Supporting Information

Potent and selective inhibition of the open-channel conformation of AMPA receptors by an RNA aptamer

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Figure S1

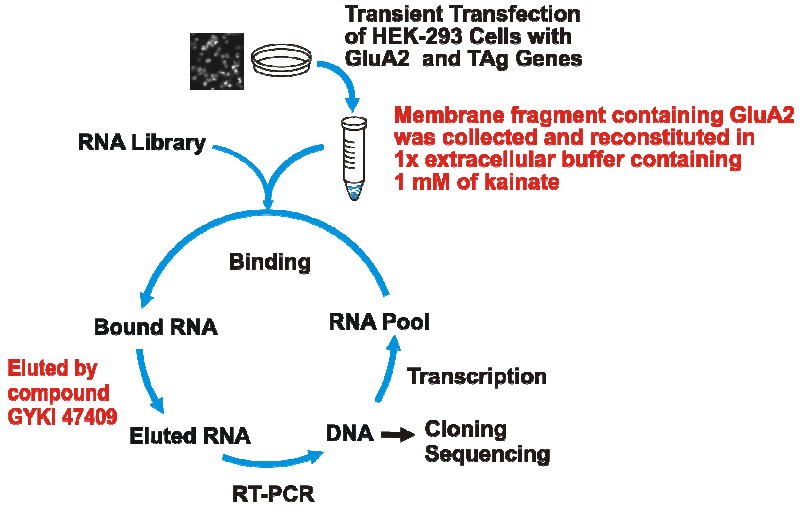

Figure S1. The use of SELEX to identify aptamers selective to the open-channel conformation of GluA2 AMPA receptors. The detailed method and operation have been described in the Experimental Procedure.

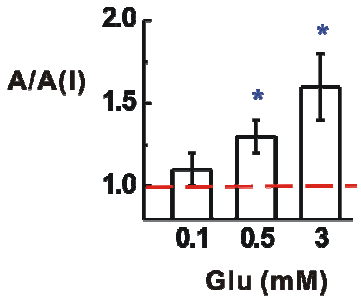

Figure S2. The inhibition effect of the full length or 100-nt AG1407 on GluA2Q_{flip} receptor channels under different concentrations of glutamate. AG1407 inhibited the open-channel state of GluA2 receptor, but not the closed-channel state, as indicated by the whole-cell recording data tested at different concentrations of glutamate. In one-tail student *t*-test, the A/A(I) value was significantly larger than 1.0 at 0.5 and 3 mM of glutamate ($P = 0.03$ and 1.9×10^{-4} respectively), as indicated by blue asterisk signs, but not at 0.1 mM of glutamate ($P = 0.25$) for 0.5 μM of AG1407. Red horizontal dashed line represents the A/A(I) value of 1.0 or there was no inhibition.

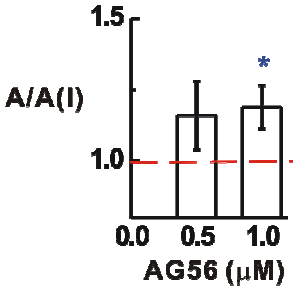

Figure S3. The AG56 had weak inhibition effect on the open-channel conformation of GluA4 receptor subunit. At 0.5 μM of AG56, the A/A(I) was not significantly larger than 1.0 ($P = 0.08$) (see also Figure 2B, left panel and the figure above). We then increased the AG56 concentration for the test. At 1 μM of AG56, the A/A(I) ratio was 1.2 ($P = 0.02$), as indicated by blue asterisk sign in this figure. Both A/A(I) values at two concentrations of AG56 contained three recordings from three different cells. The glutamate concentration was 3 mM for all the points. Red horizontal dashed line represents the A/A(I) value of 1.0 or no inhibition.

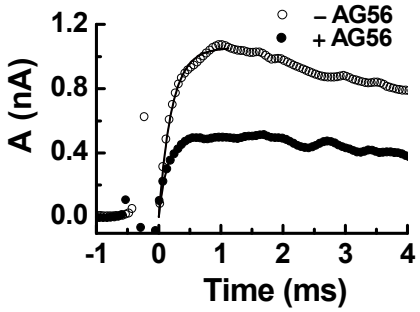

Figure S4. The whole-cell current trace collected using the laser-pulse photolysis technique. The glutamate concentration released was 0.5 mM. The k_{obs} for the control (without AG56, hollow circle) was calculated to be 5880 ± 55 s^{-1}, whereas the k_{obs} in the presence of 1 μM AG56 (solid black dot) was 4980 ± 100 s^{-1}. A/A(I) = 1.05/0.515 = 2.0. It should be mentioned that Δk_{obs} was 900 s^{-1}, slightly larger than the value or the constant value displayed in the right panel of Figure 3C. This was because we used a higher AG56 concentration to inhibit the rate; this was consistent with the prediction by equ. 9 in that a higher inhibitor concentration generated a larger Δk_{obs} value. In addition, a larger % of current reduction was also contributed by the use of a higher glutamate concentration, because AG56 inhibited the receptor more strongly at a higher glutamate concentration.