

Enterocins and Enterocin-producing strains modulate oxidative metabolism of macrophages in mice infected with *Trichinella spiralis*

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Gut microbiota represents a relevant factor that may strongly interfere with the pathophysiology of parasitic infections, determine the parasite survival and the outcome of parasitic infections. The immunomodulatory activity of probiotic bacteria is expressed through inhibition of inflammatory response, stimulation of phagocytic activity and activation of antigen presenting cells. Macrophages are antigen presenting cells – essential in the process of phagocytosis, they release cytokines and regulate inflammation. After contact with the antigen, they stimulate and produce reactive oxygen species that are highly toxic to parasites. Superoxide anion O^{2-} is the basic component of macrophage activity. This study was focused on the effect of Enterocins (Enterocin M and Durancin-like ED26E/7) and their producing, probiotic strains *Enterococcus faecium* AL41=CCM8558 and *E. durans* ED26E/7) on the production of superoxide anion in peritoneal macrophages of *Trichinella spiralis* infected mice.

The strains *E. faecium* CCM8558 and *E. durans* ED26E/7 were administered in mice *per os* daily at the dose of 100 µl (109 CFU/ml) and their Enterocins (Enterocin M, Durancin-like) at the dose of 50 µl with activity 51 200 AU/ml and 25 600 AU/ml, respectively). Mice were infected with 400 T. spiralis larvae on day 7 of treatment. Production of the superoxide anion in the peritoneal macrophages was detected *ex vivo*. The strain *E. faecium* CCM8558 increased the O^{2-} production prior to parasitic infection, on the day 7 of application. The administration of all Enterocins/Enterocin-producing strains to mice prevented a significant inhibition of the production caused by *T. spiralis* infection on day 5 post infection (*p. i.*). In addition, the strains *E. faecium* CCM8558, *E. durans* ED26E/7 and Enterocin M induced a significant stimulation of macrophage's metabolic activity on day 5 *p. i.*, i. e. in the early intestinal phase of trichinellosis. In next days, only *E. faecium* CCM8558 increased the superoxide anion formation, but not significantly. The strains *E. faecium* CCM8558, *E. durans* ED26E/7 and Enterocin M significantly stimulated oxidative metabolism of macrophages again, in the developed muscular phase, on day 32 *p. i.*

The increase in the metabolic activity of peritoneal macrophages induced by Enterocins/Enterocin-producing strains in the intestinal phase of trichinellosis supported the host anti-parasite deffence and can result in the decreased infectivity of larvae caused by damage and killing of newborn larvae with reactive oxygen species from macrophages. Therapeutic approaches with

beneficial Enterocins/Enterocin-producing strains could help to reduce the risks of infestation by parasites or complement classical anti-parasite treatment.

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