Occurrence of 2,4-disulfate fucose branches is the major motif for the anticoagulant action of fucosylated chondroitin sulfate


INTRODUCTION: Fucosylated chondroitin sulfate (fucCS) is a unique glycosaminoglycan obtained from sea cucumbers, composed of a chondroitin sulfate-like core and branches of sulfated fucose. We now obtained this glycosaminoglycan from different species. Their structures and anticoagulant activities were compared.

MATERIAL AND METHODS: These polysaccharides were compared using anion exchange and gel permeation chromatographies. Their structures were determined using one and two dimensional NMR spectroscopy. The anticoagulant and antithrombotic activities were compared using a variety of in vitro and in vivo assays.

RESULTS AND DISCUSSION: The various fucosylated chondroitin sulfates showed a similar central core, composed of chondroitin sulfate-like structure. Units of 2,4-disulfated fucose are present in the branches of the polysaccharides from the four species. However, some species contains also other fucose units with distinct sulfation patterns in their branches. Thus, fucosylated chondroitin sulfate from Isostichoppus badianotus and Patalus mollis have simple branches of 2,4-disulfated fucoses while those from Ludwigothuria grisea and Cucumaria frondosa have additional fucose units with a single sulfate ester in their branches. When tested on coagulation assays and on model of thrombosis using experimental animals the four fucosylated chondroitin sulfated showed similar effects.

CONCLUSION: Our results indicate that the occurrence of 2,4-disulfated fucose branches is the preponderant structure motif for the anticoagulant and antithrombotic effects of these polysaccharides.

Palavra chave: sea cucumber, fucosylated chondroitin sulfate, anticoagulant activity

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