Enterococcus mundtii ST4SA and Lactobacillus plantarum 423 excludes Listeria monocytogenes EGDe from the gastro-intestinal tract as shown by bioluminescent studies in mice

Winschau Fayghan van Zyl, S M Deane and L M T Dicks
University of Stellenbosch, South Africa

Listeria monocytogenes is an opportunistic food-borne pathogen which can be life-threatening to individuals with a weakened immune system. The aim of this study was to reveal if the probiotic strains L. plantarum 423 and E. mundtii ST4SA colonizes the gastro-intestinal tract (GIT) of mice and whether strains 423 and ST4SA could exclude L. monocytogenes from the GIT. The mCherry fluorescence gene and a gene for chloramphenicol resistance were cloned into the pGKV223D LAB/E. coli expression vector and stably expressed in E. mundtii ST4SA. The same two genes were integrated into a non-functional region on the genome of L. plantarum 423 by homologous recombination. Mice were gavaged with L. plantarum 423, E. mundtii ST4SA and a combination of the two strains for 6 consecutive days and orally infected with a bioluminescent strain of L. monocytogenes (strain EGDe) on the last day of treatment. Listeria monocytogenes EGDe was excluded from the small intestine of L. plantarum 423-treated mice 4 hours after infection and from the large intestine 2 hours later. No bioluminescent and thus metabolically active cells of L. monocytogenes EGDe were recorded in the GIT of mice treated with E. mundtii ST4SA. Lactobacillus plantarum 423 and E. mundtii ST4SA colonized the colon the strongest. The ability of L. monocytogenes EGDe to colonize the GIT was reduced by pre-treatment with L. plantarum 423 or E. mundtii ST4SA. The most rapid decline in L. monocytogenes EGDe cell numbers was recorded in mice pre-colonized with E. mundtii ST4SA suggesting that E. mundtii ST4SA is the most effective in controlling the growth of L. monocytogenes EGDe in the GIT.

Biography

Winschau Fayghan van Zyl has completed his BSc in Molecular Biology and Biotechnology at the University of Stellenbosch and obtained the degree in 2011. In 2012, he obtained his BSc (Hons) in Microbiology, also at the University of Stellenbosch. He obtained his MSc degree in Microbiology and is currently enrolled as PhD student at the University of Stellenbosch in the research laboratory of Professor L M T Dicks. His research is focussed on lactic acid bacteria and host-microbe interactions.

Notes: