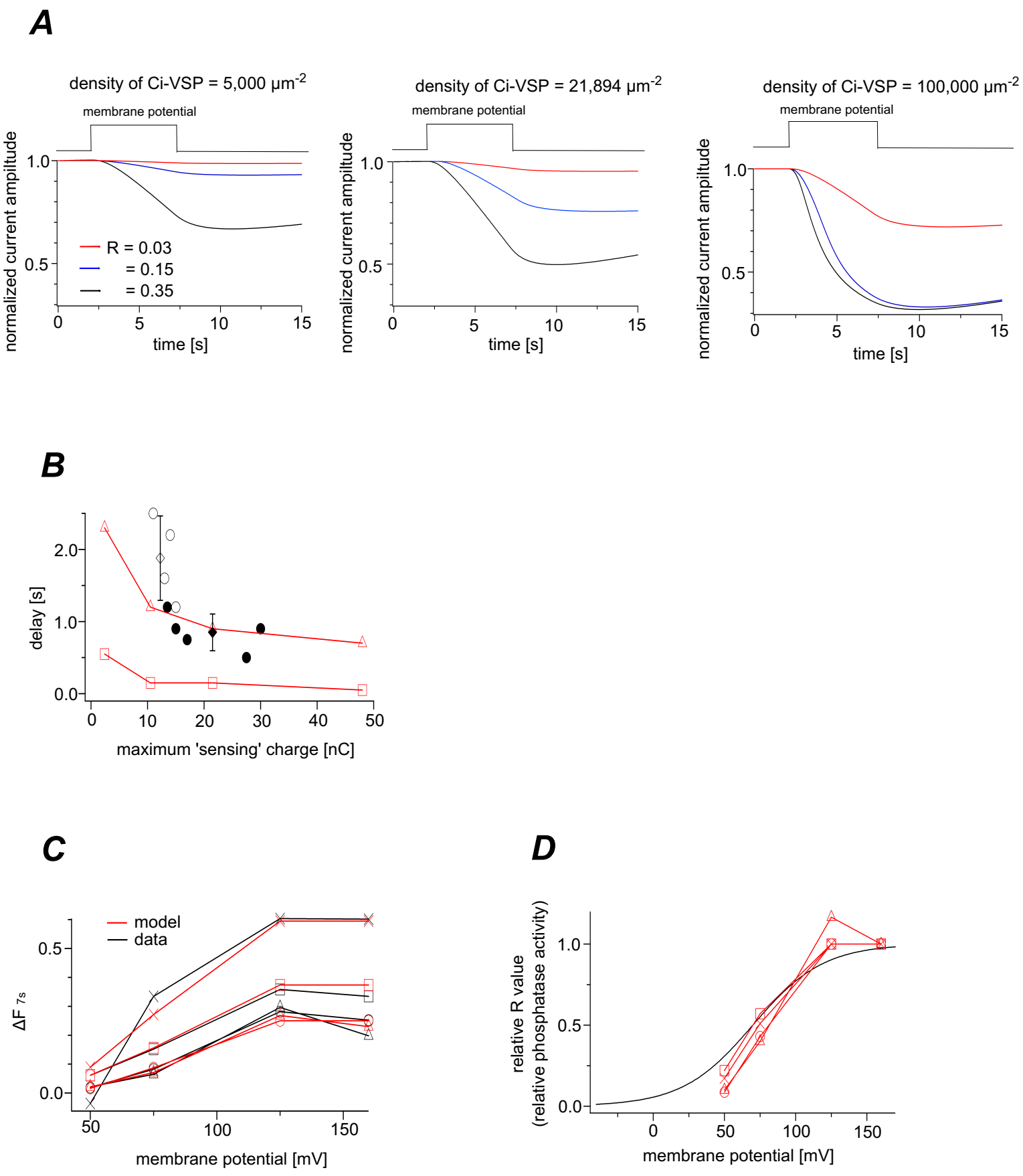
Supplemental information

Supplemental figure 1. Single channel currents of Kir2.1 channel

Single channel recordings of Kir2.1 were made in the on-cell patch mode. The bath solution contained 20 mM HEPES, 100 mM K-methanesulphonate and 3 mM $MgCl_2$, and the pH was adjusted to 7.2. The pipette solution was the same to the bath solution for TEVC measurements (see Methods for details). The pipette resistances were 2.0-4.0 MΩ. Currents were elicited by voltage steps to -120 mV. Data were sampled at 7.5 kHz, and the traces digitally filtered at 500 Hz are shown. The open probability and the single channel current amplitude were estimated to be 0.75 and 0.91 pA, respectively.

Supplemental figure 2. Modeling of the decay of PH_{PLC}-GFP fluorescence when the maximum enzymatic activity of Ci-VSP was defined by an R value of 0.35. *A*, simulation of PH_{PLC}-GFP decay at the three indicated Ci-VSP densities. *D* = 6.0 $\mu m^2 \bullet s^{-1}$. *B*, relationship between the delay and the maximum 'sensing' charge. The color codes and symbols are the same as in Fig. 8B. *C*, each set of experimental data were fitted with the model as shown in Fig. 9A. The enzyme activity at 160 mV was defined such that R = 0.35, and the data at other membrane potentials were fitted only by adjusting the value of R. *D*, relative R values estimated in *C* were plotted against the membrane potential together with the 'sensing' charges. The black line indicates the Q-V curve of Ci-VSP, which is the same as shown in Fig. 9B. Red lines indicate R. In *C* and *D*, data from four oocytes are shown as different symbols.

Supplemental figure 1



Supplemental figure 2