

Multifunctional cell-assembled biomaterials

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Abstract

Advanced therapy medicinal products put forward the notion that tissue repair and regeneration can be accomplished best by recruiting the cells' innate proficiency to create their own tissue-specific extracellular matrix with a precision and stoichiometric efficiency still unmatched by man-made devices. This unprecedented clinical success has been attributed to the secreted, intertwined network of deposited extracellular matrix, which increases cell survival rate by protecting them and also acts as a biological glue, enabling localised delivery of the cells and their bioactive and rich in trophic factors secretome. Despite the striking in various clinical indications outcomes, only a handful of products have been commercialised. This limited technology transfer from bench-top to clinic has been attributed to the prolonged cell culture time required to develop an extracellular matrix rich implantable device (up to 196 days), which is associated with cell phenotype loss and senescence. This talk will advocate the use of macromolecular crowding, alone or in combination with other *in vitro* microenvironment modulators (e.g. oxygen tension, growth factor supplementation), for the accelerated development of multifunctional biomaterials.

Biography

Dimitrios I. Zeugolis is the Director of the Regenerative, Modular & Developmental Engineering Laboratory (REMODEL) at National University of Ireland Galway, Ireland and University of Ioannina, Greece. Dimitrios is President-elect of Matrix Biology Ireland and Editorial Committee member-elect of the Tissue Engineering and Regenerative Medicine International Society. Dimitrios has authored >100 peer-reviewed articles, >400 peer-reviewed conference papers and >15 peer-reviewed book chapters. He is on the editorial board of >10 journals and acts as reviewer for >130 journals and >30 funding agencies. Dimitrios has chaired / co-chaired >15 conferences and >50 symposia and has acted as advisor in >25 conferences. Dimitrios has secured 2 patents and founded 2 companies. He has conducted research for >40 companies and has been involved in the development and commercialisation of numerous food and medical device products.

