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Osteo differentiation of intact amniotic membrane and outcome for tissue engineering

Florelle Gindraux

University Hospital of Besançon, France

The human amniotic membrane (hAM) is known to have a good potential for tissue regeneration, as a scaffold containing mesenchymal stromal cells (MSC) and growth factors, with low immunogenicity, anti-microbial, anti-inflammatory, anti-fibrotic and analgesic properties. Several case reports relate its use for oral and maxillofacial surgery (vestibuloplasty; guided bone regeneration and buccal defects).

Based on previous findings reporting the possibility to osteodifferentiate whole tissue (Lindenmair et al. 2010), we aimed to use hAM as a bioactive membrane for bone repair. In this study, we sought to confirm its *in vitro* osteogenic potential and to observe the effects of the culture on cell function and phenotype. At the same time, we aimed to develop simple and rapid phenotypic and functional controls, which could be easily implemented in a tissue bank, in order to qualify cultured hAM. Finally, we evaluated the *in vivo* biocompatibility of cultured hAM.

Results showed that hAM could be osteo differentiated *in vitro* by an osteogenic medium and presented an apparently osteocyte phenotype. Moreover, the culture, especially in this condition, led to structural alterations of epithelium related to modification of cell function, very probably beneficial for bone repair. We report that phenotype could be easily determined by von Kossa staining and that cultured, especially osteo differentiated, hAM did not involve *in vivo* allogenic reaction, testifying to its good biocompatibility.

Biography

Florelle Gindraux graduated with Masters (in 2001) and a PhD degree (2007) from the University of Franche-Comté (Besançon, France). She performed a post-doctoral internship for 2 years as R&D Project manager with TBF (Tissue Bank of France) in Mions-Lyon, France, where she developed her Ph.D. project. i.e. the development of an advanced therapeutic medicinal product for bone repair using Mesenchymal Stem Cells (MSCs). She is specialized in bone repair (for orthopaedic and maxillo-facial surgeries) and more generally for other tissue repair (cartilage, ligament, tendon, dental pulp, teeth, skin). For the last 6 years, she has been working at the University Hospital of Besançon and the University of Franche-Comté where she combines R&D with clinical research on MSCs (from perinatal tissue) and biomaterials for tissue regeneration. Florelle Gindraux is currently EORS (European Orthopaedic Research Society) Ambassador for France and is co-organizing the next meeting to be held in Nantes in July 2014. She has authored 35 international publications (6 Pubmed cited); 14 Book chapters; 2 Books; as well as 27 international & 34 national communications (as presenting author). Florelle Gindraux has also obtained 3 awards for her previous work.

fgindraux@chu-besancon.fr