The selection of the aptamer for sialic acid and its applications as competitor from sialidase and allosteric aptazyme sensor

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Sialic acid is located on cell surface and it is related in spreading, or metastasis of various cancer cells and infection of pathogen[1)]. In the study, the RNA aptamer for sialic acid was developed by *in vitro selection* for 10^{th} cycle. Generated aptamer had high affinity of Kd = 1.35 nM and binding site of sialic acid containing loop by RNAse footprinting assay was searched. With developed aptamer, we can protect sialylated glycan completely from sialidase, hydrolyzing sialic acid modified glycan. Previously, the fusion molecule(i.e. aptazyme) of aptamer and hammerhead ribozyme[2)] was developed as *in situ* sensor. The advantages of allosteric ribozyme sensor are that sandwich detection method used commonly with antibody can be avoided, real time analysis of target molecules could be available in solution state without purification step, and target molecule could be detected in several seconds to several minutes. To apply as sensor with recognition property of the aptamer, allosteric ribozyme was produced by conjugation the aptamer and ribozyme having catalytic activity of self cleavage. This sensor could detect sialic acid without permethylation or fluorescence tagging until 20 nM. In addition, it showed high catalytic activity selectively on only sialyloligosaccharides. As a result, aptamer-based sensor using allosteric ribozyme can detect rapidly sialic acid at natural state without hindrance by property of analytes. The general principle could form the basis of a new generation of i*n vitro* assay for sialic acid.

References

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