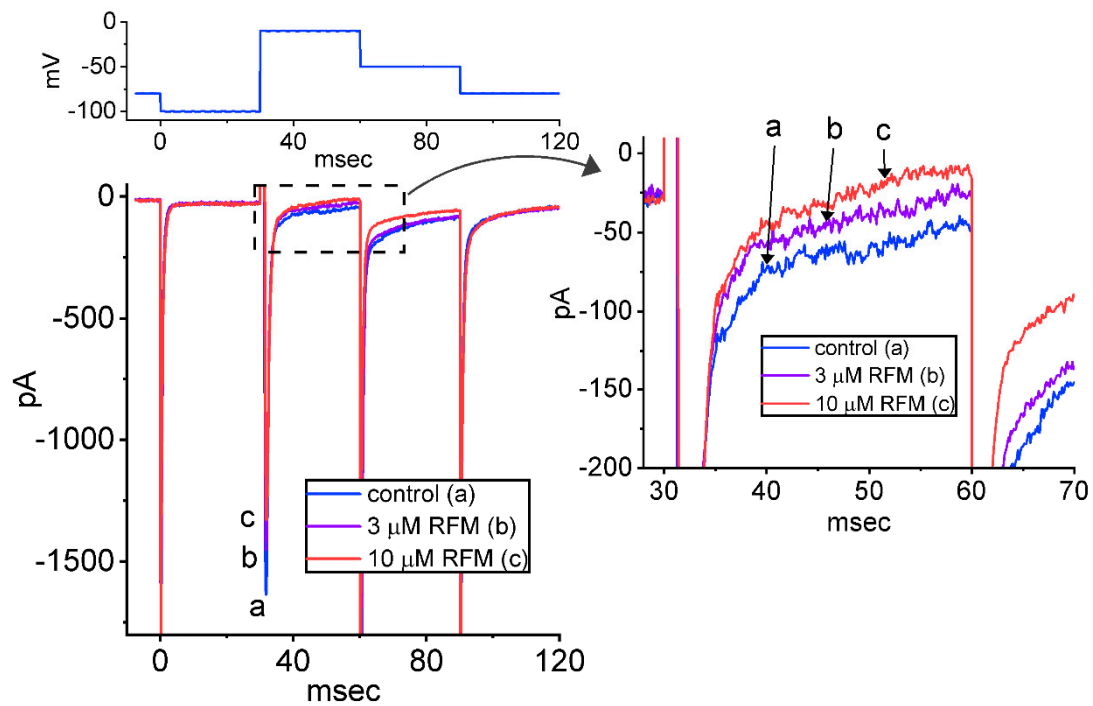


## Supplementary Information

### *Effect of rufinamide (RFM) on voltage-gated $\text{Na}^+$ current ( $I_{\text{Na}}$ ) in mouse hippocampal (mHippoE-14) neurons*

In another set of experiments, we sought to determine if the presence of RFM can result in any perturbations on peak and late components of  $I_{\text{Na}}$  in hippocampal mHippoE-14 cells. The preparation of hippocampal neurons is illustrated in **Materials and Methods**. As cells were depolarized from -100 to -10 mV with a duration of 30 msec, the peak and late amplitude of  $I_{\text{Na}}$  was robustly evoked with a rapid activating and inactivating time course. One minute of exposing cells to 3 or 10  $\mu\text{M}$  RFM progressively and differentially decreased the peak and late  $I_{\text{Na}}$  (**Supplementary Figure S1**). For example, the presence of 10  $\mu\text{M}$  RFM significantly decreased the peak and late  $I_{\text{Na}}$  to  $1234 \pm 89$  and  $21 \pm 6$  pA ( $n = 8$ ,  $P < 0.05$ ) from control values of  $1623 \pm 102$  and  $49 \pm 9$  pA ( $n = 8$ ), respectively. After washout of RFM, peak and late amplitudes of  $I_{\text{Na}}$  were returned to  $1611 \pm 98$  and  $48 \pm 9$  pA ( $n = 8$ ). It is clear from the present observations that similar to the results found in pituitary GH<sub>3</sub> cells, the presence of RFM is effective in suppressing peak and late  $I_{\text{Na}}$  in mHippoE-14 neurons and that RFM decreased late  $I_{\text{Na}}$  to a greater extent than peak  $I_{\text{Na}}$ .



**Supplementary Figure S1.** Inhibitory effect of RFM on  $I_{Na}$  in hippocampal mHippoE-14 cells.

In these experiments, cells were immersed in  $Ca^{2+}$ -free, Tyrode's solution containing 10 mM tetraethylammonium chloride and 0.5 mM  $CdCl_2$ , and the recording electrode was filled with  $Cs^+$ -containing solution. The upper part shows the voltage-clamp protocol applied. Current trace labeled a is control, and those labeled b and c were acquired in the presence of 3 and 10  $\mu M$  RFM, respectively. Current traces at a faster time scale in the right side indicate an expanded record from dashed box in the left side.