

INSIGHTS INTO NOVEL BIOMATERIALS FOR DURA MATER SUBSTITUTES FOR IMPROVED DURAL CLOSURE

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Abstract:

The dura mater is the toughest and outermost protective layer of the meninges that covers brain tissue and protects it. Major dura mater defects increase the risk of problems such as wound infection, leakage of cerebrospinal fluid, cerebral herniation, etc. Therefore, the use of dural replacements in the reconstruction or repair of the dura mater has important therapeutic implications. The present review describes the detailed anatomical structure, and makeup of the human dura mater and discusses the improvement in dural substitute development to repair damaged dura mater. It also comprehensively outlines the various conventional grafts, including autologous, allogeneic, and xenogeneic based replacements, and their advantages and disadvantages in the restoration of the dura mater. It also highlighted the preclinical and clinical outcomes related to the various reported polymeric dural substitutes that are fabricated through various scaffolding techniques using both natural as well as synthetic polymers like collagen, chitosan, bacterial cellulose, silk fibroin, PCL (polycaprolactone), PLLA (poly (L-lactic acid)), PGA (polyglycolic acid) and Polyurethane. Furthermore, the advancement of composite materials in the making of dural substitutes has also been discussed. Finally, we address the limitations and future directions in creating dura mater substitutes that are therapeutically significant.

References

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