

4) Translating tissue-engineered tracheal replacement from bench to bedside

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Abstract

There are a variety of airway diseases with different clinical settings, which may extend from a surgical approach to total organ replacement. Tissue engineering involves modifying cells or tissues in order to repair, regenerate, or replace tissue in the body and seems to be a promising approach for airway replacement. The successful implantation of stem-cell-based tissue-engineered trachea in a young woman with end-stage post-tuberculosis left main bronchus collapse serves as a prototype for the airway tissue-engineered-based approach. The trachea indeed could represent a perfect model system to investigate the translational aspects of tissue engineering, largely due to its low-oxygen needs. This review highlights the anatomy of the airways, the various disease conditions that cause damage to the airways, elaborates on the essential components of the tissue-engineering approach, and discusses the success of the revolutionary trachea transplantation approach.