Accepted Manuscript

Title: Synthesis and anti-inflammatory activity of gold-nanoparticle bearing a dermatan sulfate disaccharide analog

Authors: Chengxiang Shang, Chao Cai, Cuixia Zhao, Yuguo Du

PII: S1001-8417(17)30214-0
DOI: http://dx.doi.org/doi:10.1016/j.cclet.2017.06.010
Reference: CCLET 4104

To appear in: *Chinese Chemical Letters*

Received date: 27-3-2017
Revised date: 23-4-2017
Accepted date: 2-6-2017

Please cite this article as: Chengxiang Shang, Chao Cai, Cuixia Zhao, Yuguo Du, Synthesis and anti-inflammatory activity of gold-nanoparticle bearing a dermatan sulfate disaccharide analog, Chinese Chemical Lettershttp://dx.doi.org/10.1016/j.cclet.2017.06.010

Communication

Synthesis and anti-inflammatory activity of gold-nanoparticle bearing a dermatan sulfate disaccharide analog

Chengxiang Shang [a,b], Chao Cai [a,c], Cuixia Zhao [a,b], Yuguo Du [a,b,*]

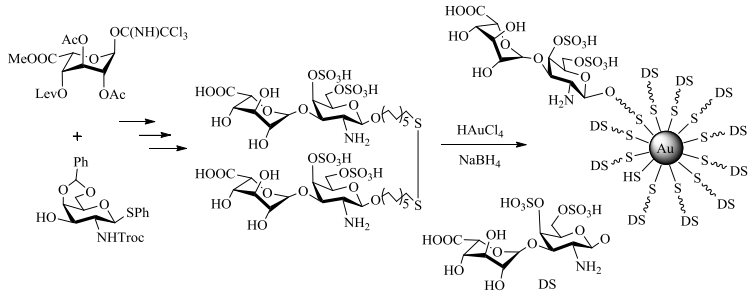
[a]*State Key Laboratory of Environmental Chemistry and Eco-toxicology, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences, Beijing 100085, China,*

[b]*School of Chemistry and Chemical Engineering, Graduate University of Chinese Academy of Sciences, Beijing 100049, China,*

[c]*Key Lab of Marine Drugs, Ministry of Education of China, School of Medicine and Pharmacy, Ocean University of China, Qingdao 266003, China*

[*] Corresponding author.
E-mail address: duyuguo@rcees.ac.cn (Y. Du).

Graphical abstarct



A novel gold glyconanoparticle coating with DS disaccharide analog has been synthesized, and the potential anti-inflammatory activity was studied using carrageenan-induced paw edema model.

ARTICLE INFO

Article history:
Received
Received in revised form
Accepted
Available online

Keywords:
L-Iduronic acid
Gold glyconanoparticles
Dermatan sulfate disaccharide
Anti-inflammatory
Carbohydrates

ABSTRACT

A dermatan sulfate (DS) repeating disaccharide analog, α-L-idopyranosiduronate-(1→3)-2-amino-2-deoxy-4,6-di-*O*-sulfo-β-D-galactopyranoside, has been convergently synthesized and successfully applied to prepare the GAG-functionalized gold glyconanoparticle. This new material exhibited good anti-inflammatory activity which was comparable to that of the drug ibuprofen incarrageenan-induced paw edema in a rat model.

Gold nanoparticles [1] have many potential applications in the fields of chemistry and medicine development, and their affinity for binding many biological carbohydrate molecules can readily generate glyconanoparticles (GNPs) [2], which are atmospheric stable, water-soluble and carbohydrate-functionalized nanoclusters [3-5]. A novel Neu5Ac-Gal-containing neoglycoside for the exploration of anticancer antigen has been accomplished using modified gold glyco-nanotechnology in our laboratory [6].

Dermatan sulfate (DS), the linear and sulfated polysaccharides belonging to the family of glycosaminoglycans (GAGs) [7], is mainly composed of a repeating disaccharide motif of uronic acid such as D-glucuronate (GlcA) or L-iduronate (IdoA)] and *N*-acetylgalactosamine (GalNAc) residues, which play the important roles in a diverse set of biological processes including cellular proliferation and differentiation, wound healing, anticoagulant, antithrombotic, and anti-inflammatory activities [8]. GAGs-containing nanoparticles bound to Au and Ag still retain their original biological activities and can be localized to prevent rapid diffusion into body like other drugs [9-11]. Moreover, chemical synthesis may avoid the potential crisis caused by impurities that