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Will matrix therapy pave the way to cell therapy and regenerative medicine?

Matrix therapy is a newly coined name to emphasis the importance of the extracellular matrix in regenerative medicine. It is a complement to regeneration as cells are never alone but are part of an environment that makes a tissue or an organ. Heparan sulfates (HS) are key elements of the extracellular matrix (ECM) which store and protect various cell communication peptides (CCP). HS play a central role in tissue homeostasis by modulating the bioavailability of CCP hence controlling the cell migration and differentiation required for healing processes. Tissue injury will lead to destruction of cells and surrounding ECM is destroyed. CCPs synthesized by inflammatory and circulating cells can then promote tissue repair but with a loss of tissue quality, leaving scars or fibroses. We have engineered biodegradable nano-polymers mimicking the HS. They bind to the structure proteins of the damaged ECM and to the CCP produced by healthy neighboring cells thereby restoring the ECM microenvironment and tissue homeostasis. This matrix therapy approach has considerably improved the quality of healing in various animal models with reduction or absence of fibrosis resulting in a real regeneration process. These HS mimetic have therefore been named RGTA for ReGeneraTing Agents. The RGTA technology has been validated in over 80 published preclinical studies and is now marketed as a human healing agent both for corneal and skin ulcers. RGTA are in development for more tissue injuries including mucosa, tendon and muscle. Altogether these studies underline the potential of RGTAs as a new therapeutic class in the field of regenerative medicine, simple safe and exploiting our natural potential without need for exogenous cells supply but can combine with cell therapy to restore cellular microenvironment and favor homing. The future of regenerative medicine lays in a proper adjustment of the microenvironment to optimize cell colonization, expansion, replacement and recovery of the functions.

Biography

Denis Barritault has Graduated in Physics, completed his PhD in Biochemistry in Paris University, Postdoctoral studies in Molecular Immunology at Pasteur Institute and NYU as NIH Fogarty Fellow, he joined INSERM unit in Paris as Developmental Biologist. He made the first description and patents of FGF extracted from retina in 1979 and 82 as skin and cornea healing agent. He became Full Professor at Paris Est University in 1985 and Founded and Directed a CNRS Laboratory on cell and tissue regeneration until 2003. He is now President of OTR3, Emeritus Professor and author in over 200 publications and 31 patents.

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