Ayan Samanta, J Material Sci Eng 2018, Volume: 7
DOI: 10.4172/2169-0022-C10-118

4th International Conference on

Polymer Chemistry

June 25-27, 2018 | Stockholm, Sweden

Ayan Samanta

Uppsala University, Sweden

Biomedical Applications of ECM derived polymers

Extracellular matrix (ECM) derived polymers have proven to be extremely useful in preparing scaffolds for tissue regeneration in vivo. Hydrogels manufactured from such polymers have the advantage of having high compatibility with cells in vitro and in vivo. Moreover, such polymers are entirely degraded inside the body and therefore, can be used for long-term in vivo applications. Collagen is the most abundant component in ECM, and therefore, collagen-based biomaterials have gained enormous importance in regenerative medicine in recent years. We have developed collagen-based, acellular biomaterials which can be used as an alternative to donor cornea transplantation and can promote regeneration of a damaged cornea. Hence, the need for donor organs, which are always under shortage, can be minimised. Since our approach is cell-free, it facilitates the regulatory acceptance. We have established the usefulness of our strategy by treating corneal blindness in animal model and limited clinical trials in patients. A major drawback of the currently developed corneal implants is their poor mechanical strength and the need to use the full-length protein such as collagen which is difficult to handle. Hence, our current approach includes the use of synthetic degradable polymers to fabricate tough hydrogels with molecular elements of stress distribution and energy dissipation. Such tough hydrogels can be handled as easily as a donor cornea and therefore, will potentiate the widespread use of this technique. Towards the end, we will also demonstrate the application of our acellular biomaterials for cardiac regeneration.

Biography

Ayan Samanta has completed his PhD from Heidelberg University, Germany in 2012. His doctoral work was focused on different aspects of nucleic acid chemistry. After several years of postdoctoral training in Heidelberg University, the University of Tübingen, and Linköping University, he has moved to Uppsala University where he currently holds a Senior Researcher and Principal Investigator position. His team employs chemical tools to solve biological and medical problems. The main research focus of his lab is biomaterial-induced corneal and cardiac regeneration. Currently, the lab also focuses on the green synthesis of polymers.

ayan.samanta@kemi.uu.se

Notes: