



## Re: Utilization of Glycosaminoglycans/Proteoglycans as Carriers for Targeted Therapy Delivery

Misra S<sup>1</sup>, Hascall VC<sup>2</sup>, Atanelishvili I<sup>3</sup>, Moreno Rodriguez R<sup>1</sup>, Markwald RR<sup>1</sup>, Ghatak S<sup>1</sup>

<sup>1</sup>Medical University of South Carolina, Department of Regenerative Medicine and Cell Biology, Charleston, USA

<sup>2</sup>Lerner Research Institute, Cleveland Clinic, Clinic of Biomedical Engineering/ND20, Cleveland, USA

<sup>3</sup>Medical University of South Carolina, Department of Medicine, Division of Rheumatology and Immunology, Charleston, USA

Int J Cell Biol 2015;2015:537560. doi: 10.1155/2015/537560.

### EDITORIAL COMMENT

Cell traffic in extracellular matrices (ECMs) is an essential process during development, wound healing and malignancies. Dynamic ECMs form the microenvironment around cells and are composed of collagens, glycoproteins, glycosaminoglycans (GAGs), and proteoglycans (PGs). The ECMs produced by epithelial and stromal cells provide mechanical and structural support and are involved in the regulation of cell morphology, metabolism, differentiation, migration, and survival. GAGs have a critical role in assembling protein-protein complexes such as growth factor-receptor or enzyme-inhibitor interactions on cell surface and in ECMs. PGs are proteins with a variable number of GAG side chains (i.e. chondroitin/dermatan sulfate, heparin/heparan sulfate, keratan sulfate). Hyaluronan, a GAG, is synthesized without a core protein and major component in the ECM of most mammalian tissues, and accumulates in cell division and remodeling that occurs during morphogenesis, inflammation and tumorigenesis. Hyaluronan regulates proliferation and motility through its receptor CD44. Moreover, CD44 is the most prevalent cell surface marker of cancer stem cells. As we well know, GAGs/PGs are constitutional elements of the bladder histology and physiology. Recently, GAGs are utilized in nanoscale drug delivery systems to deliver cargo, systemically or locally, loaded with drugs for cancer treatment. For example, paclitaxel with hyaluronic acid 10–12 kDa components for antimetabolic delivery in bladder carcinoma cells has been reported. Therefore, in the near future GAGs/PGs as carriers for targeted therapy delivery will be more effective modality against bladder cancer.

Fehmi Narter, MD, PhD