In vivo study of the potential toxicity and translocation of autochthonous *Lactobacillus casei* in mice

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Abstract

Statement of the Problem: From the point of view of health safety of potentially probiotic bacteria, the basic requirements are non-toxicity, absence of antibiotic resistance genes, and translocation. The aim of our research was to investigate the subacute toxicity of the indigenous strain of *Lactobacillus casei* 5s and to test the possible translocation of orally administered lactobacilli from the intestine to the blood, liver, and kidneys. Methodology & Theoretical Orientation: An oral toxicity study was conducted in 10 NMRI mice weighing 18-22 g according to OECD guidelines No. 407. Each animal was administered a dose of $1x10^7$ CFU/ml *L. casei* 5s by gastric gavage daily for fourteen days. The control group of 5 mice received 1 ml of saline by gastric gavage. At the end of the experiment, all mice were sacrificed by cervical dislocation, and the internal organs were examined macroscopically. No deaths or significant differences in behavior were observed between the experimental and control groups. Bacterial translocation to the blood and tissues was studied in the same animals. Blood samples and a suspension of liver and kidney homogenates were applied to nutrient media for the cultivation of lactobacilli, incubated anaerobically at 37°C for 48 hours, and then examined on Petri dishes to determine whether lactobacilli colonies had formed. Findings: There was no growth, and all plates remained sterile, indicating that there was no translocation of orally introduced lactobacilli to the blood, liver, and kidneys. Conclusion & Significance: Absence of translocation and subacute toxicity, are indicators of the health safety of *L. casei* 5s as a potential probiotic, which can be confirmed by further in vitro and in vivo studies.

Recent Publications

1. OECD GUIDELINES FOR TESTING OF CHEMICALS NO 407 (2008) Repeated Dose 28 - Day Oral Toxicity Study in Rodents.
2. Zhou JS, Shu Q, Rutherfurd KJ, Prasad J, Gopal PK, Gill HS (2000) Acute oral toxicity and bacterial translocation studies on potentially probiotic strains of lactic acid bacteria. Food and chemical toxicology: an international journal published for the British Industrial Biological Research Association 38(2-3):153-161.
3. Potruch A, Schwartz A, Ilan Y (2022) The role of bacterial translocation in sepsis: a new target for therapy. Therapeutic advances in gastroenterology 15:17562848221094214.
4. Rubin IMC, Stevnsborg L, Mollerup S, Petersen AM, Pinholt M (2022) Bacteraemia caused by *Lactobacillus rhamnosus* given as a probiotic in a patient with a central venous catheter: a WGS case report. Infection prevention in practice 4(1):100200.
5. Fine RL, Mubiru DL, Kriegel MA (2020) Friend or foe? Lactobacillus in the context of autoimmune disease. Advances in immunology 146:29-56.

Biography

Dr. Gordana Zavišić specializes in the development of new biotechnological products with autochthonous bacterial strains, isolation, purification, and identification of natural isolates of thermophilic and mesophilic bacteria and their use in biotechnological research (biotransformation, production of secondary metabolites), microbiological testing/quality assessment of drugs, dietary products, disinfectants and preservatives in the pharmaceutical industry.

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