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A Novel Polynucleotide/polysaccharide Triple Helix and its Application to a Gene Carrier

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Schizophyllan is a polysaccharide that belongs to a β (1→3)- glucan family and has been known to activate the immunity system. This paper reports our new finding that schizophyllan forms a stoichiometric macromolecular complex with single-stranded polynucleotides. Accompanying with the complexation, the circular dichroism for polynucleotides is dramatically changed (see Fig 1). This feature indicates that polynucleotides undergo a conformational transition. Stoichiometric study suggests that two schizophyllan chains and one polynucleotide chain form a triple helix. X-ray crystallography and molecular mechanics for the complex confirm the triple helix formation. The complex protects the bound polynucleotide from hydrolysis by ribonucelases. Recently, we successfully demonstrated possibility to apply schizophyllan to a new gene carrier with a biological assay system as shown by Fig 2.

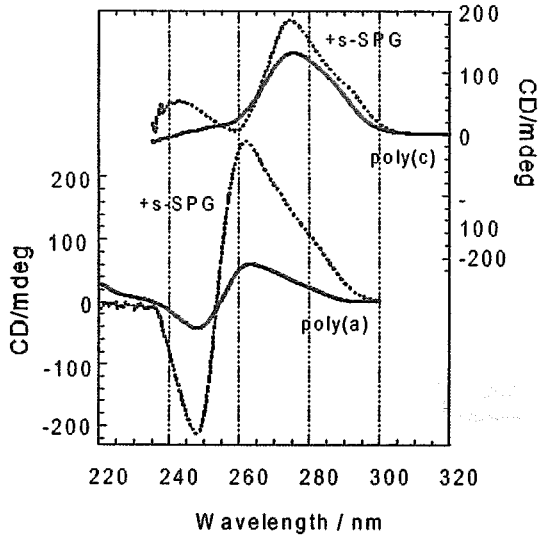

Figure 1. Change of the CD spectra upon the complexation between s-SPG&poly(C) and s-SPG&poly(A)

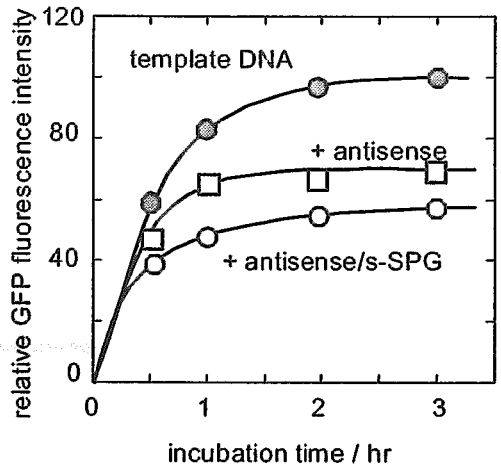

Figure 2. Inhibition of GFP transcription/translation by the s-SPG/antisense DNA carrier.

References
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