SEMI-SYNTHETIC PATHWAYS TO OBTAIN GLYCOSAMINOGLYCANS MIMETICS FROM SUSTAINABLE SOURCES

Fabiana Esposito, Serena Traboni, Alfonso Iadonisi, Emiliano Bedini

Department of Chemical Sciences, University of Naples Federico II Complesso Universitario Monte S. Angelo, via Cintia 4, I-80126 Napoli, Italy
fabiana.esposito3@unina.it

Sulfated glycosaminoglycans (GAGs) are highly complex, anionic, linear polysaccharides extracted from extracellular matrix of animals cells. Some of them are exploited in already approved therapeutic treatments, and a significant number of novel drugs are currently under development [1]. Nonetheless, naturally occurring GAGs exhibit variable chemical compositions and biological activities, which could cause unpredictable results during applications (*e.g.* heparin crisis in 2007). However, sulfated polysaccharides can also be obtained in a semi-synthetic way: the introduction of sulfate groups into the backbones of natural unsulfated polysaccharides allows to endow them with bioactivities similar to sulfated GAGs but without risks derived from their typical animal sources [2]. This work is focused on the development of semi-synthetic strategies for the regioselective modification of polysaccharides to obtain new polysaccharide-based products, which can be proposed as substitutes for GAG-based drugs already existing but obtained from less eco-sustainable sources.
The regioselective derivatizations that are carried out aim at the insertion of negatively charged functionalities (sulfate or phosphate groups, Figure 1), in order to mimic the structural characteristics of natural GAGs. The starting materials are polysaccharides extracted from bacterial or algal sources. In particular, the attention is focused on the development of suitable multi-step sequences all relying upon protection-derivatization-deprotection sequences [3,4].

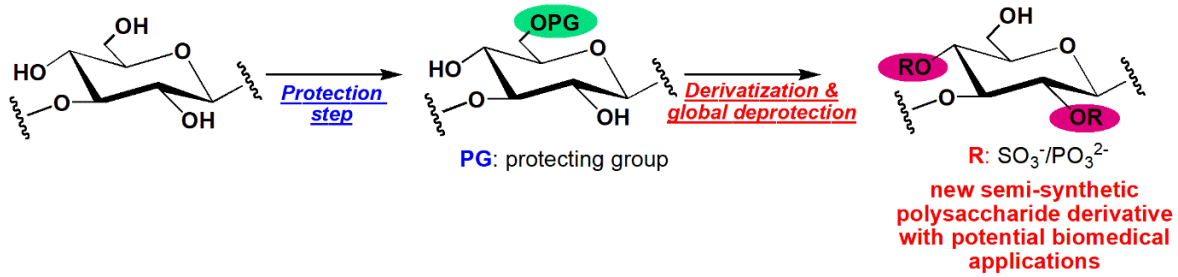

Figure 1

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