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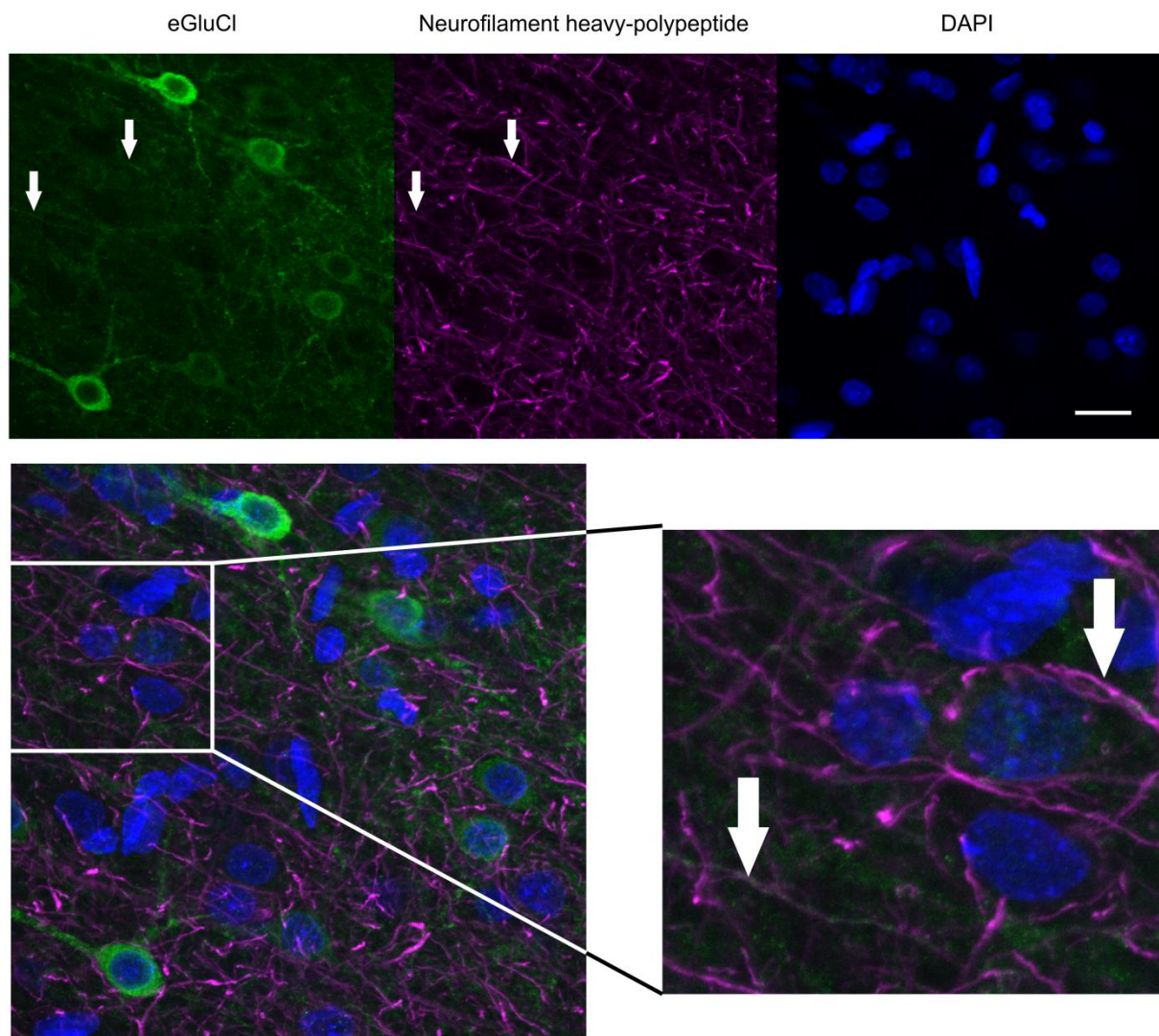
# Biochemical autoregulatory gene therapy for focal epilepsy

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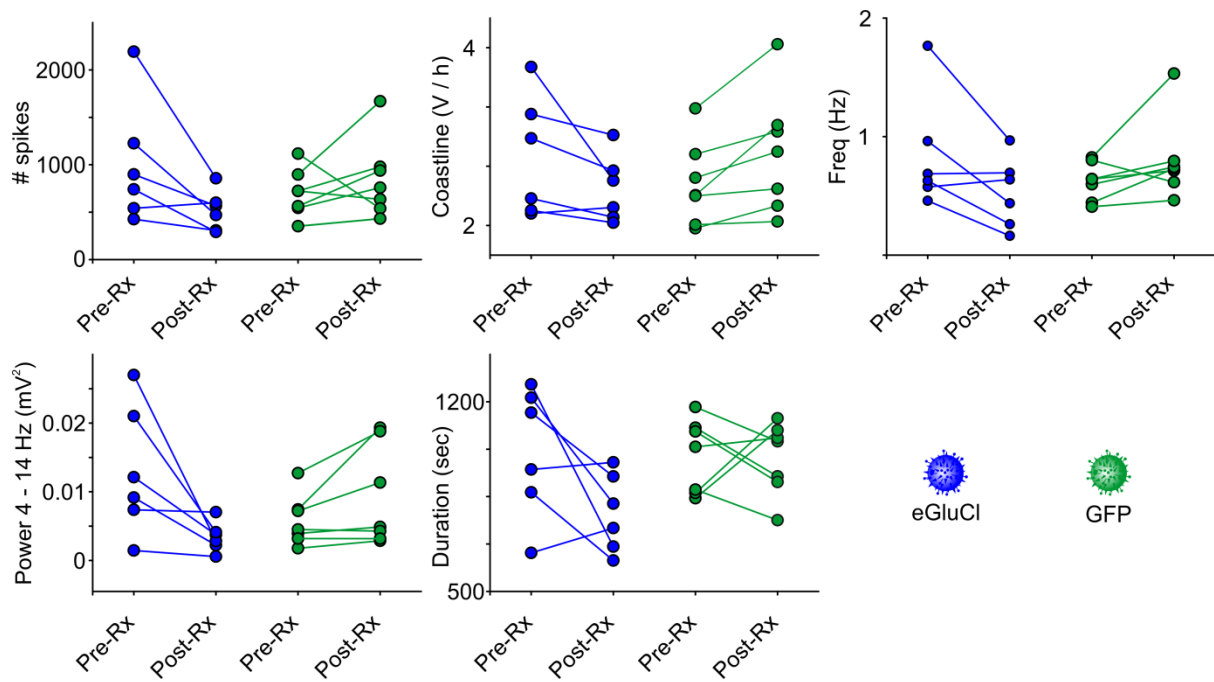
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**Supplementary Figure 1: Immunolabeling of eGluCl, neurofilament and DAPI.**



The arrows indicate the overlap of eGluCl and neurofilament heavy polypeptide. The merged image is shown on bottom (n=1 animal). (scale bar 20 $\mu$ m)

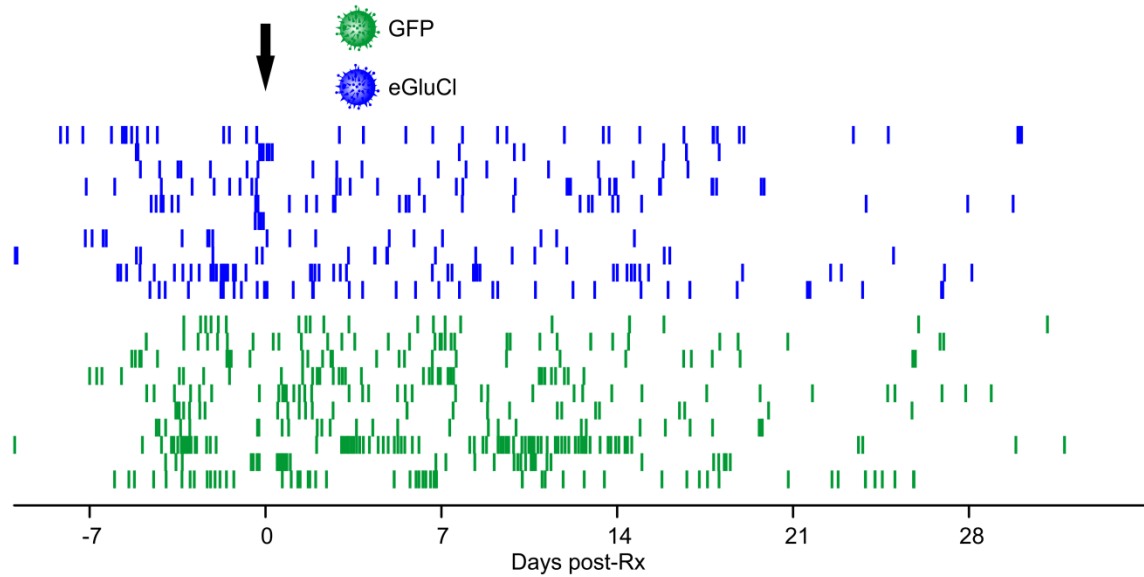
**Supplementary Figure 2: Quantification of the acute chemoconvulsant-induced seizure model.**



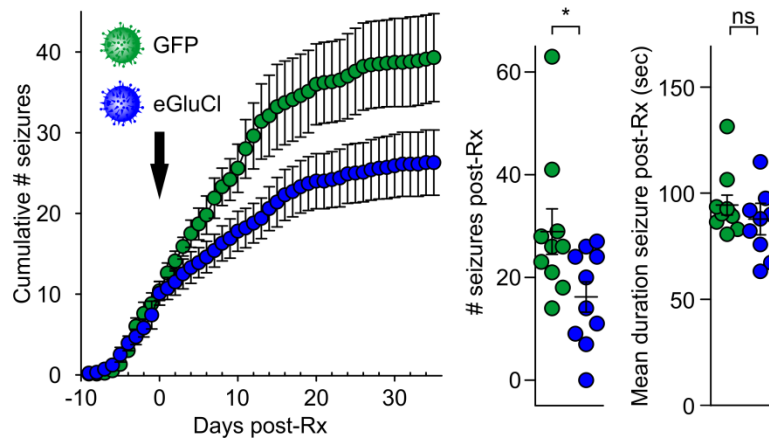
Absolute number of spikes (# spikes), coastline, spike frequency, 4-14Hz power, and seizure duration in animals injected with pilocarpine pre-Rx and post-Rx.

### Supplementary Figure 3: Quantification of the model of chronic focal neocortical epilepsy.

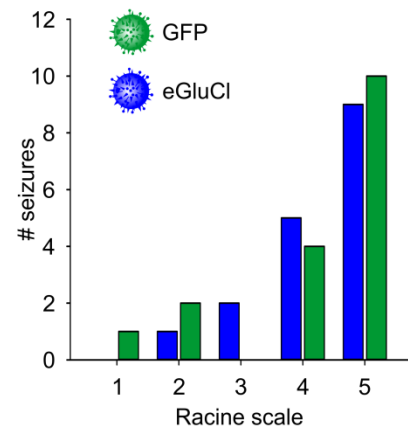
a



b

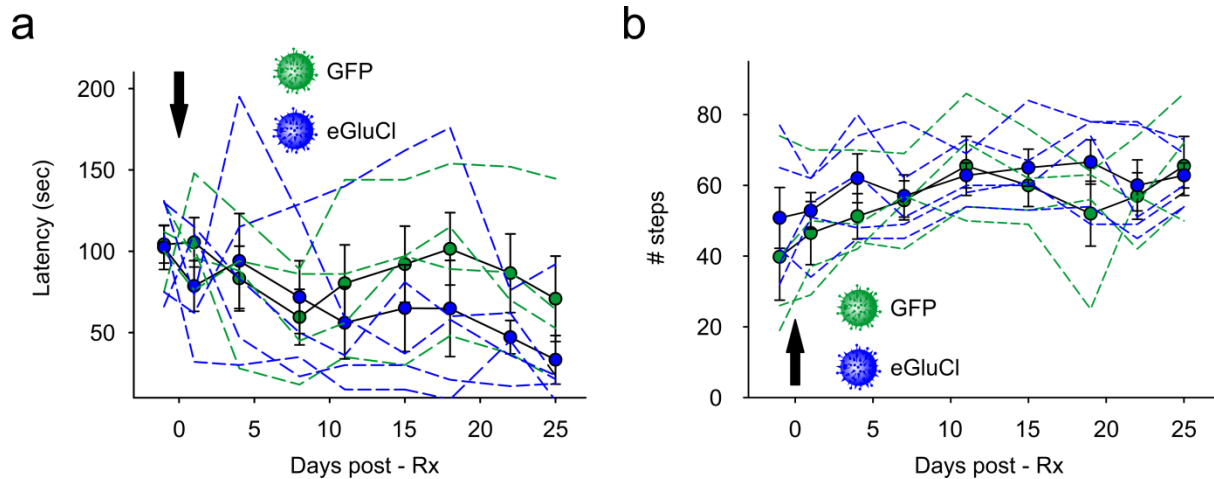


c



(a) Raster plot of seizures in all animals after TetTx injection. The arrow indicates lentivector injection. (b) Left: cumulative absolute number of seizures in animals treated with either eGluCl or GFP (mean $\pm$ sem). The arrow indicates the time point of lentivector injection. Middle: absolute cumulative number of seizures for all animals post-Rx at day 35 (eGluCl: 16.2 $\pm$ 2.9, n=10; GFP: 28.9 $\pm$ 4.4, n=10; mean $\pm$ sem, p=0.034, Mann Whitney test). \*p<0.05. Right: Average seizure duration in all animals (eGluCl 85.6 $\pm$ 53 sec, n=9; GFP 94.3 $\pm$ 4.7 sec, n=10; mean $\pm$ sem, p=0.278, Mann Whitney test; note that one eGluCl-treated animal did not experience any seizures post-Rx). (c) Racine scale for randomly selected seizures (three from each of 6 animals in each group).

# Supplementary Figure 4: Long term behavioural side effect screen.



**(a)** Latency to fall from rotarod before and after treatment with eGluCl or GFP. The arrow indicates the timepoint of lentivector injection (mean $\pm$ sem, two-way ANOVA,  $F(1,56)=0.72$ ; eGluCl,  $n=5$ ; GFP,  $n=4$ ). The dashed lines represent individual experiments. **(b)** Absolute number of steps taken by the same animals on the elevated grid (mean $\pm$ sem, two-way ANOVA,  $F(1,56)=0.37$ ; eGluCl,  $n=5$ ; GFP,  $n=4$ ). The dashed lines represent individual experiments.