Selective pressure affects transfer and establishment of a Lactobacillus plantarum resistance plasmid in the gastrointestinal environment - DTU Orbit (09/11/2019)

**Selective pressure affects transfer and establishment of a Lactobacillus plantarum resistance plasmid in the gastrointestinal environment**

**Objectives and methods:** A Lactobacillus plantarum strain recently isolated from French raw-milk cheese was tested for its ability to transfer a small plasmid pLFE1 harbouring the erythromycin resistance gene erm(B) to Enterococcus faecalis. Mating was studied in vitro and in different gastrointestinal environments using gnotobiotic rats as a simple in vivo model and streptomycin-treated mice as a more complex model. Transfer and establishment of transconjugants in the intestine were investigated with and without selective pressure. Results: Compared with the relatively low transfer frequency of similar to 5.7 x 10(-8) transconjugants/recipient obtained in vitro by filter mating, a surprisingly high number of transconjugants (10(-4) transconjugants/recipient) was observed in gnotobiotic rats even without antibiotic treatment. When erythromycin was administered, a transfer rate of similar to 100% was observed, i.e. the recipient population turned completely into transconjugants (3 x 10(9) cfu/g faeces). Additionally, the time to reach a stable transconjugant population level was much faster in the erythromycin-treated gnotobiotic rats (1 day) than in the untreated animals (4-5 days). Transconjugants persisted in the gut in relatively stable numbers at least 12 days after termination of antibiotic treatment. In the streptomycin-treated mice, no transfer was observed either with or without erythromycin treatment. Conclusions: The overall results imply that the gastrointestinal tract may comprise a more favourable environment for antibiotic resistance transfer than conditions provided in vitro. However, the indigenous gut microbiota severely restricts transfer, thus minimizing the number of detectable transfer events. Treatment with erythromycin strongly favoured transfer and establishment of pLFE1.

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