

# Carrageenan

Subjects: **Biochemistry & Molecular Biology**

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Carrageenan (CGN) is a sulfated galactose copolymer composed of alternating units of D-galactose and 3,6-anhydro-galactose joined by  $\alpha$ -1,3 and  $\beta$ -1,4-glycosidic linkages.

carrageenans

immunomodulators

antioxidants

polyelectrolyte complexes

drug delivery

## 1. Introduction

CGN is classified into various types such as  $\lambda$ ,  $\kappa$ ,  $\iota$ ,  $\epsilon$ ,  $\mu$ , depending on the amount and location of sulfate groups as well as the presence or absence of 3,6-anhydro-galactose units<sup>[1]</sup>.

## 2. Applications

CGNs have diverse activities including immunomodulatory<sup>[2]</sup>, anticoagulant<sup>[3]</sup>, antithrombotic<sup>[4]</sup>, antiviral<sup>[5]</sup>, and antitumor effects<sup>[6]</sup>. In recent years, CGNs have been increasingly used for pharmaceutical purposes. CGNs are one source of soluble dietary fibers<sup>[7]</sup>. Standard animal safety studies in which CGN was administered in diet showed no adverse effects<sup>[8]</sup>. Due to their biocompatibility, safety (USP35-NF30S1, BP2012, EP7.0), availability, wide range of biological activity, a simple thermo-reversible gelation mechanism, viscoelastic properties and the ability to form complexes with polycations via electrostatic interactions, CGNs are ideal components to obtain new vehicles for the delivery therapeutic substances that can be retained at mucosal surfaces and release the drug slowly<sup>[9]</sup>.

Marine polysaccharides stimulate different types of immune system cells, both in vitro and in vivo, to produce and secrete molecules with immunostimulatory effects<sup>[10][11]</sup>. CGNs have been demonstrated to play an important role as free-radical scavengers and antioxidants for the prevention of oxidative damage in living organisms<sup>[12]</sup>. Our studies on the antioxidant capacity of CGN<sup>[13]</sup> have shown that the activity of carrageenans depends on the polysaccharide structure. Hence, they have therapeutic potential for the treatment of immunological disorders.

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