Biomaterials for Peripheral Nerve Repair - state of the art

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Nerve injuries, especially in the peripheral nervous system (PNS), present a significant challenge due to the limited capacity of nerves to regenerate after severe damage. To address this issue, biomaterials have emerged as an important tool in nerve regeneration, offering innovative solutions to enhance the healing process, support axonal growth, and improve functional recovery. nIn this context, several natural materials like collagen, keratin, silk chitosan and synthetic materials e.g. polylactic acid, polycaprolactone, and polyethylene glycol gained much attention in application in nerve regeneration. Natural materials have intrinsic biocompatibility and bioactivity, making them favourable for nerve regeneration. On the other hand, synthetic materials offer tunable properties, which can be customised to meet specific needs in nerve regeneration.nSummarising, biomaterials are essential in nerve regeneration, offering innovative solutions to support nerve growth, protect regenerating axons, and deliver bioactive molecules. As research in this area progresses, combining biomaterials with stem cells, growth factors, and electrical stimulation may further enhance their efficacy, bringing us closer to more effective treatments for nerve injuries in the peripheral and central nervous systems.