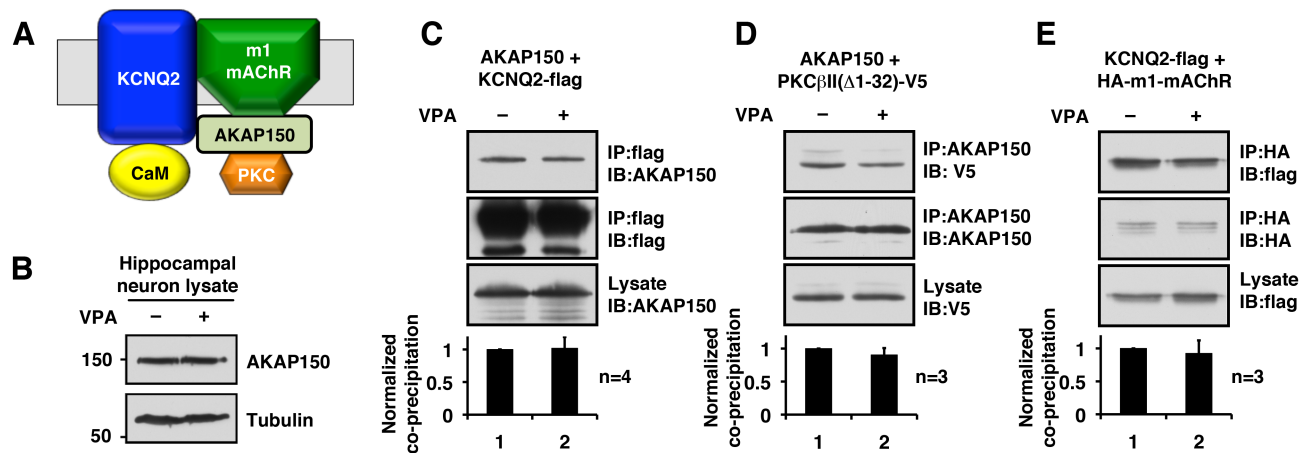


**Supplementary Figure 1. Intraperitoneal administration of 2 mg/kg XE991 did not affect locomotion, exploratory or anxiety-like behaviors. (A)** Administration of XE991 did not have a significant effect on locomotion or exploratory activity, as measured by the distance traveled throughout the 30 min observation period or total distance traveled compared to saline. **(B)** There was no significant difference between XE991 treatment and saline control in stereotypic behavior. **(C)** Anxiety level measured by center/periphery ratio was not significantly affected by XE991 compared to saline.



**Supplementary Figure 2. VPA treatment did not change AKAP150 protein expression or AKAP150 protein interaction.** **A)** Schematic diagram showing the KCNQ2 channel complex. **B)** Immunoblots showing equal protein expression between control and VPA treated cultured hippocampal neurons. Tubulin blotting confirmed equal loading. **C)** Co-immunoprecipitation of AKAP150 with KCNQ2-flag from transiently transfected HEK293A cells. The histogram summarizes quantification from 4 independent experiments. VPA did not disturb KCNQ2-AKAP150 interaction. **D)** Co-immunoprecipitation of V5 tagged PKC $\beta$ II( $\Delta$ 1-32) with AKAP150 from transiently transfected HEK293A cells. The histogram summarizes 3 independent experiments. VPA did not disturb AKAP150-PKC $\beta$ II interaction. **E)** Co-immunoprecipitation of KCNQ2-flag with HA-tagged m1 muscarinic receptors from transiently transfected HEK293A cells. The histogram summarizes 3 independent experiments. Error bars show s.e.m.