

5<sup>th</sup> International Conference on

# Tissue Engineering & Regenerative Medicine

September 12-14, 2016 Berlin, Germany

## Combination of drug and cell delivery to stimulate spinal cord repair

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**T**raumatic spinal cord injuries (SCI) cause devastating neurological deficits and disabilities. Symptoms vary greatly, ranging from pain and paralysis. We focus on drug and cell delivery for spinal cord repair following traumatic SCI. We incorporated FGF-2 and VEGF in scaffolds, and GDNF and VEGF in hydrogels and studied their impact on spinal cord injury and functional recovery. We observed a functional recovery of rats treated with GDNF. In order to further stimulate spinal cord repair, our approach is to combine drug and stem cells with hydrogels, to ensure local delivery of drugs and survival of cells at the injury site. Human dental stem cells from the apical papilla (SCAP) have been selected based on their origin (neural crest) and ease of access. We first assessed the impact of SCAP encapsulation in different hydrogels. We then compared *in vivo* the influence of SCAP delivery with the implantation of the whole tissue they originate from (apical papilla) in a rat spinal cord hemisection model. Functional recovery was observed in the group treated with the papilla. Genomic and proteomic analysis are being performed to identify the markers involved. Second, SCAP were grown on growth factor-loaded microcarriers and embedded in hydrogel. Impact on cell survival and gene expression is being studied, after which the system will be implanted in a SCI model. In conclusion, we are developing a multidisciplinary approach based on the combination of drug and cell delivery to stimulate spinal cord repair.

### Biography

Anne des Rieux has completed his PhD in 2006 from Université Catholique de Louvain (UCL), Belgium and performed her Post-doctoral study at the Northwestern University, Chicago. She is an Associate Professor at UCL and is developing a team within the Louvain Drug Research Institute (LDRI). She has published more than 30 papers in reputed journals.

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