Facile detection of cancer cell-derived exosomes by split aptamers

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Circulating exosomes derived from cancer cells have attracted attention as a new biomarker for liquid biopsy [(1-3)]. Among the other cancer biomarkers, exosomes have some advantages for the diagnosis. (i) Exosomes include a variety of biomolecules, such as nucleic acids, membrane proteins, and lipids and reflect the pathological state of their parental cells. In particular, CD63 and EpCAM, which are membrane proteins over-expressed on the cancer cell membranes, are potential biomarkers for cancer diagnosis. (ii) Exosomes are stable under physiological conditions due to their lipid bilayer membrane. (iii) A considerable amounts of exosomes ($\sim 10^9$ particles/mL) is released from tissues and cells to body fluids. Therefore, exosomes are expected as biomarkers for early detection of cancers. However, despite the above advantages, there are some drawbacks. (i) Exosome recovery is time-consuming. (ii) It is difficult to detect exosomes in high-throughput.

In this study, we challenged to identify split aptamers for selective detection of membrane proteins included in cancer-derived exosomes and to develop exosome-detecting systems using the split aptamers for cancer diagnosis.

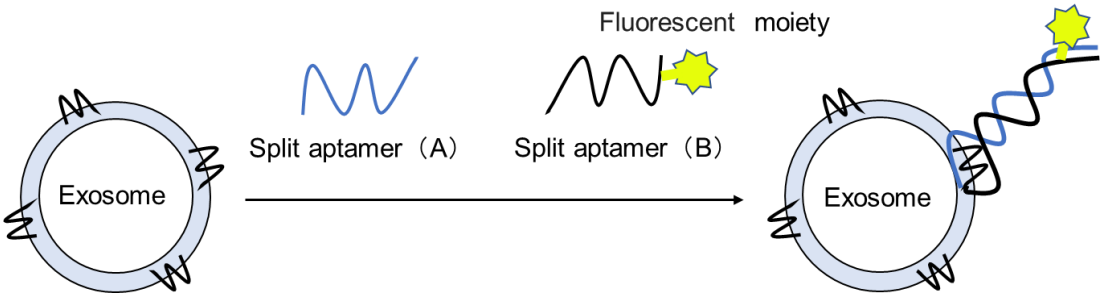

Figure 1. Schematic diagram of the binding of split aptamers A and B to biomarkers localized on the surface of exosomes.

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