

1) Bader, A. and Macchiarini, P. (2010), **Moving towards *in situ* tracheal regeneration: the bionic tissue engineered transplantation approach.** Journal of Cellular and Molecular Medicine, 14: 1877–1889. doi: 10.1111/j.1582-4934.2010.01073.x

ABSTRACT: In June 2008, the world's first whole tissue-engineered organ – the windpipe – was successfully transplanted into a 31-year-old lady, and about 18 months following surgery she is leading a near normal life without immunosuppression. This outcome has been achieved by employing three groundbreaking technologies of regenerative medicine: (i) a donor trachea first decellularized using a detergent (without denaturing the collagenous matrix), (ii) the two main autologous tracheal cells, namely mesenchymal stem cell derived cartilage-like cells and epithelial respiratory cells and (iii) a specifically designed bioreactor that reseed, before implantation, the *in vitro* pre-expanded and pre-differentiated autologous cells on the desired surfaces of the decellularized matrix. Given the long-term safety, efficacy and efforts using such a conventional approach and the potential advantages of regenerative implants to make them available for anyone, we have investigated a novel alternative concept how to fully avoid *in vitro* cell replication, expansion and differentiation, use the human native site as micro-niche, potentiate the human body's site-specific response by adding boosting, permissive and recruitment impulses in full respect of sociological and regulatory prerequisites. This tissue-engineered approach and ongoing research in airway transplantation is reviewed and presented here.