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DeColi: Gut Decolonization of Multi-Resistant *Escherichia coli*

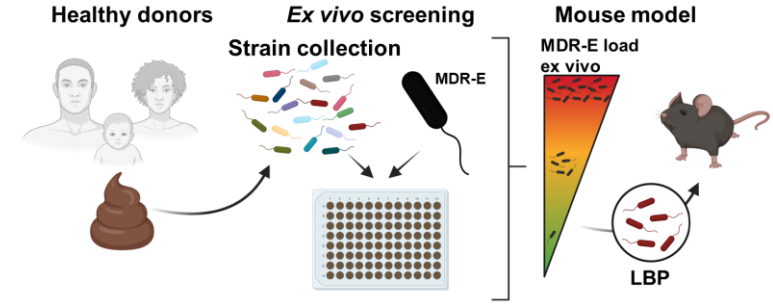
Keywords: Probiotic therapy, multidrug-resistant *E. coli*, gut decolonization, microbiome, Live Biotherapeutic product, hospital-acquired infections

INVENTION NOVELTY

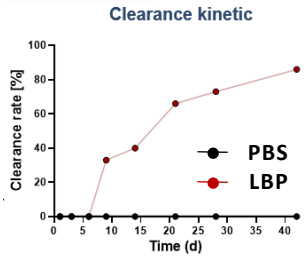
This invention introduces a novel probiotic-based method that utilizes specific commensal *Escherichia coli* strains to target and remove multidrug-resistant (MDR) *E. coli* from the gut. Unlike existing treatments, it offers a non-antibiotic solution, using naturally occurring competitive exclusion to prevent MDR *E. coli* colonization. Using this Live Biotherapeutic Product (LBP) reduces the risks of antibiotic resistance and preserves the gut's natural microbiome.

VALUE PROPOSITION

DeColi offers a groundbreaking alternative to antibiotics, helping to combat the global challenge of antibiotic resistance. By providing an LBP intervention, this technology not only prevents infections with MDR *E. coli* but also supports the recovery of patients' microbiomes after antibiotic treatments. It holds significant promise for immunocompromised patients and individuals at high risk of MDR bacterial infections, reducing hospital-acquired infection rates and the spread of resistant strains.



Decolonization of MDR E. coli was observed after precolonization with LBP.



Protective LBP promotes clearance rates of >80% compared to PBS (phosphate-buffered saline) as negative control.
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TECHNOLOGY DESCRIPTION

The invention employs selected probiotic *E. coli* strains, potentially in combination with strains of the *Klebsiella oxytoca* species complex, to competitively exclude MDR *E. coli* and other MDR-E from the gut. These strains block the colonization of harmful bacteria by occupying the same niche and utilizing similar carbon resources, effectively outcompeting MDR strains. The solution can be used both as a prophylactic and preemptive intervention for patients, particularly after antibiotic treatment or in high-risk healthcare environments.

COMMERCIAL OPPORTUNITY

The LBP can be developed into supplements for human healthcare, focusing on preventing hospital-acquired infections. There is also potential for application in consumer health as part of probiotics and microbiome restoration therapies.

DEVELOPMENT STATUS

Preclinical animal studies have shown effective decolonization of MDR *E. coli* strains with no observed toxicity or adverse effects, validating the efficacy of the DeColi LBP in preventing and treating gut colonization

PATENT SITUATION

A European patent application has been filed under application number EP24182102.4.

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