

Screening of antiangiogenic polysaccharides from marine algae and the mechanism of inhibitory effect

Kiminori Matsubara, Masaharu Mori

Departments of Nutritional Science and Nursing, Okayama Prefectural University

Summary

Angiogenesis is forming new blood vessels from existing blood vessel and has important role in physiological processes. In addition, angiogenesis is involved in several pathological conditions, including tumor growth and metastasis, atherosclerosis and diabetic retinopathy. Inhibitory agents for angiogenesis are very useful to prevent such diseases. Some sulfated polysaccharides are potent antiangiogenic agents. Marine algae have been recognized as valuable resource of sulfated polysaccharides and some of them have strong anticoagulant activity. However, there are few reports on their antiangiogenic effect. We screened the activity of anticoagulant polysaccharides isolated from marine algae using an *in vitro* rat aortic ring assay. Three anticoagulant polysaccharides were isolated, and one polysaccharide from a marine green alga, *Codium cylindricum* showed antiangiogenic activity. The anticoagulant was sulfated galactan. We also examined their effect on human umbilical vein endothelial cells (HUVEC) tube formation assay. Sulfated galactan from *C. cylindricum* inhibited HUVEC tube formation, however others had no effect. The sulfated galactan completely inhibited HUVEC tube formation at 30 $\mu\text{g/ml}$. At the inhibitory concentrations on HUVEC tube formation, the sulfated galactan had almost no effect on HUVEC proliferation. Therefore, the sulfated galactan exerts its antiangiogenic activity through inhibiting endothelial cell tube formation. These results show that sulfated galactan from *C. cylindricum* could be a valuable algal polysaccharide to design new antiangiogenic agents and to be used as functional food material.