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Stem Cell Applications in Medical Biotechnology

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Editorial

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INTRODUCTION

Stem cell research is one of the most promising fields in medical biotechnology. Stem cells, with their self-renewal and differentiation capabilities, offer therapeutic potential in regenerative medicine, genetic disorders, and oncology [1].

Clinical Applications

In India, stem cell transplantation is widely used in treating hematological malignancies and bone marrow failure syndromes. Advances in induced pluripotent stem cells (iPSCs) allow the generation of patient-specific cells, minimizing rejection [2]. Cardiac and neurological applications are under active research. Clinical trials have shown potential benefits of mesenchymal stem cells in cerebral palsy and spinal cord injury [3]. Similarly, stem cell-based therapies for diabetes, where pancreatic beta cells are regenerated, are showing promise [4].

CHALLENGES AND FUTURE

Challenges include high treatment costs, ethical concerns, and lack of uniform regulatory frameworks. Nonetheless, India has initiated guidelines through the Indian Council of Medical Research (ICMR) to regulate stem cell therapies [5].

CONCLUSION

Stem cell biotechnology is redefining therapeutic possibilities. With strong research infrastructure and regulatory oversight, India can become a global leader in stem cell-based medicine

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