

## **Ligand specificity and dose-response of heterologously expressed I7 olfactory receptor: biosensor using QCM (Quartz Crystal Microbalance)**

Hwi Jin Ko, Tai Hyun Park

Seoul National University, School of Chemical Engineering, Cell & Microbial Engineering Lab.

(02) 880-8020, FAX (02) 875-9348

### **Abstract**

The olfactory receptor protein of rat, I7 was expressed on the surface of HEK-293 cells. For targeting and detecting the protein, rho-tag import sequence was fused with I7 protein. The olfactory receptors were correctly expressed on the plasma membrane in HEK-293 cells<sup>1)</sup> and the stable cell lines regulated by an inducer were obtained. The expression on the cell surface and the binding of specific odorant molecules to the olfactory receptor were confirmed by an immunocytochemical, western blotting method and QCM (quartz crystal microbalance)<sup>2)</sup>. The QCM results showed that the expressed protein I7 strongly interacted with octyl aldehyde (octanal), which is a specific odorant for I7 protein<sup>3)</sup>. We also used several kinds of odorants and the results showed that I7 differentially interacted with odorants. The QCM results of I7 receptor according to the different concentration of octyl aldehyde showed that the expressed I7 protein represented a dose-dependent relationship. All of the results indicate that the I7 receptor proteins expressed on the cell surface are very specific and sensitive to its specific odorant.

### **References**

1. Zhao, H., Ivic, L., Otaki, J.M., Hashimoto, M., Mikoshiba, K. & Firestein, S. (1998), "Functional expression of a mammalian odorant receptor", *Science* **279**, 237-242.
2. Wu, T. Z. (1999), "A piezoelectric biosensor as an olfactory receptor for odour detection: electronic nose", *Biosens. Bioelectron.* **14**, 9-18.
3. Singer, M. S. (2000), "Analysis of the molecular basis for octanal interactions in the expressed rat I7 olfactory receptor", *Chem. Senses* **25**, 155-165.