

A development of molecular sensor that delivers environmental information to inside of vesicle-based molecular robots

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In the molecular robotics project, a planned molecular robot that is based on a vesicle or a gel as a body consists of molecular sensors, molecular computers, and molecular actuators. These components are communicated with single-stranded DNAs each other. We covered a development of molecular sensor that was a conjugated molecule between DNA strands and lipid.^[1] This sensor molecule located on a surface of vesicle could hybridize with a complementary DNA/RNA strand that represented an environmental information. The hybridization caused a shape change of the molecular sensor, consequently a single-stranded DNA was released into an inner water pool of vesicle. The released DNA was a trigger for molecular computers encapsulated in the vesicle.

[1] P. Barton, C. A. Hunter, T. J. Potter, S. J. Webb, and N. H. Williams *Angew. Chem. Int. Ed.* **2002**, *41*, 3878-3881.