have reported that probiotics and yogurt have anticarcinogenic effects [3] and in particular the use of fermented milk products is associated with reduced risk of breast, colon and pancreatic cancers [4].

Polyamines transport in some bacterial strains has been extensively investigated [5, 6] whereas there is a lack of knowledge about their uptake by bacteria commonly used in the fabrication of milk products. For this reason the transport of spermidine and putrescine by *L. acidophilus, L. bulgaricus* and *S. thermophilus* was investigated.

[1] Naila A, Flint S, Fletcher G, Bremer P, Meerdink G. J. (2010) Food Sci. 75:R139-50
[2] Atiya Ali M, Poortvliet E, Strömberg R, Yngve A. (2011) Food Nutr Res. 14:55
[3] Apás AL, Dupraz J, Ross R, González SN, Arena ME. (2010) J Biosci Bioeng. 110:537-40

[4] Terahara M, Meguro S, Kaneko T. (1998) Biosci Biotechnol Biochem. 62:197-200
[5] Wortham BW, Patel CN, Oliveira MA. (2007) Adv Exp Med Biol. 603:106-15
[6] Igarashi K, Kashiwagi K. (1999) Biochem J. 3:633-42

This work was done in collaboration with "Centrale del latte di Vicenza" (Vicenza) and the Department of Molecular Sciences and Nanosistems, Ca' Foscari University of Venice.

(Vicenza, 16 maggio 2013)