The Torch
Vol. 4 (24)

Probiotic mediated ascariasis treatment

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Ascaris lumbricoides (roundworm) is the largest parasite of human beings, growing up to 35cm. It commonly causes a condition called ascariasis. Albendazole and mebendazole are drugs that are predominantly prescribed to treat ascariasis; however, they have side effects, such as abdominal pain, diarrhoea, and teratogenic effects on the foetus. Hence, there is a need for alternative medicine for this condition. One of the enzymes produced by Ascaris lumbricoides is beta-carbonic anhydrase, which causes the reversible interconversion of carbon dioxide and bicarbonate. Beta-carbonic anhydrase is a metalloenzyme that is limited to prokaryotes and lower eukaryotes. Additionally, it is absent in human beings. Hence, targeting beta-carbonic anhydrase is a promising approach for preventing ascariasis.   In this research combat, Lactobacillus which is used as a probiotic agent to improve the beneficial gut microbiota and thereby enhance the immune system can be transformed with a gene encoding the ribonuclease (RNase) enzyme which can specifically cleave the messenger RNA (mRNA) of the beta carbonic anhydrase gene, thus inhibiting the metalloenzyme activity and resulting in improper homeostasis, which could destroy the Ascaris lumbricoides.   This transformed Lactobacillus can be produced in probiotic form and consumed as tablets, capsules, powders or drinks. Hence, using probiotic-mediated inhibition of beta-carbonic anhydrase, the usual side effects of chemical medications can be lowered, and the population of the gut microbiota can be strengthened effectively.

Keywords: Ascaris lumbricoides, Lactobacillus, Beta carbonic anhydrase, RNase, Probiotic, Capsules

Citation:
Dharani A. Probiotic mediated ascariasis treatment. The Torch. 2023. 4(24). Available from:
https://www.styvalley.com/pub/magazines/torch/read/probiotic-mediated-ascariasis-treatment.