Regenerative medicine for the esophagus

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Abstrak

ABSTRACT
Advances in tissue engineering techniques have made it possible to use human cells as biological material. This has enabled pharmacological studies to be conducted to investigate drug effects and toxicity, to clarify the mechanisms underlying diseases, and to elucidate how they compensate for impaired organ function. Many researchers have tried to construct artificial organs using these techniques, but none has succeeded in growing a whole organ. Unlike other digestive organs with complicated functions, such as the processing and absorption of nutrients, the esophagus has the relatively simple function of transporting content, which can be replicated easily by a substitute. In regenerative medicine, various combinations of materials have been applied, including scaffolding, cell sources, and bioreactors. Exciting results of tissue engineering techniques for the esophagus have been reported. In animal models, replacing full-thickness and full-circumferential defects remains challenging because of stenosis and leakage after implantation. Although many reports have manipulated various scaffolds, most have emphasized the importance of both epithelial and mesenchymal cells for the prevention of stenosis. However, the results of repair of partial full-thickness defects and mucosal defects have been promising. Two successful approaches for the replacement of mucosal defects in a clinical setting have been reported, although in contrast to the many animal models, there are few pilot studies in humans. We review the recent results and evaluate the future of regenerative medicine for the esophagus.