

## Supporting Information

### **DNA-mediated Self-assembly of Taste Cells and Neurons for Taste Signal Transmission**

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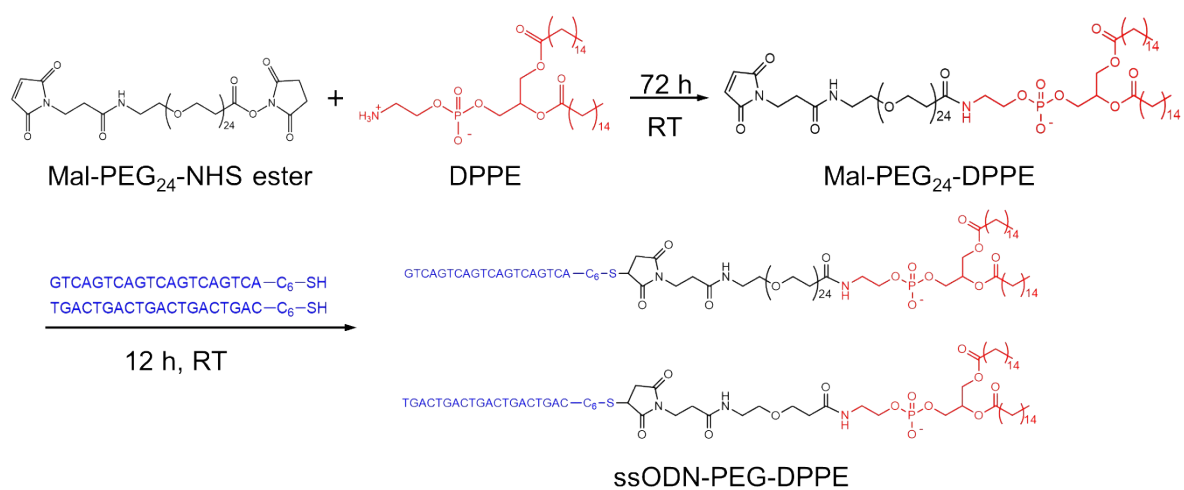
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## Supporting Figures



**Fig. S1** Synthetic scheme of DNA-lipid conjugate (ssODN-PEG-DPPE).

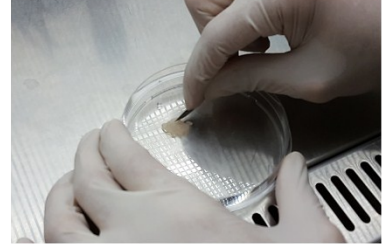
(1) Neonatal mouse (2 days)



(2) Cut the tongues of mouse



(3) Slice tongues in small tissues



(4) Digest the tissues for 15 min and

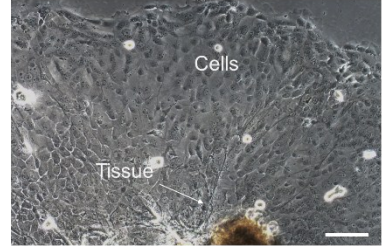


\*Mixture of trypsin/EDTA, Accutase®, and DNase I

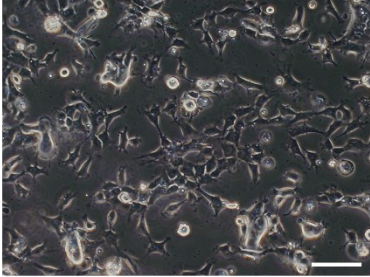
(5) Seed tissues to collagen I coated plate



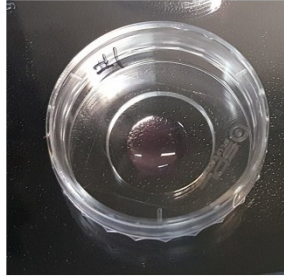
(6) Incubate the tissues for 4~5 days



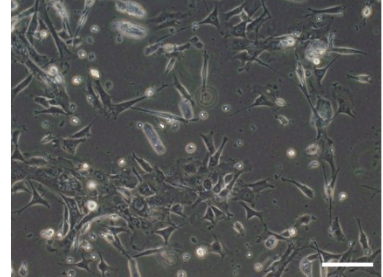
(7) Sub-culture #1 (Incubated for 2 days)



(8) Transfer to the experimental plate

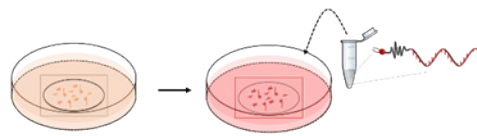


(9) Sub-culture #2 (Incubate for 3 days)



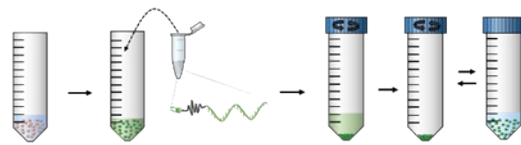
**Fig. S2** Procedures of primary taste cell culture. Scale bar = 100  $\mu\text{m}$

**(1) (GTCA)<sub>5</sub>-PEG-DPPE to neuronal cell**



Mix DNA solutions and  
incubate for 60 min at 37 °C

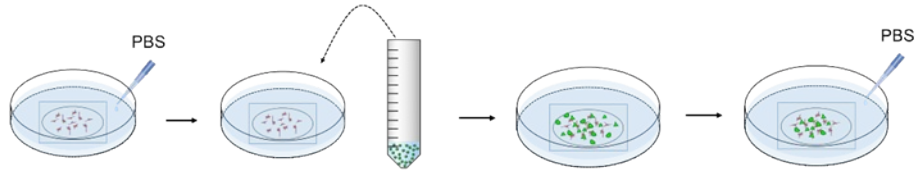
**(2) (TGAC)<sub>5</sub>-PEG-DPPE to taste cell**



Mix DNA solutions and  
incubate for 30 min at 37 °C

Remove remaining DNA  
and ssODN-PEG-DPPE

**(3) Neuronal and taste cell assembly by DNA hybridization**

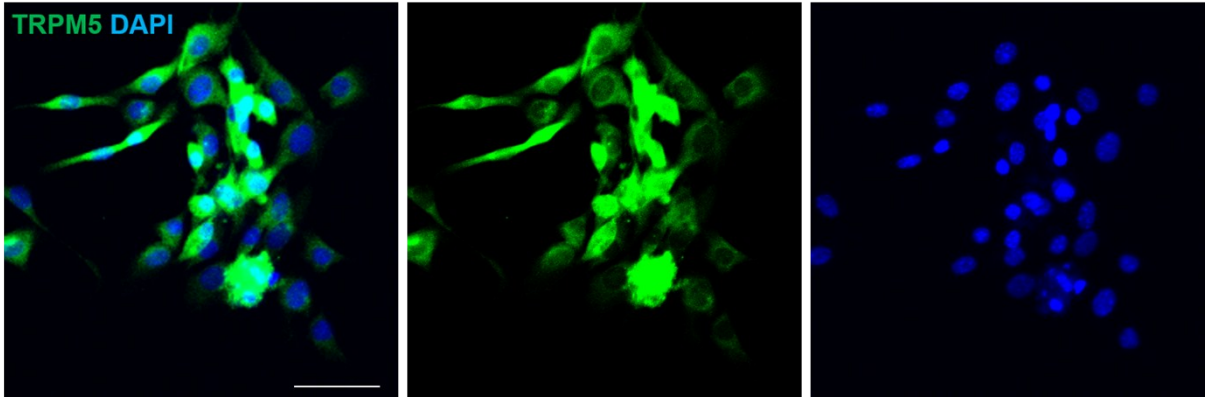


Remove remaining DNA  
and ssODN-PEG-DPPE

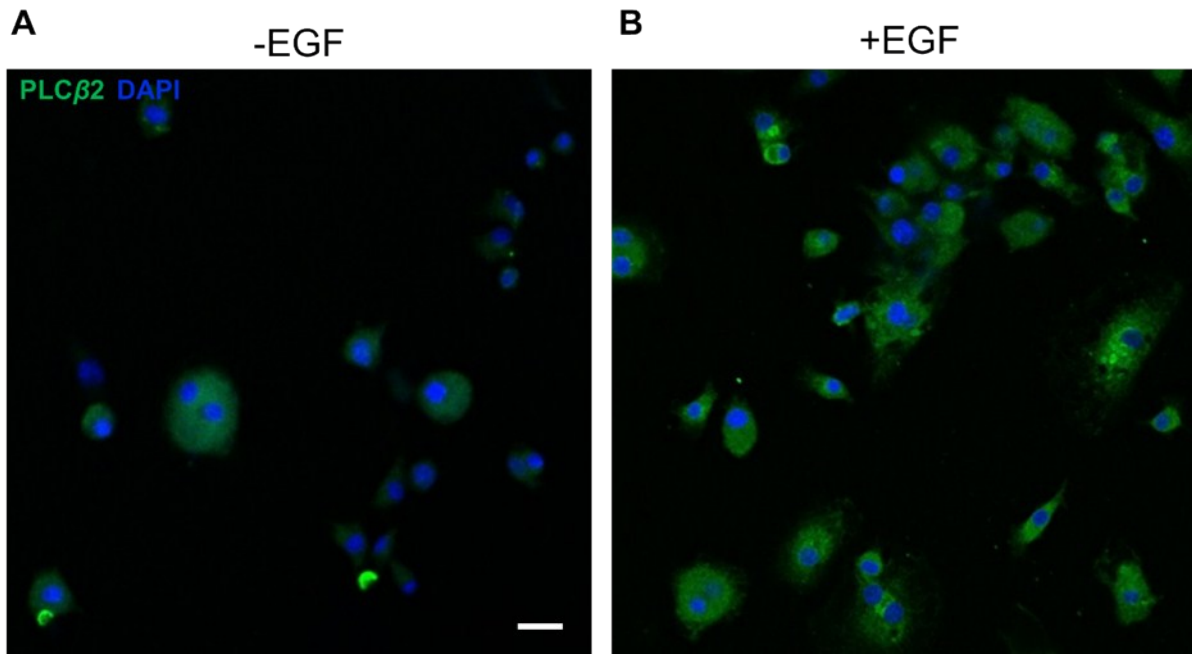
Mix taste cells on neuronal cells and  
incubate for 30 min at 25 °C

Remove unattached cells

**Fig. S3** Schematic images of procedure of DNA-mediated taste and neuronal cell assembly.

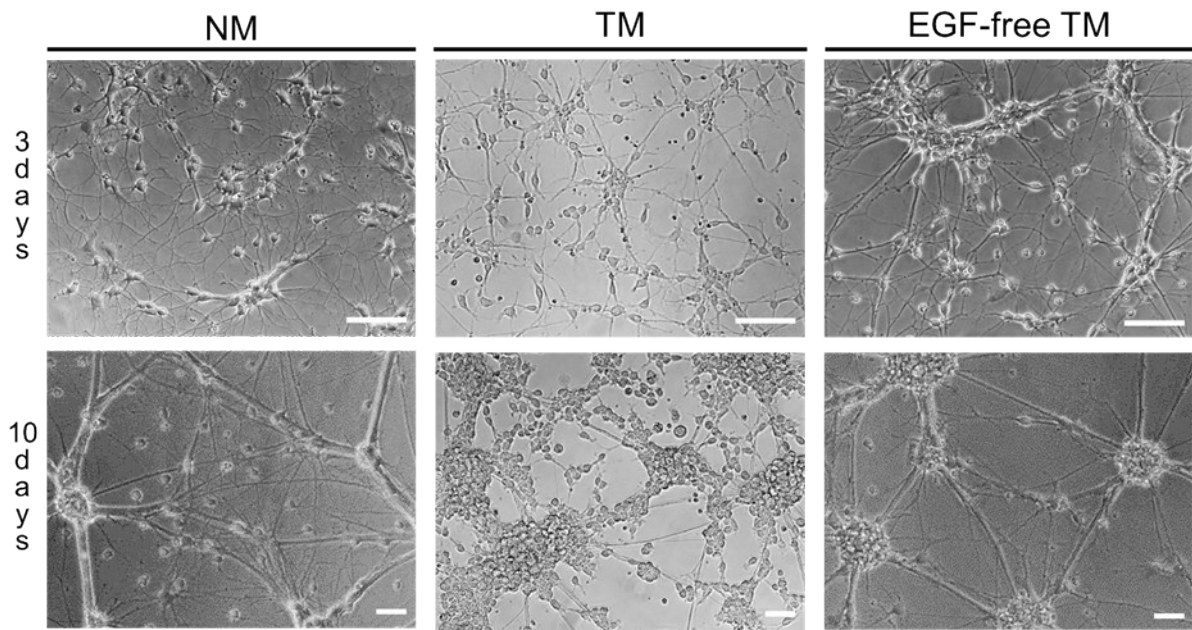


**Fig. S4** TRPM5 immunostaining of taste cells cultured in TM. Scale bar = 50  $\mu$ m

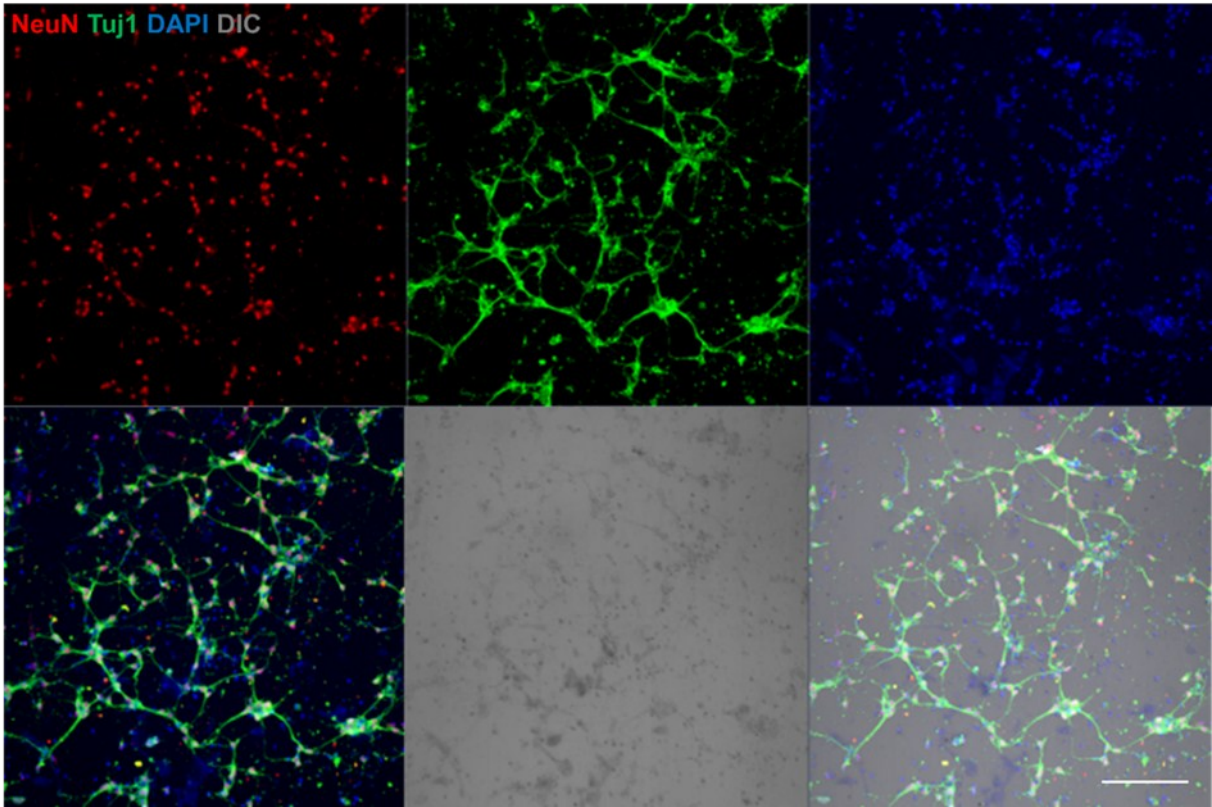


**Fig. S5** PLC $\beta$ 2 immunostaining of taste cells cultured in (A) EGF-free TM and (B) TM. Taste cells cultured in TM show higher expression level of PLC $\beta$ 2 than taste cells in EGF-free TM.

Scale bar = 100  $\mu$ m



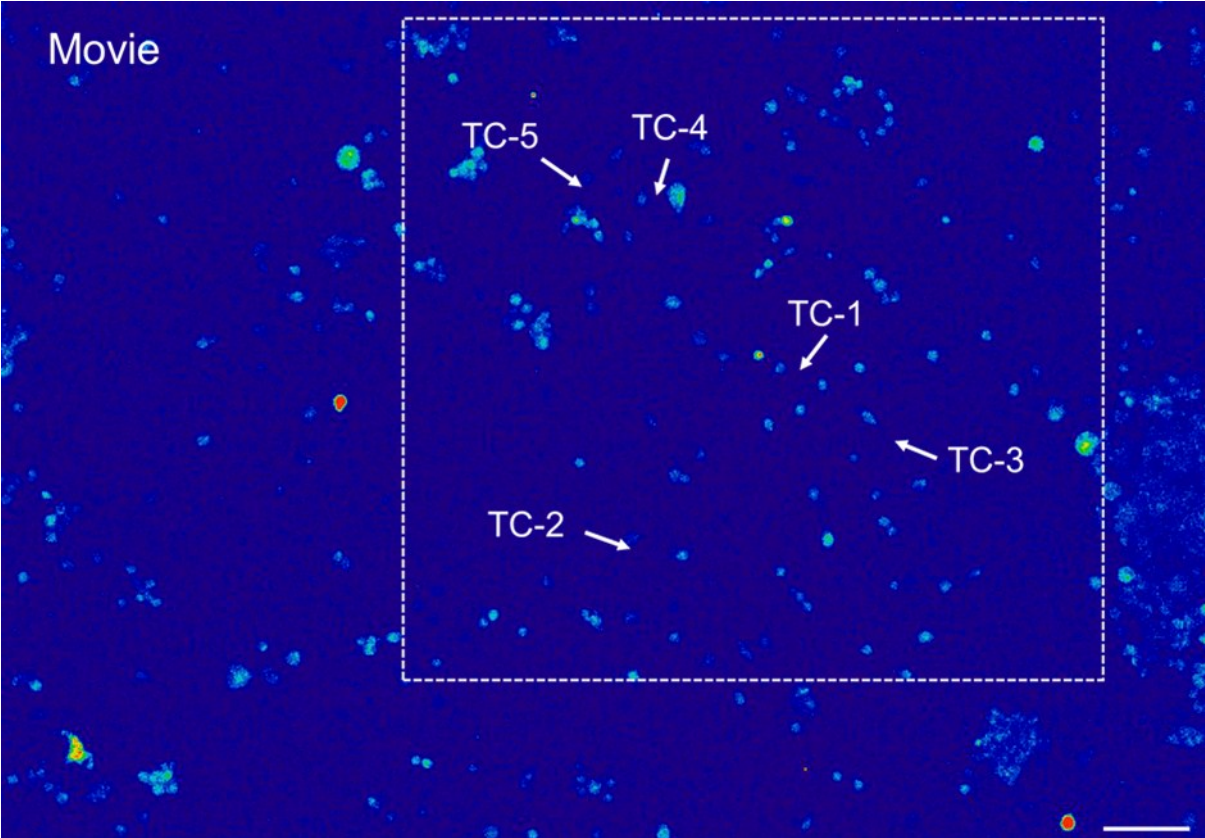
**Fig. S6** Culture of neurons in three different culture media. Scale bar = 100  $\mu\text{m}$



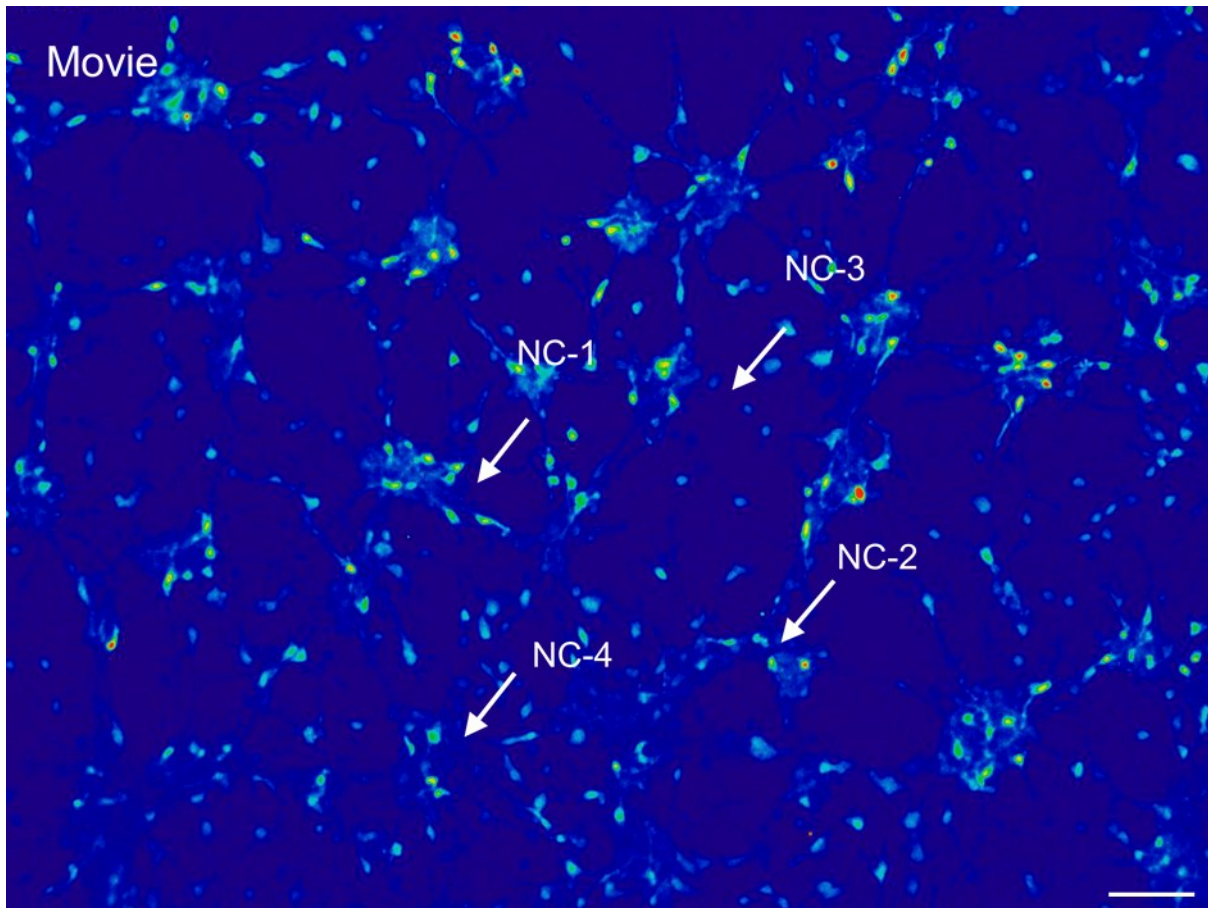
**Fig. S7** Immunostaining of neurons cultured in EGF-free TM. Scale bar = 100  $\mu\text{m}$



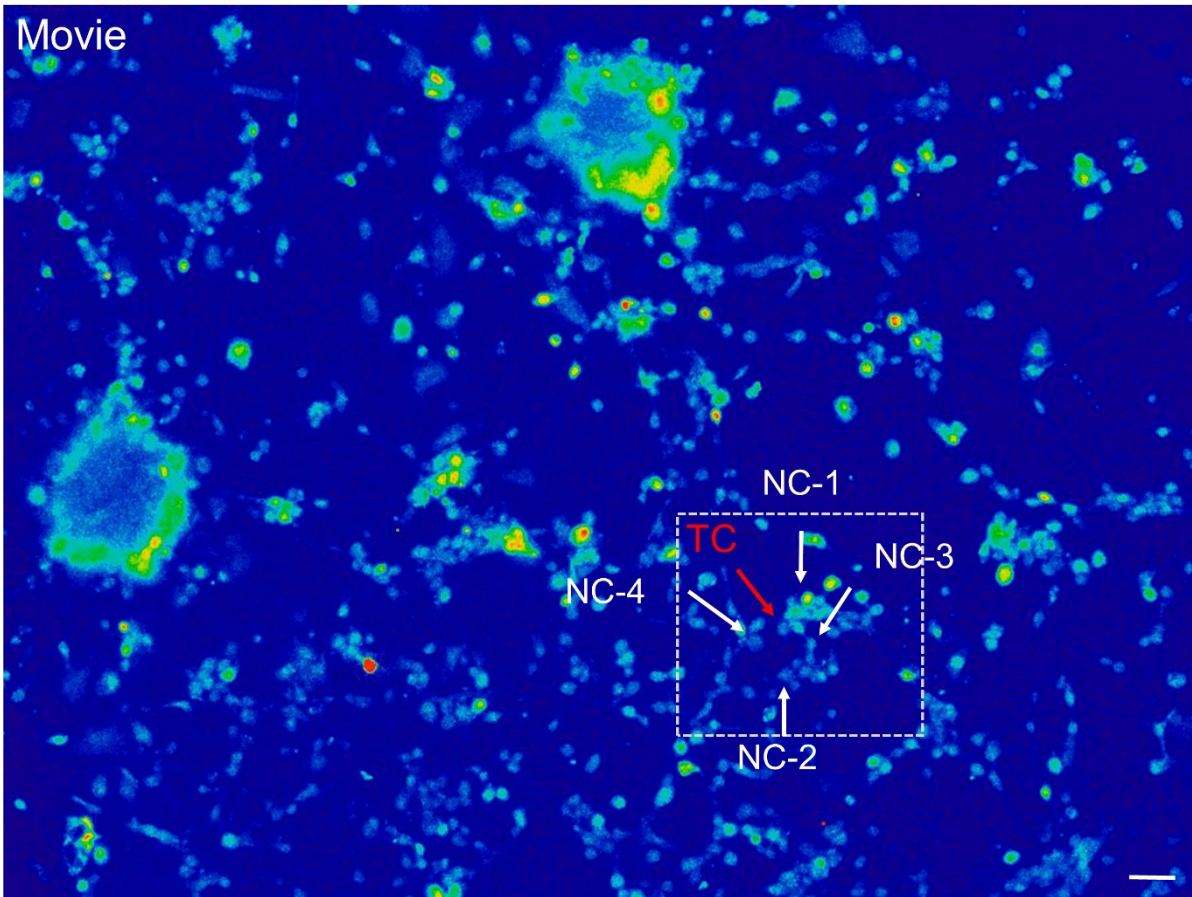
**Supporting Movies**



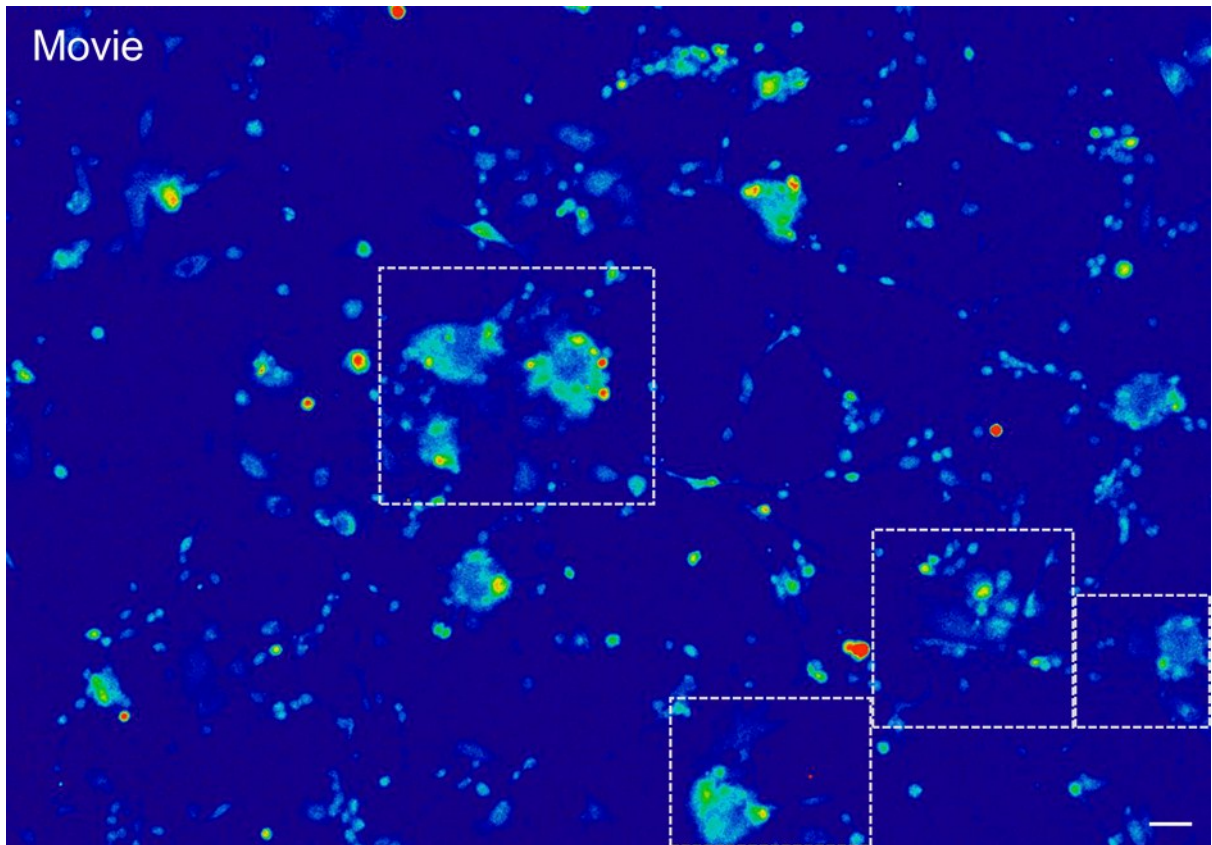
Movie S1. Movie clip of calcium imaging of taste cells (30× fast, Figure 4). Scale bar = 100 μm.



**Movie S2.** Movie clip of calcium imaging of neuronal cells (30× fast, Figure 5). Scale bar = 50  $\mu\text{m}$ .



**Movie S3.** Movie clip of calcium imaging of simply mixed taste and neuronal cells (30× fast, Figure 6). Scale bar = 50  $\mu\text{m}$ .



**Movie S4.** Movie clip of DNA-mediated taste and neuronal cells (30× fast, Fig. 7). Scale bar = 50  $\mu\text{m}$ .