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Editorial

Introduction to the NASSJ special issue on advances in regenerative therapy for spinal diseases



The spine is a complex and essential component of the human body, responsible for providing structural support, protecting the spinal cord, and facilitating movement. However, the spine is also susceptible to a range of injuries and degenerative conditions that can lead to chronic pain and disability. Regenerative medicine is expected to play a major role in treating this loss of spinal function.

Regenerative therapies targeting the elements that make up the spine can be divided broadly into bone, intervertebral disks, and spinal nerves.

Bone tissue regeneration has a long history of clinical application. Several proteins [1] and peptides [2] are already in widespread clinical use. Numerous studies are ongoing to enhance and improve the efficiency of bone regeneration capabilities. However, bone regeneration is often aimed at achieving bone fusion in spinal fusion procedures rather than at restoring the spine to its original state. Therefore, cytokine and cellular therapies for the intervertebral disks have been reported based on elucidating the cellular functions [3] and metabolic pathways of the disks to regenerate the spine while preserving spinal mobility [4].

In spinal cord research, there have been reports of active regenerative medicine that re-establishes spinal cord conduction pathways by regenerating neurons and their connections [5] rather than the passive approach to attenuate secondary injury mechanisms after spinal cord injury.

Although not in the true meaning of regeneration, this special issue also includes a review paper on advances in robotic assistance from the perspective of restoring motor function. Robotic assistance has emerged as a promising approach to facilitate gait function acquisition in individuals with neurological injuries, disorders, and age-related muscle weakness. It will play an essential role by combining robot technology and artificial intelligence (AI).

Regenerative medicine is spreading and expanding its reach and is still developing rapidly with the rise of new technologies such as genome editing, organoids [6], neuromodulation [7], and AI and data science.

This special issue will help our readers understand the current state of regenerative therapy for spinal diseases, the avenues for future progress, and the implications for spine care.

Declarations of competing interest

The author declare that there is no conflict of interest regarding the content of this manuscript.

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