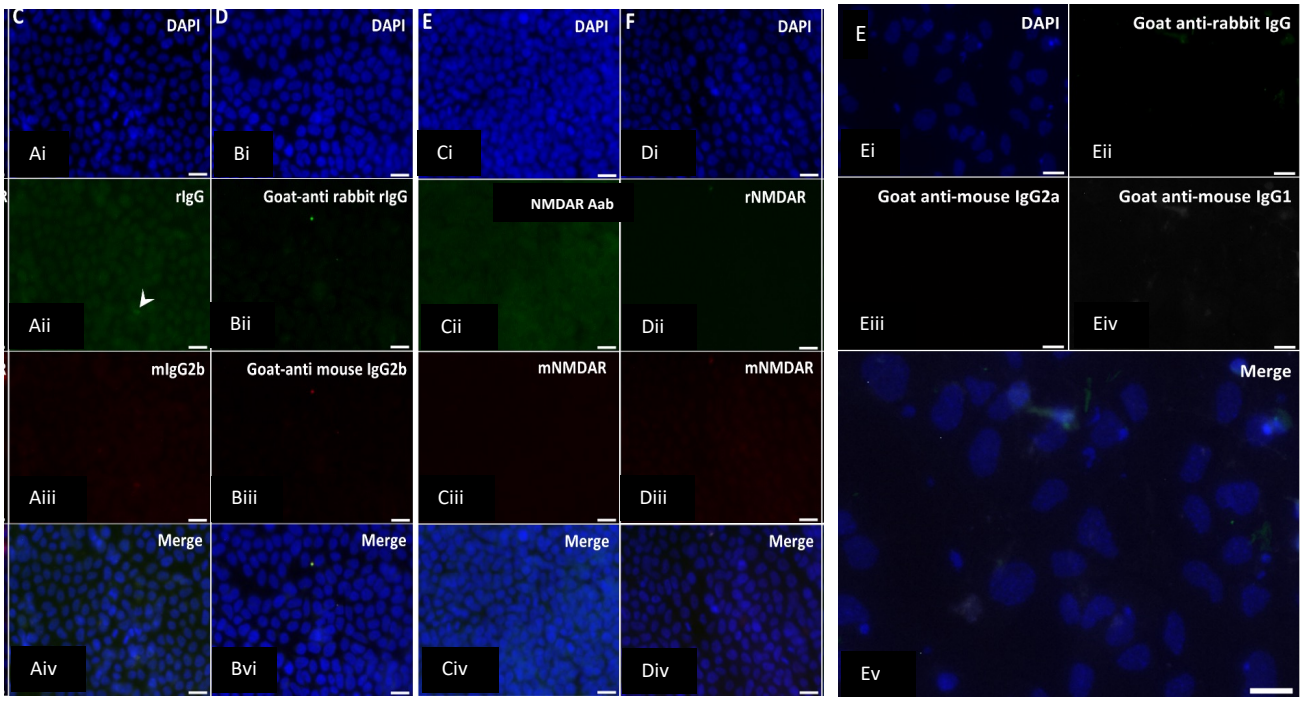
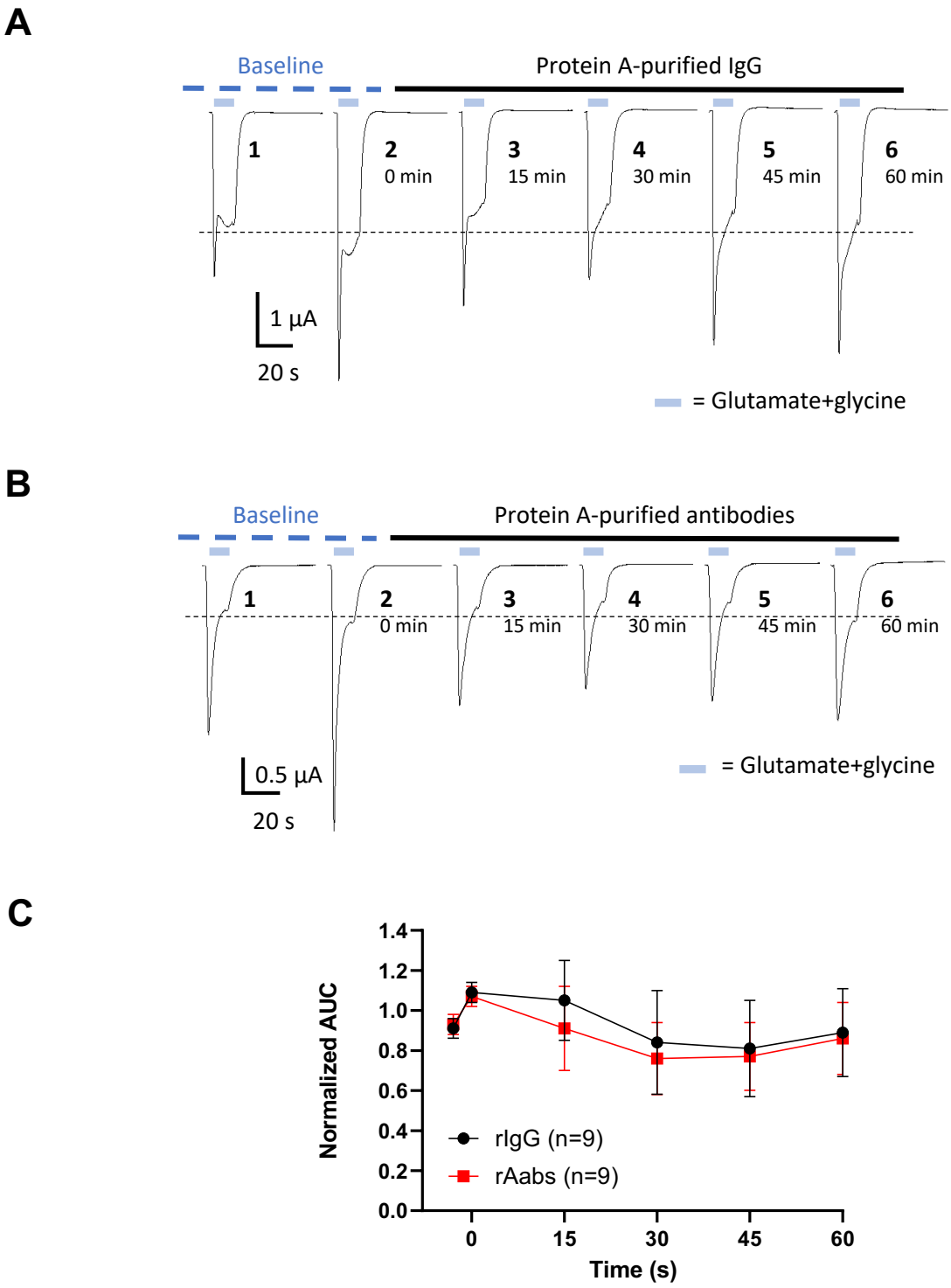
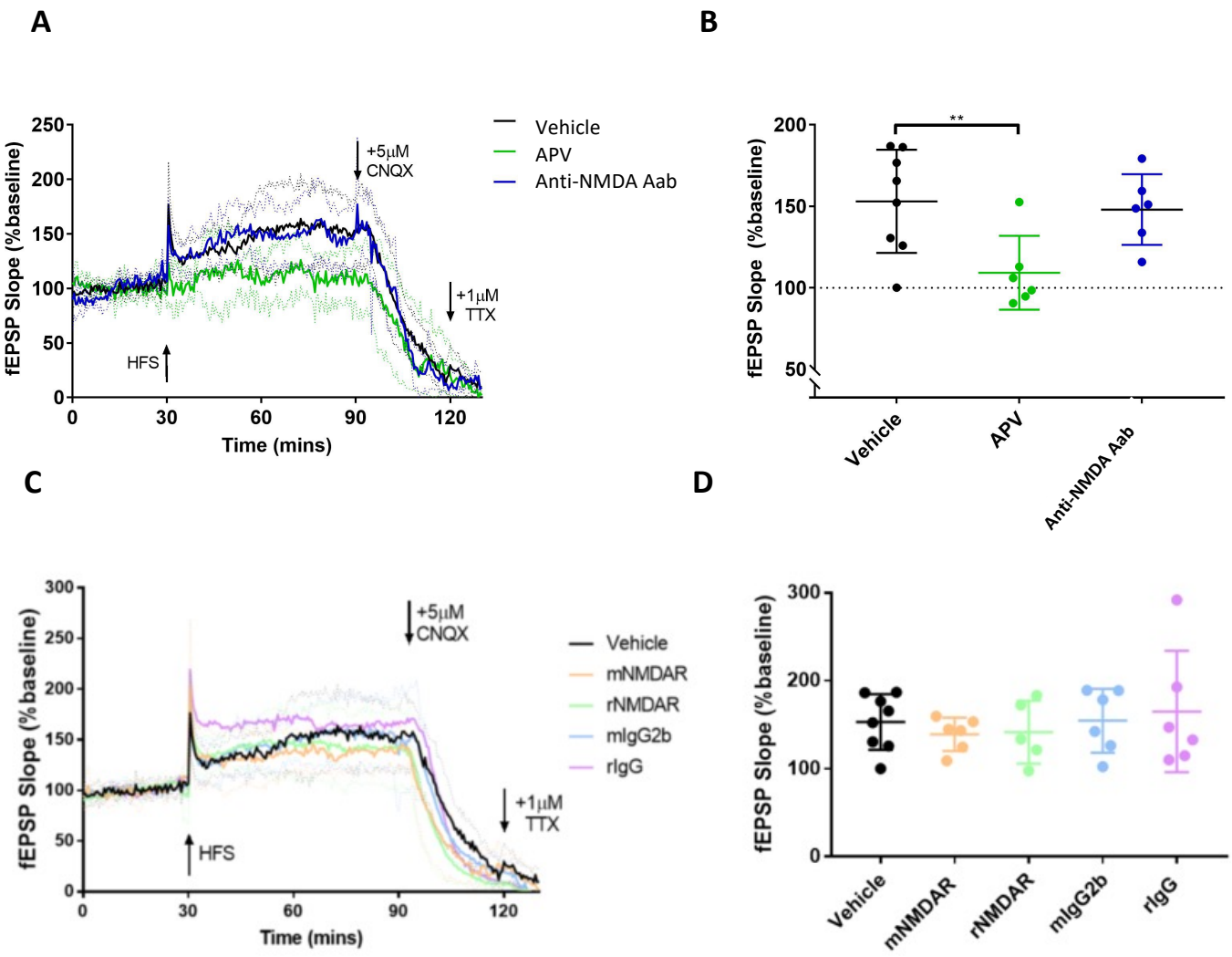


Supplemental Figure 1: Immunocytochemistry staining controls.
NR1-transfected HEK cells incubated with **(Ai-Aiv)** class-specific negative controls rIgG and mIgG2b or **(Bi-Biv)** secondary-only antibody controls showed no positive staining. **(Ci-Civ, Di-Div)** Empty vector-transfected HEK cells showed no clear staining when incubated with anti-NMDAR1 Aabs (1:100) or with each one of two commercial anti-NR1 antibodies (1:100). Representative image selected from n=3 biological replicates. **(Ei-Ev)** Primary cortical neuronal cells (DIV14) incubated with the secondary-only antibody control showed no staining in any channel. Representative image selected from n=3 biological replicates.
Scale bar = 20 µm throughout.



Supplemental Figure 2. Protein A-purified anti-NMDAR Aabs have no effect on NMDA current in Xenopus oocytes.

Traces of NMDAR-evoked responses over time before and after incubation of Protein A-purified antibodies: 1 µM glutamate/10 µM glycine-induced NMDA currents were elicited every 15 min in the presence of **(A)** Protein A-purified IgG or **(B)** Protein A-purified anti-NMDAR Aabs (both 1:300 dilution) applied for up to 60 min. **(C)** Graph shows effect of Protein A-purified anti-NMDAR Aab and rIgG glutamate-evoked (AUC) responses normalised to baseline (mean of applications 1 and 2 shown above). There was no significant change in current AUC when compared to baseline in anti-NMDAR Aabs or rIgG incubated oocytes. Each oocyte was used for baseline and treatment throughout the 60 min experiment.



Supplemental Figure 3. Effects of Protein A-purified anti-NMDAR Aabs and control antibodies on HFS-induced LTP in hippocampal brain slices.

(A) Normalised mean traces of vehicle, 50 μM APV and Protein A-purified anti-NMDAR Aabs treated slices undergoing LTP induction. Vehicle and Protein A-purified anti-NMDAR Aabs typically elicited a potentiation of ~150% post-HFS, which was maintained for at least 1 h. The addition of APV almost completely inhibited any HFS-induced LTP. **(B)** Comparison of LTP magnitudes (mean fEPSP slope during 80-90 min application) revealed a significant reduction in potentiation of APV treated slices compared to vehicle ($p < 0.005$, n = 6-9 per group) whereas Protein A-purified anti-NMDAR Aabs treated slices revealed no significant changes in potentiation of any condition when compared to vehicle slices ($p = 0.98$, n = 6-9 per group). Data represented as mean ± SD, **: $p < 0.01$. **(C)** Normalised mean traces of vehicle, 'positive' (mNMDAR, rNMDAR) and 'negative' (mIgG2b, rIgG) control treated slices during LTP induction. Vehicle experiments typically elicited a potentiation of ~150% post-HFS, which was maintained for at least 1 h. **(D)** Comparison of LTP magnitude (mean fEPSP slope during 80-90min of experiment) revealed no significant changes in potentiation of any condition when compared to vehicle slices (mNMDAR $p = 0.9238$, rNMDAR $p = 0.9676$, mIgG2b $p = 0.9999$, rIgG $p = 0.9543$, n = 5-8 per group). Data represented as mean ± SD.