**Supplemental File 1:**

Probiotics in liver and pancreas tissue engineering

|  |  |  |  |
| --- | --- | --- | --- |
| **Probiotics** | **Mechanism of action** | **Method** | **Ref.** |
| *Bifidobacterium animalis* | Increasing IL-6 expression, promotion of liver regeneration | Was detected | [1] |
| *Lactobacillus rhamnosus* | Improving liver function and reduced hepatic injury and inflammation | Dietary feeding/Animal samples | [2,3] |
| *Bifidobacterium infantis* | Attenuating tumor-associated liver injury | Dietary feeding | [4] |
| *Lactobacillus gasseri* | Attenuating tumor-associated liver injury | Dietary feeding | [4] |
| *Lactobacillus plantarum* | Attenuating tumor-associated liver injury  Improvement of liver function after hepatic resection | Oral administration/ Dietary feeding | [4,5] |
| *Lactobacillus salivarius* | Attenuation of hepatic injury  Reduction of liver abnormalities  Reduction of total bilirubin  Reduced bacterial translocation elevated IL-10 | In-vivo treatment | [6] |
| *Bifidobacterium longum* | Reduction of liver injury  Inhibition of transplant rejection | Feeding/Animal samples | [7] |
| *Lactobacillus acidophilus* | Reduction of liver injury  Inhibition of transplant rejection | Feeding/Animal samples | [7] |
| *Enterococcus faecalis* | Reduction of liver injury  Inhibition of transplant rejection | Feeding/Animal samples | [7] |
| *Pediacoccus pentosaceus* | Improvement of liver function after hepatic resection | Oral administration/feeding | [5] |
| *Leuconostoc mesenteroides* | Improvement of liver function after hepatic resection | Oral administration/feeding | [5] |
| *Lactobacillus paracasei* | Improvement of liver function after hepatic resection | Oral administration/feeding | [5] |
| *Lb. plantarum* | Liver cleansing through enhancing phagocytosis and reducing apoptosis | In-vitro and in-vivo treatment | [8] |
| *Lactobacillus vaginalis* | Reduction of TG, TC, LDL and lipid accumulation in liver  Reduction of liver steatosis  Increasing HDL level | In-vivo treatment | [9] |
| *Bifidobacterium animalis* subsp. *Lactis* | Reduction of TG, TC, LDL and lipid accumulation in liver  Reduction of liver steatosis  Increasing HDL level | In-vivo treatment | [9] |
| Eubacteria | liver regeneration | Was detected | [10] |
| *Clostridium* | liver regeneration | Was detected | [10] |
| *L. lactis* | Reduction of liver fibrosis and damage | Oral administration | [11] |

**References**:

1. Cuenca S, Sanchez E, Santiago A, El Khader I, Panda S, Vidal S, et al. Microbiome composition by pyrosequencing in mesenteric lymph nodes of rats with CCl4-induced cirrhosis. J Innate Immun. 2014;6(3):263–71.

2. Wang Y, Kirpich I, Liu Y, Ma Z, Barve S, McClain CJ, et al. Lactobacillus rhamnosus GG treatment potentiates intestinal hypoxia-inducible factor, promotes intestinal integrity and ameliorates alcohol-induced liver injury. Am J Pathol. 2011;179(6):2866–75.

3. Wang Y, Liu Y, Kirpich I, Ma Z, Wang C, Zhang M, et al. Lactobacillus rhamnosus GG reduces hepatic TNFα production and inflammation in chronic alcohol-induced liver injury. J Nutr Biochem. 2013;24(9):1609–15.

4. Håkansson Å, Bränning C, Molin G, Adawi D, Hagslätt ML, Jeppsson B, et al. Blueberry husks and probiotics attenuate colorectal inflammation and oncogenesis, and liver injuries in rats exposed to cycling DSS-treatment. PLoS One. 2012;7(3):e33510.

5. Rayes N, Pilarski T, Stockmann M, Bengmark S, Neuhaus P, Seehofer D. Effect of pre- and probiotics on liver regeneration after resection: A randomised, double-blind pilot study. Benef Microbes. 2012;3(3):237–44.

6. Lv LX, Hu XJ, Qian GR, Zhang H, Lu HF, Zheng BW, Jiang L, Li LJ. Administration of Lactobacillus salivarius LI01 or Pediococcus pentosaceus LI05 improves acute liver injury induced by D-galactosamine in rats. Appl Microbiol Biotechnol. 2014;98(12):5619-32.

7. Xie Y, Chen H, Zhu B, Qin N, Chen Y, Li Z, et al. Effect of Intestinal Microbiota Alteration on Hepatic Damage in Rats with Acute Rejection After Liver Transplantation. Microb Ecol. 2014;68(4):871–80.

8. Valdéz JC, Peral MC, Rachid M, Santana M, Perdigón G. Interference of Lactobacillus plantarum with Pseudomonas aeruginosa in vitro and in infected burns: the potential use of probiotics in wound treatment. Clin Microbiol Infect. 2005;11(6):472-9.

9. Liang X , Zhang Z , Zhou X , Lu Y , Li R , Yu Z , Tong L , Gong P , Yi H , Liu T , Zhang L . Probiotics improved hyperlipidemia in mice induced by a high cholesterol diet via downregulating FXR. Food Funct. 2020;11(11):9903-9911.

10. Wu X, Sun R, Chen Y, Zheng X, Bai L, Lian Z, Wei H, Tian Z. Oral ampicillin inhibits liver regeneration by breaking hepatic innate immune tolerance normally maintained by gut commensal bacteria. Hepatology. 2015;62(1):253-64.

11. Delgado-Venegas CS, Martínez-Hernández SL, Cervantes-García D, Montes de Oca-Luna R, de Jesús Loera-Arias M, Mata-Martínez MG, Ventura-Juárez J, Muñoz-Ortega MH. Modulating effects of the probiotic Lactococcus lactis on the hepatic fibrotic process induced by CCl4 in Wistar rats. Exp Ther Med. 2021;21(4):339.