

Artificial Lipid Bilayer Functionalized with Human Olfactory Receptor

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Polydiacetylene (PDA) is a polymerized diacetylenic surfactant which shows color transition from blue to red and fluorescent change from non-fluorescent to red-fluorescent against various stimulations. Introducing the UV cross-linkable diacetylene monomers makes bilayered phospholipid vesicles available in wide range of biological applications such as sensing, drug delivery, and enzymatic reaction. Human olfactory receptors (hORs) are integral membrane proteins and bind to their specific olfactory ligands, and thereby they are very useful for developing bioelectronics noses. In this study, we fabricated, for the first time, an artificial PDA/lipid bilayer functionalized successfully with hORs. Polymerization of membrane assembly embedding hORs enabled the formation of robust bilayer and affected little hOR structure and activity. The enhanced stability of polymerized membrane assembly with hORs against surfactants was characterized. As a result, the bilayer's biological performance was confirmed by using circular dichroism spectrum and tryptophan fluorescence assay.