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Involvement of GPR143 in the hippocampal pathophysiological alteration after limbic seizures

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Temporal lobe epilepsy (TLE) is the most common form of epilepsy. The hippocampus, located in the mesial temporal lobe, is implicated in the development of TLE. However, mechanisms underlying hippocampal epileptogenesis in TLE remain unclear. Here, we investigated whether ocular albinism 1 gene product (GPR143), which is highly expressed in the hippocampus, is involved in hippocampal epileptogenesis in TLE. We induced limbic seizures by administration of kainic acid. We found that seizure scores reduced in *Gpr143*-gene deficient (GPR143-KO) mice compared to *wild-type* (*wt*) mice. Next, we performed histological examination. To evaluate granule cell reorganization, we measured the width of the granule cell layer 6 days after seizure induction. The granule cell layer dispersed less in GPR143-KO mice than *wt* mice. We further found that an increased number of survival neurons and a morphological change of microglia in the CA3 region and its surrounding area in GPR143-KO mice, respectively. Thirty days after seizure induction, we observed aberrant sprouting of granule cell axons in the molecular layer. We immunohistochemically assessed the distribution of synaptoporin, a protein that is often present in the mossy fiber boutons, in the molecular layer. The intensity of ectopic synaptoporin signals decreased in GPR143-KO mice, suggesting that mossy fiber sprouting occured less compared to *wt* mice. Thus, our findings indicate that GPR143 is involved in the modulation of seizure phenotype and hippocampal epileptogenesis in TLE.