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Regenerative Medicine for Muscular Dystrophy**Rafael Torres**

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Muscular dystrophies comprise a group of inherited disorders characterized by progressive skeletal muscle degeneration resulting from genetic mutations affecting muscle integrity. Existing treatments largely focus on symptom management and supportive care, underscoring the need for regenerative therapeutic approaches. Stem cell-based interventions have demonstrated considerable promise in restoring muscle regeneration. Satellite cells, mesenchymal stem cells, and induced pluripotent stem cells have each shown the ability to promote muscle repair through direct differentiation and secretion of bioactive molecules that stimulate endogenous regeneration.

Recent advances combining CRISPR-Cas9 gene editing with patient-derived stem cells enable correction of disease-causing mutations prior to transplantation. Tissue-

engineered muscle constructs further improve cell survival and functional integration following implantation. Preclinical studies demonstrate increased muscle fiber regeneration, reduced fibrosis, improved muscle strength, and enhanced mobility. On-going clinical trials continue evaluating long-term safety, immune responses, and therapeutic efficacy. Future strategies integrating gene editing, biomaterial scaffolds, and personalized stem cell therapies may offer durable treatments capable of slowing or reversing disease progression.

Biography

Rafael Torres is a molecular biologist investigating regenerative therapies for neuromuscular diseases. His work focuses on combining stem cell biology with gene editing technologies to develop innovative treatments for inherited muscular disorders