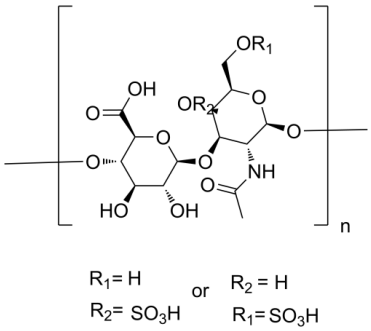
Data Sheet

Product Name:	Chondroitin sulfate
Cat. No.:	CS-6354
CAS No.:	9007-28-7
Molecular Formula:	$(C_{14}H_{21}NO_{14}S)n$
Target:	Endogenous Metabolite; MMP; NO Synthase
Pathway:	Immunology/Inflammation; Metabolic Enzyme/Protease
Solubility:	H_2O : ≥ 50 mg/mL



BIOLOGICAL ACTIVITY:

Chondroitin sulfate, one of five classes of glycosaminoglycans, has been widely used in the treatment of osteoarthritis. Chondroitin sulfate reduces inflammation mediators and the apoptotic process and is able to reduce protein production of inflammatory cytokines, **iNOS** and **MMPs**. IC50 & Target:iNOS[1] MMPs[1] ***In Vitro:*** Chondroitin sulfate is a class of sulfated glycosaminoglycans that are linear polysaccharides consisting of repeating disaccharide units composed of uronic acid and N-acetylhexosamine. Several pathogens including parasites, bacteria, and viruses have been shown to utilize cell surface chondroitin sulfate chains to attach to and infect host cells[1]. Chondroitin sulfate occurs naturally in the extracellular matrix of connective tissues, e.g., bone, cartilage, skin, ligaments and tendons. Chondroitin sulfate has been shown to elicit a range of beneficial effects: anti-inflammatory effects, an increase in type II collagen and proteoglycans, a reduction in bone resorption and a better anabolic/catabolic balance in chondrocytes[2]. A large range of chondroitin sulfate concentrations has been used (e.g. 12.5 to 2000 mg/mL, but generally less than200 mg/mL) in ***in vitro*** studies. Chondroitin sulfate (200 mg/mL) decreases the chondrocyte susceptibility to single nucleotide polymorphism-induced apoptosis[3]. Chondroitin sulfate reduces inflammation mediators and the apoptotic process and is able to reduce protein production of inflammatory cytokines, iNOS, MMPs[4]. ***In Vivo:*** The high content of chondroitin sulfate in the aggrecan plays a major part in allowing cartilage to resist tensile stresses during various loading conditions by providing this tissue with resistance and elasticity. It has been shown that chondroitin sulphate interferes with the progression of structural changes in joint tissues and is used in the management of patients with osteoarthritis[3]. Chondroitin sulfate is mostly administered orally at doses ranging from 800 to 1200mg/day. Chondroitin sulfate is rapidly absorbed by the gastrointestinal tract. The absorbed chondroitin sulfate reaches the blood compartment as 10% chondroitin sulfate and 90% depolymerized low-molecular-weight derivatives[5].

PROTOCOL (Extracted from published papers and Only for reference)

Cell Assay: [4]Chondrocytes are cultured into six-well culture plates. 12 hours after plating, the culture medium is replaced with 2.0 mL of fresh medium containing LPS at a concentration of 50 mg/mL. 4 hours later, HA, Chondroitin sulfate, HS, keratan sulphate and DS are added separately to each of the wells at concentrations of 0.5 and 1.0 mg/mL. The number of viable chondrocytes is then quantified by trypan blue dye exclusion test from several randomly chosen areas of each well[4].

References:

[1]. Mikami T, et al. Biosynthesis and function of chondroitin sulfate. Biochim Biophys Acta. 2013 Oct;1830(10):4719-33.

[2]. Martel-Pelletier J, et al.Discrepancies in composition and biological effects of different formulations of chondroitin sulfate. Molecules. 2015 Mar 6;20(3):4277-89.

[3]. Monfort J, et al. Biochemical basis of the effect of chondroitin sulphate on osteoarthritis articular tissues. Ann Rheum Dis. 2008 Jun;67(6):735-40.

[4]. Campo GM, et al. Glycosaminoglycans modulate inflammation and apoptosis in LPS-treated chondrocytes. J Cell Biochem. 2009 Jan 1;106(1):83-92.

[5]. Henrotin Y, et al. Chondroitin sulfate in the treatment of osteoarthritis: from in vitro studies to clinicalrecommendations. Ther Adv Musculoskelet Dis. 2010 Dec;2(6):335-48.

CAIndexNames:

Chondroitin, hydrogen sulfate

SMILES:

O=S(O)=O.O=S(O)=O.OC([C@@H]1[C@@H](OC)[C@H](O)[C@@H](O)[C@H](O[C@@H]2[C@@H](NC(C)=O)[C@H](OC)O[C@H](CO[R])[C@@H]2O[R])O1)=O.[R].[R].[=].[=].[R2=].[R1=].[n].[or]

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