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Recent advances in single-cell engineered live biotherapeutic products research for skin repair and disease treatment

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Abstract

The human microbiome has emerged as a key player in maintaining skin health, and dysbiosis has been linked to various skin disorders. Amidst growing concerns regarding the side effects of antibiotic treatments, the potential of live biotherapeutic products (LBPs) in restoring a healthy microbiome has garnered significant attention. This review aims to evaluate the current state of the art of the genetically or metabolically engineered LBPs, termed single-cell engineered LBPs (eLBPs), for skin repair and disease treatment. While some studies demonstrate promising outcomes, the translation of eLBPs into clinical applications remains a significant hurdle. Substantial concerns arise regarding the practical implementation and scalability of eLBPs, despite the evident potential they hold in targeting specific cells and delivering therapeutic agents. This review underscores the need for further research, robust clinical trials, and the exploration of current advances in eLBP-based bioengineered bacterial chassis and new outlooks to substantiate the viability and effectiveness of eLBPs as a transformative approach in skin repair and disease intervention. © 2023, The Author(s).

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