Abstract

Gene therapy in regenerative medicine offers promising solutions for repairing or replacing damaged tissues and organs. This thesis describes the potential of gene therapy to revolutionize regenerative medicine by enabling targeted interventions at the molecular and genetic levels. The thesis delves into various gene therapy techniques such as viral and non-viral vectors, CRISPR/Cas9 gene editing, and RNA interference highlighting their application in regenerating tissues like bone, cardiac muscle, liver and nervous tissue. Through a review of current research, the thesis analyzes the efficacy, safety, and ethical considerations associated with these therapies, noting key breakthroughs and limitations that impact their translation to clinical practice.

Keywords: viral vector, non-viral vector, CRISPR/Cas9, regenerative medicine, genetic material, gene therapy, stem cell