Electronic Supporting Information

Visual Detection of Odorant Geraniol Enabled by Integration of Human Olfactory Receptor into Polydiacetylene/Lipid Nano-Assembly

Taegon Kim[a,1], Dongseok Moon[b,1], Jin Hyuk Park[a,c,1], Heehong Yang[b], Seongyeon Cho[b], Tai Hyun Park[b,*], and Dong June Ahn[a,c*]

In this Supplementary Information, the following results are presented:

Fig. S1. SDS-PAGE analysis of hOR1A2. (A) Gel staining of samples from production of hOR1A2. (B) Gel staining of the purified hOR1A2. (C) Western blot analysis of purified hOR1A2.

Fig. S2. Dynamic light scattering (DLS) data of the particles. Intensity distribution of (A) the PDA vesicles and (B) PDA/hOR complexes.

Fig. S3. The control experiment for geraniol reactivity of TCDA and TCDA/DMPC vesicles without embedded hOR.

Fig. S4. Integrated PL values for 530 to 720 nm of TCDA-only vesicles without phospholipid (control) and TCDA vesicles with phospholipid for successful reconstitution of HoR1A2 after treatment of geraniol solution (0, 0.01, 0.1, and 1 mM).

Fig. S5. (A) Colorimetric dose-dependence test of the PDA vesicles and PDA/hOR complexes with geraniol (0.01, 0.1, and 1 mM). (B) Colorimetric selectivity test of the PDA/hOR complexes with geraniol, trimethylamine (TMA), helional, and amyl butyrate (AB) (1 mM).

Fig. S6. PL spectra of the PDA/hOR complexes prepared using TCDA and DMPC (6:4 mole ratio) with DMSO (control) and geraniol (1 mM).

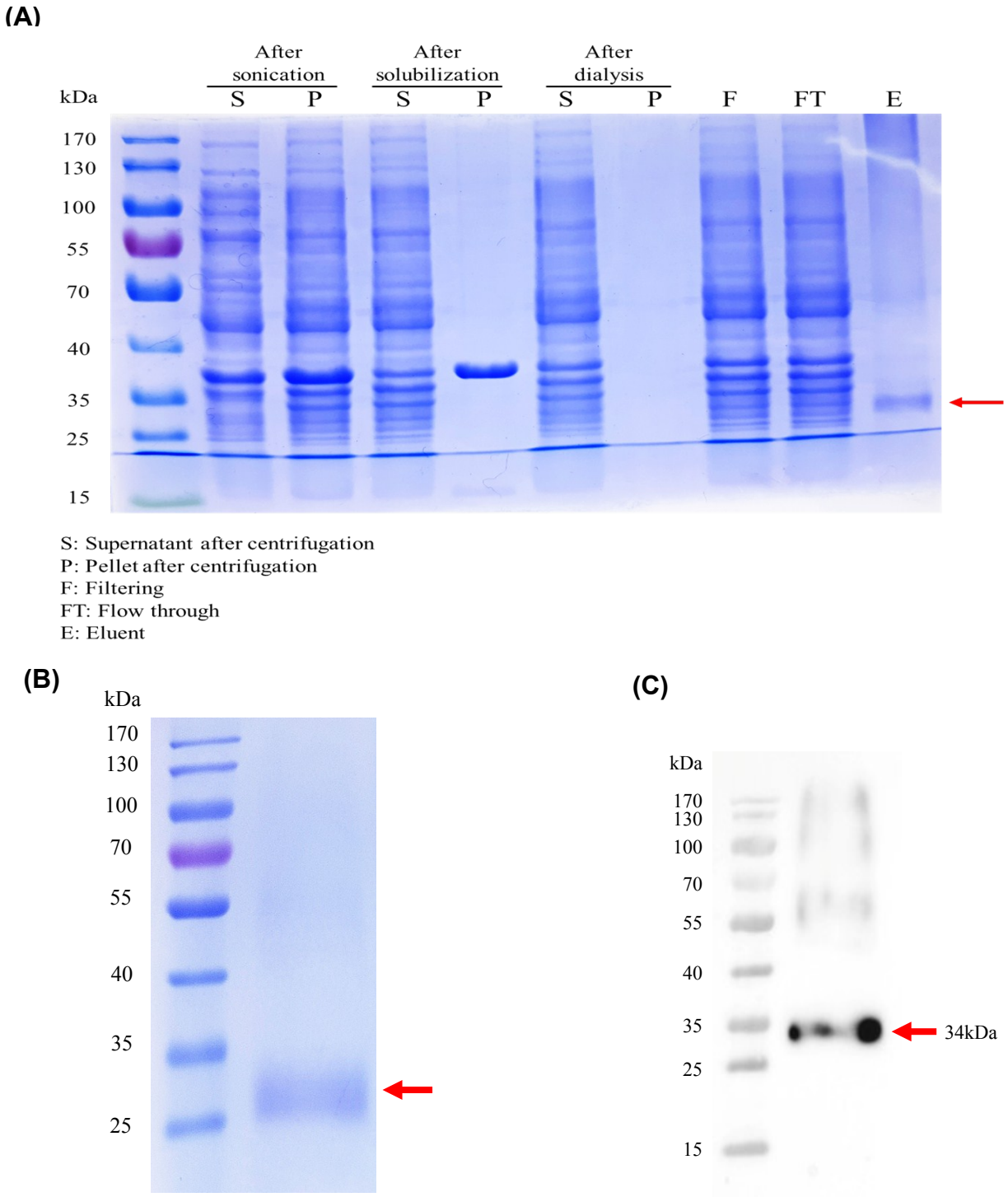

Fig. S1. SDS-PAGE analysis of hOR1A2. (A) Gel staining of samples from hOR1A2 production steps. hOR1A2 was purified in final step (eluent). (B) Gel staining of the purified hOR1A2. (C) Western blot analysis of purified hOR1A2. Primary antibody was anti-his tag antibody and secondary antibody was anti-mouse IgG-HRP antibody.

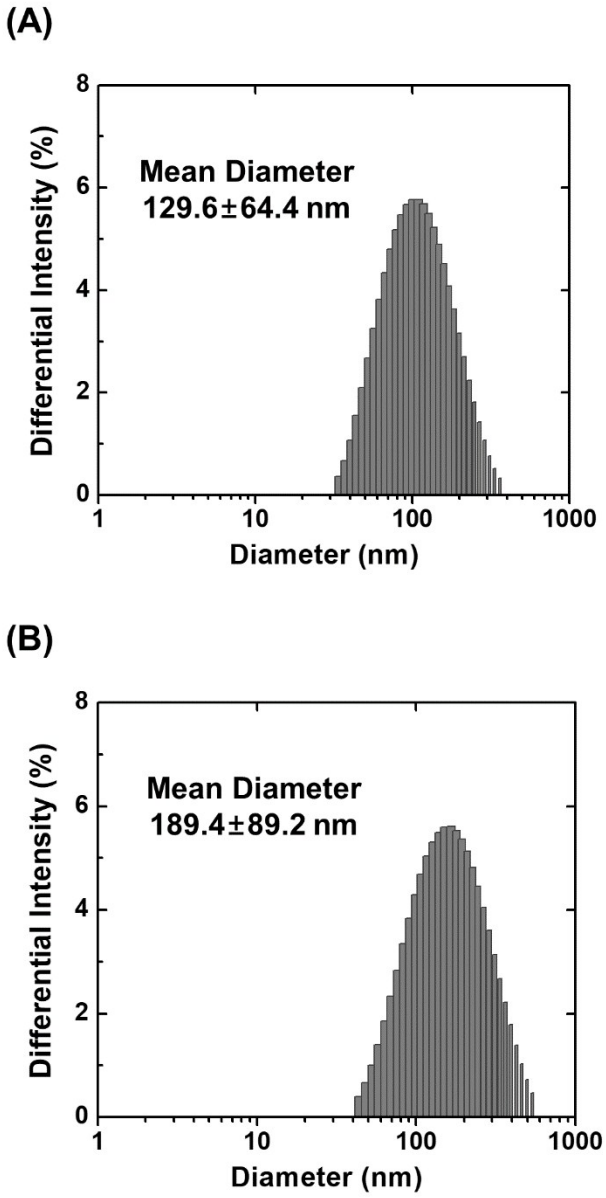

Fig. S2. Dynamic light scattering (DLS) data of the particles. Intensity distribution of (A) the PDA vesicles and (B) PDA/hOR complexes. The measurements were conducted at room temperature (RT).

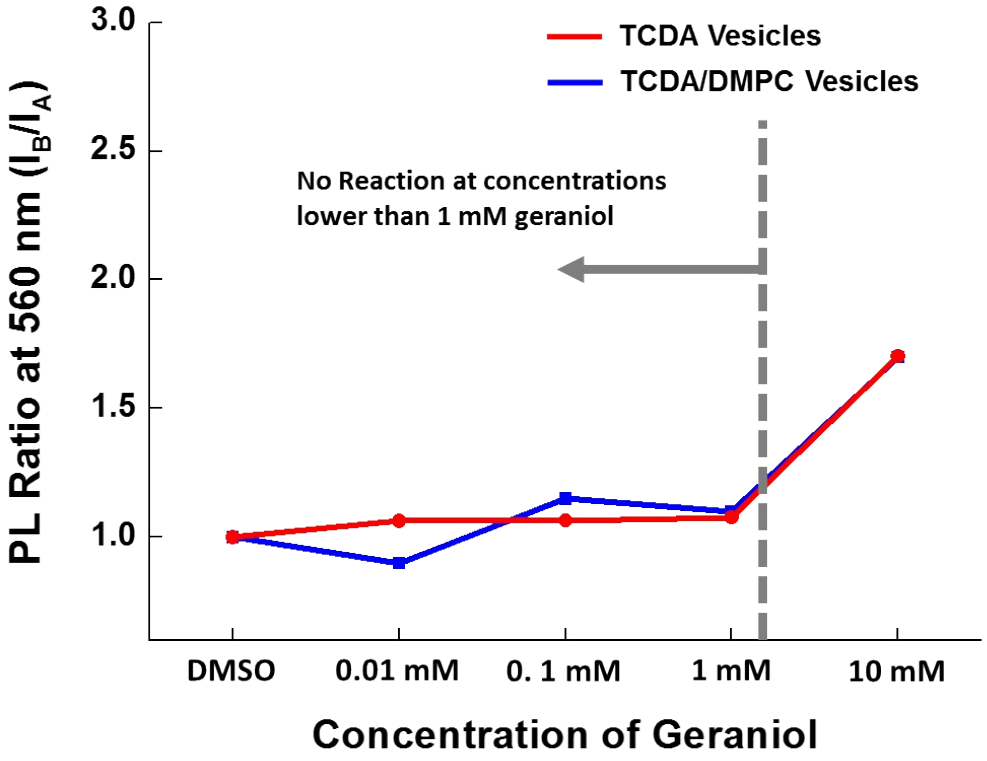

Fig. S3 The control experiment for geraniol reactivity of TCDA and TCDA/DMPC vesicles without embedded hOR. PL spectra after treatment of geraniol solution with different concentration were obtained. The excitation wavelength was 450 nm. I_A and I_B is the PL intensity of zero concentration and that of concentration experimented at 560 nm, respectively.

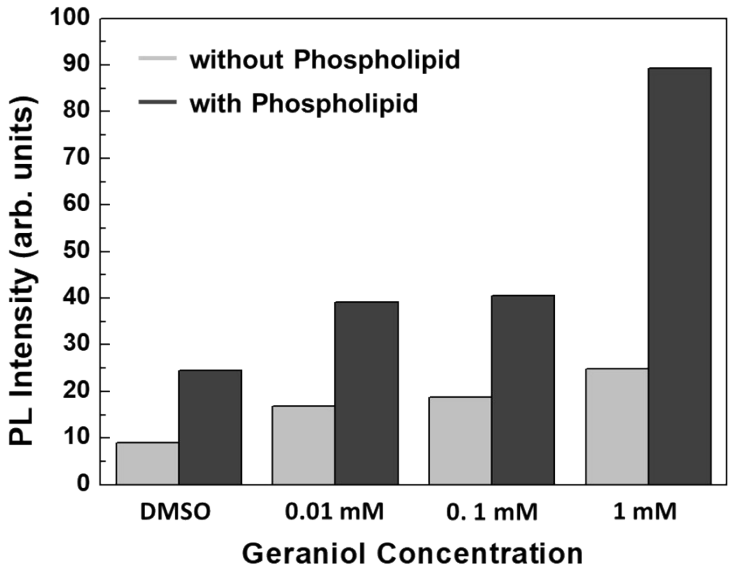

Fig. S4. Integrated PL values for 530 to 720 nm of TCDA-only vesicles without phospholipid (control) and TCDA vesicles with phospholipid for successful reconstitution of HoR1A2 after treatment of geraniol solution (0, 0.01, 0.1, and 1 mM). The excitation wavelength was 450 nm.

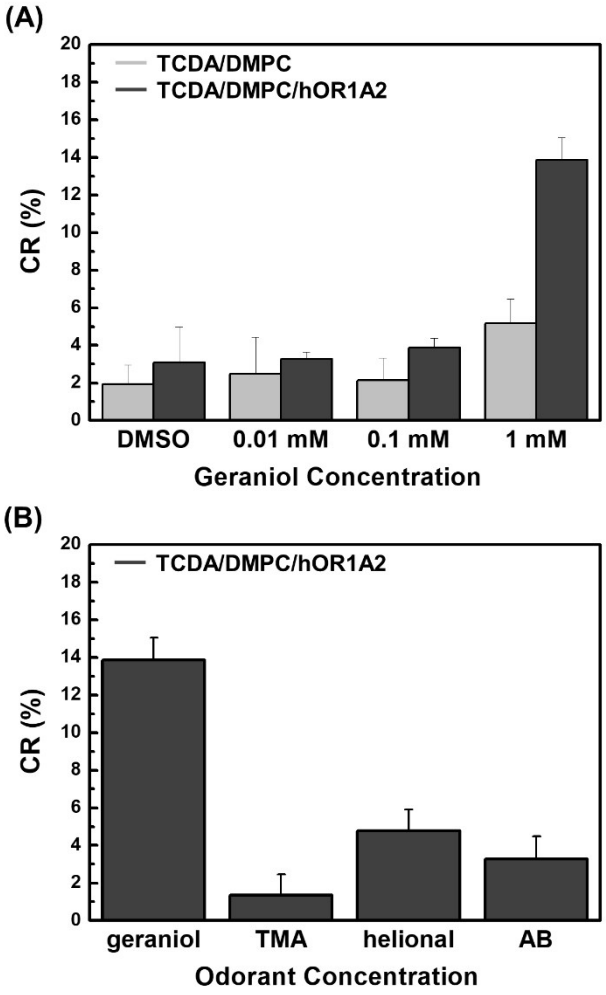

Fig. S5. (A) Colorimetric dose-dependence test of the PDA vesicles and PDA/hOR complexes with geraniol (0.01, 0.1, and 1 mM). (B) Colorimetric selectivity test of the PDA/hOR complexes with geraniol, trimethylamine (TMA), helional, and amyl butyrate (AB) (1 mM). All measurements were carried out at 27 °C: % CR = $[(PB_0 - PB_1)/PB_0] \times 100$ and PB = $A_{blue}/[A_{blue} + A_{red}]$[16]. The parameter A is the absorbance at the blue component in the UV-Vis spectrum (approximately 645 nm) or the red component (approximately 545 nm). The parameter PB_0 is the red/blue ratio of the TCDA/DMPC/hOR1A2 without odorants, and PB_1 is the value obtained for the TCDA/DMPC/hOR1A2 complex with odorants.

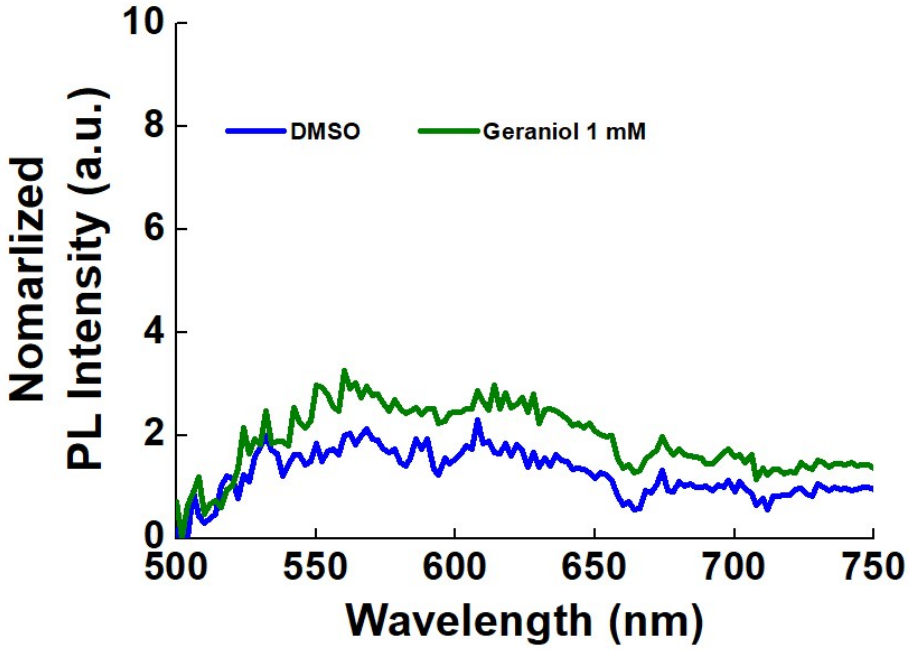

Fig. S6. PL spectra of the PDA/hOR complexes prepared using TCDA and DMPC (6:4 mole ratio) with DMSO (control) and geraniol (1 mM). This assembly did not interact with the target geraniol 1 mM.