Membrane Vesicles of Lactobacillus Species to treat oral pathogens-

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Indian council of Medical Research (ICMR)

Name of the Scheme
Ad-hoc

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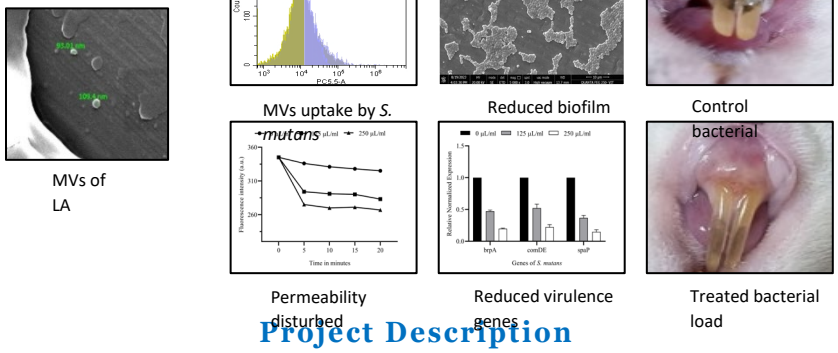
Rs. 60,32,085

Duration of the Project (years)
3

Graphical Abstract/ Lavout

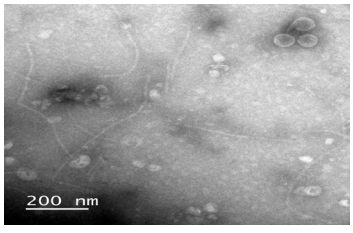


Project Description

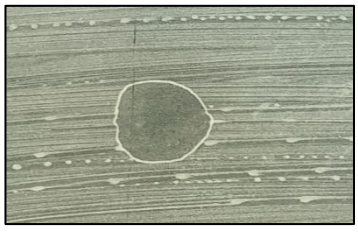
Despite considerable research and a variety of treatment approaches, dental decay continues to be a global health challenge. The use of antibiotics in treatment often leads to increased resistance, and antimicrobial agents can have negative side effects. *Streptococcus mutans* is a key contributor to oral diseases, more so than other pathogens. Probiotics, however, play a beneficial role in maintaining overall health. Specifically, *Lactobacillus acidophilus* in the mouth can block harmful bacteria by competing for nutrients. Yet, evidence suggests they may also promote tooth decay. Our research focuses on Membrane vesicles (MVs) produced by *L. acidophilus*, which serve as a means for bacterial communication and can eliminate competing bacteria. These MVs match previous findings in size, zeta potential, and spherical morphology. They exhibit significant antimicrobial properties, prevent biofilm formation, hinder bacterial adhesion and invasion, and reduce the expression of virulence genes *brpA*, *comDE*, and *spaP* against *S. mutans*. In a live rat model, they effectively prevented S. mutans infection, enhancing the value of our results. This research points to new therapeutic avenues that could offer alternatives to traditional treatments and help tackle antibiotic resistance.

Products/ Instruments/ Results/ Outreach Activities

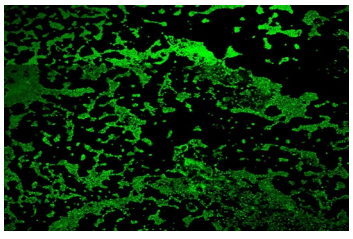
MV of *L. acidophilus* - TEM



MV inhibit *S. mutans*

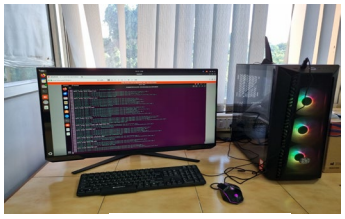


MV inhibit *S. mutans* biofilm



MV inhibit *S. mutans* – in vivo

Cooling centrifuge



System - HP