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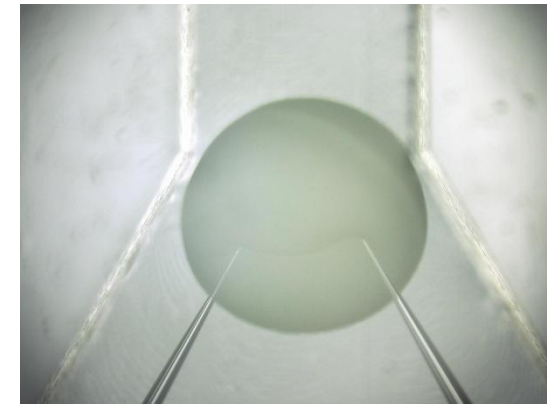
I currently focus on developing a sensor device composed of biological materials which are especially membrane proteins, lipid membranes or cells expressing specific chemical receptors. To push ahead with the research, I will try to fabricate the multiple olfactory sensors. I presently attempt downsizing of the device that has the system for insertion of electrodes into cells. Furthermore, I want to use cell membrane fractions future. The first goal is high integration of the device with cells. And I developed an easy method to make nm-depth steps on glass in my past research. Accordingly, I want to make the nano-structure which is useful for observation and analysis of bimolecular behaviors or properties.

Theme1 : Actuator-mountable Cell-based Odorant Sensor

Biological responses to odorants are attractive for chemical sensing because of their high sensitivity and selectivity. Here, we used recombinant cells expressing specific membrane proteins as odorant sensors. We used oocytes from frog (*Xenopus laevis*) and adopted a fluidic device as a suitable platform for oocyte handling and electrophysiological measurement. The system accomplishes sensitivity of 10 nM (approximately 2 parts per billion in solution). And it can distinguish the differences of chemical moiety in odorants. To construct the sensor, we established an efficient and reproducible method of installing oocytes into the fluidic device. In addition, we demonstrated concurrent sensing of multiple chemicals and integration of the sensor with a robotic system.

Ref.: "Highly Sensitive and Selective Odorant Sensor using Living Cells Expressing Insect Olfactory Receptors" N. Misawa, H. Mitsuno, R. Kanzaki, S. Takeuchi, PNAS, vol.107, pp15340-15344, (2010)

Keyword: Fluidic channel, Odorant receptor, Robot, *Xenopus* oocyte



A cell (*Xenopus* oocyte) inserted by two glass capillary electrodes in the fluidic channel.