Structure and antiviral activity of an acidic polysaccharide from an edible blue-green alga, *N. flagelliforme*

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Recently, the development of antiviral agents possessing novel mechanisms of action has been required since many kinds of infectious diseases have become one of serious problems in our society. In the present study, we isolated a novel acidic polysaccharide, nostoflan (NSF), from a terrestrial blue-green alga, *Nostoc flagelliforme*, and examined its structure and antiviral activity.

Sugar composition and methylation analyses of NSF revealed that it was mainly composed of →4)-D-Glc*p*-(1→, →6,4)-D-Glc*p*-(1→, →4)-D-Gal*p*-(1→, →4)-D-Xyl*p*-(1→, D-GlcA*p*-(1→, D-Man*p*-(1→ with a ratio of ca. 1:1:1:1:0.8:0.2. Oligosaccharide analysis after partial acid hydrolysis of NSF revealed that this polysaccharide might be mainly composed of the sugar sequences of →4)-β-D-Glc*p*-(1→4)-D-Xyl*p*-(1 and →4)-[β-D-GlcA*p*-(1→6)-]-β-D-Glc*p*-(1→4)-D-Gal*p*-(1→. NSF showed potent antiviral activities against several enveloped viruses including herpes simplex virus type 1, type 2 (HSV-1, HSV-2), human cytomegalovirus, and influenza A virus (IFV). NSF selectively inhibited the attachment of HSV-1 to host cells but not its penetration phase. In experimental animal study where IFV-infected mice received NSF intranasally, the mortality of mice were significantly decreased. Neutralizing titers in sera of mice treated with NSF were higher than that treated with oseltamivir. From these results, NSF was found to be a novel polysaccharide which shows antiviral activity either in vitro and in vivo in spite of a non-sulfated polysaccharide.