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New Solutions for Old Problems: How Reproductive Tissue Engineering Has Been Revolutionizing Reproductive Medicine
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Abstract
Acquired disorders and congenital defects of the male and female reproductive systems can have profound impacts on patients, causing sexual and endocrine dysfunction and infertility, as well as psychosocial consequences that affect their self-esteem, identity, sexuality, and relationships. Reproductive tissue engineering (REPROTEN) is a promising approach to restore fertility and improve the quality of life of patients with reproductive disorders by developing, replacing, or regenerating cells, tissues, and organs from the reproductive and urinary systems. In this review, we explore the latest advancements in REPROTEN techniques and their applications for addressing degenerative conditions in male and female reproductive organs. We discuss current research and clinical outcomes and highlight the potential of 3D constructs utilizing biomaterials such as scaffolds, cells, and biologically active molecules. Our review offers a comprehensive guide for researchers and clinicians, providing insights into how to reestablish reproductive tissue structure and function using innovative surgical approaches and biomaterials. We highlight the benefits of REPROTEN for patients, including preservation of fertility and hormonal production, reconstruction of uterine and cervical structures, and restoration of sexual and urinary functions. Despite significant progress, REPROTEN still faces ethical and technical challenges that need to be addressed. Our review underscores the importance of continued research in this field to advance the development of effective and safe REPROTEN approaches for patients with reproductive disorders. © 2023, The Author(s) under exclusive licence to Biomedical Engineering Society.

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