Interictal EEG discoordination in a rat seizure model

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Introduction

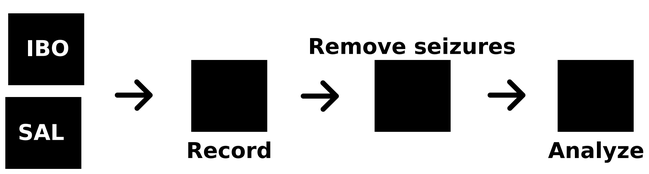
Do patients with medial temporal lobe epilepsy (MTLE) display abnormal EEG activity during interictal states?

Methods

Animal model of MTLE:
P7: bilateral injection of ibotenic acid (**IBO**) or saline (**SAL**) into ventral hippocampus of Long-Evans rats

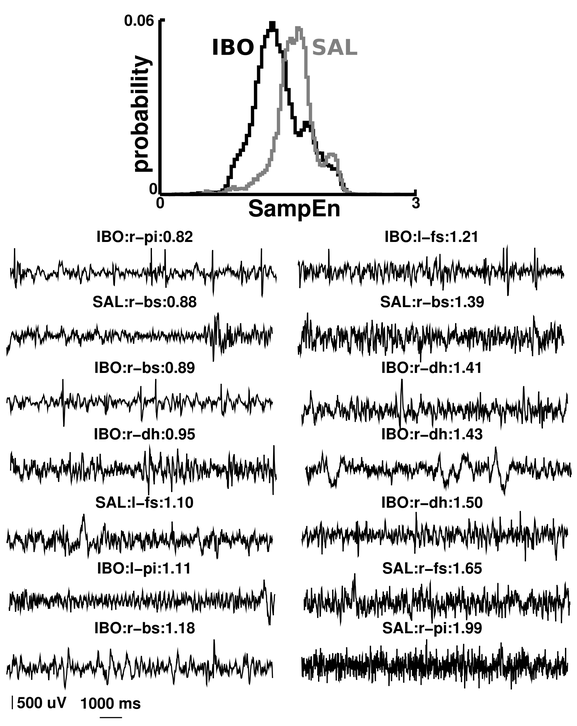
P60-90: LFP recorded bilaterally from piriform (pi), dorsal hippocampus (dh), front cortical screw (fs), back cortical screw (bs)

Seizures+noise detected/excluded with White/Dudek/Staley algorithm



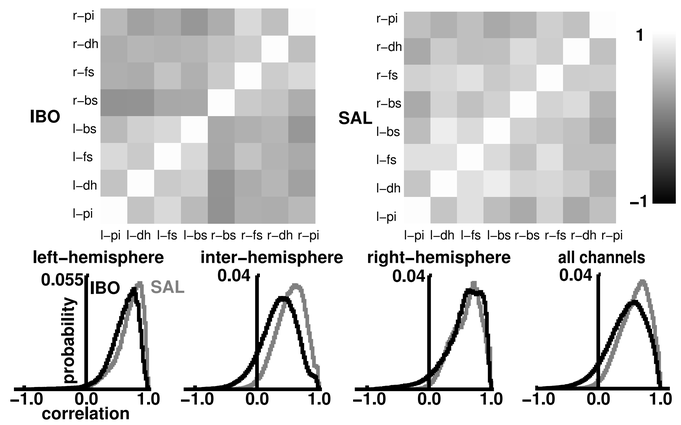
Results

Reduced entropy in interictal LFP across areas and time-scales

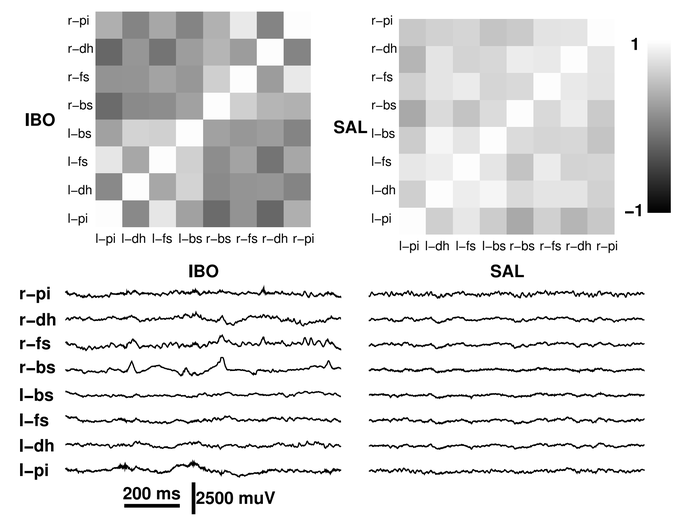


Reduced coordination across different areas, most noticeably interhemispherically

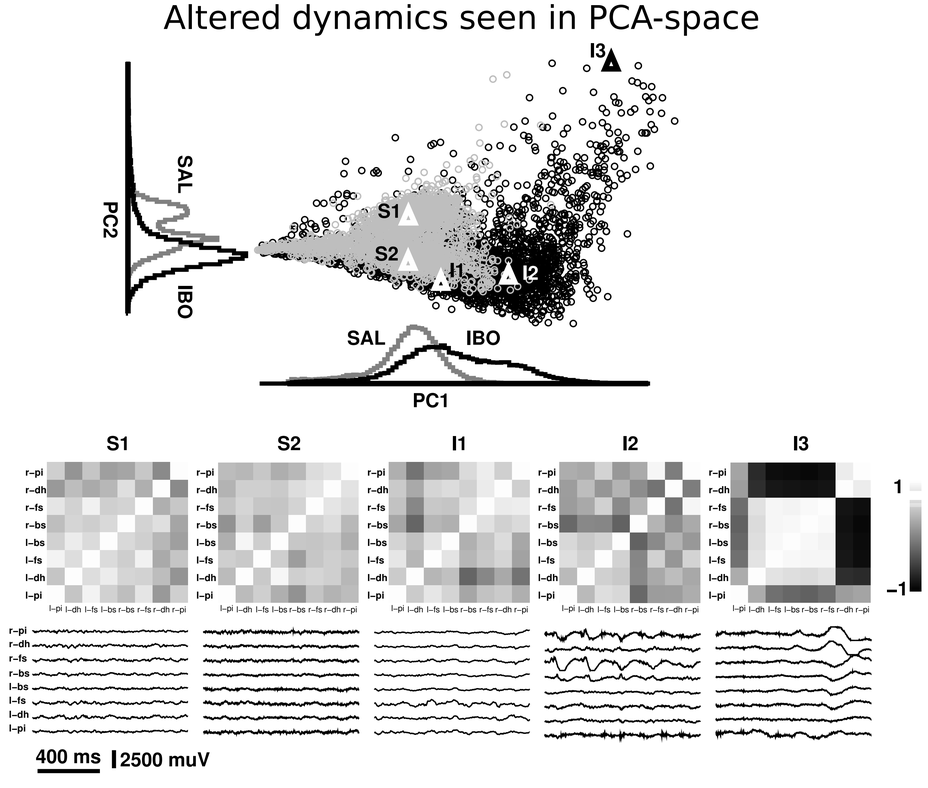
Average correlation matrices and distributions



Examples of typical correlation states and LFPs

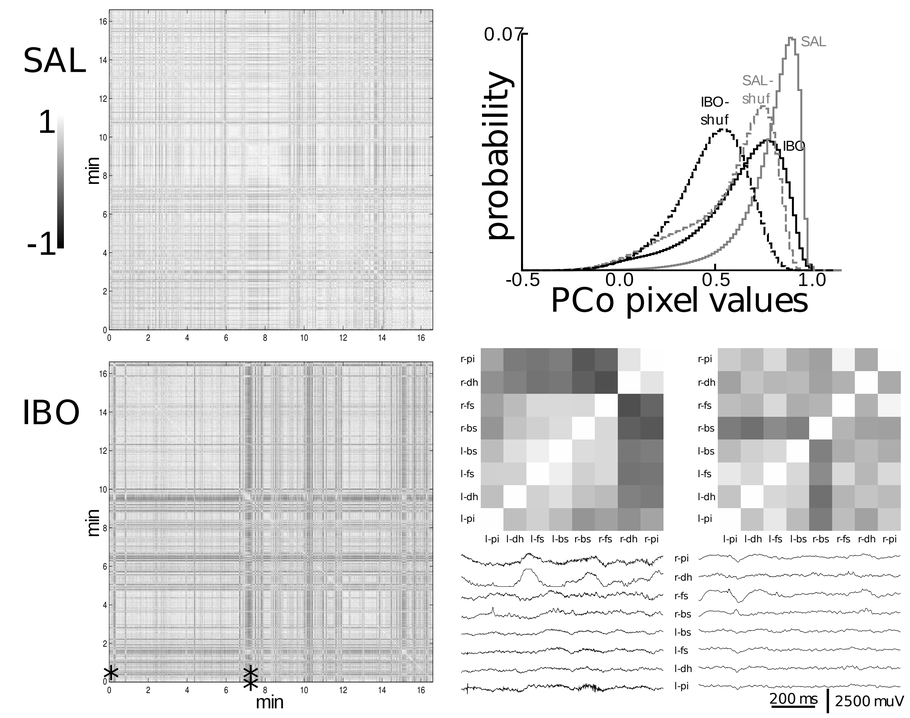


Altered dynamics seen in PCA-space



Altered temporal variability

Measure population coordination (PCo) -- recurrence of correlation relations across time.



Conclusions

1. We could distinguish epileptic from control animals based on the different patterns of activity similarity (population coordination) across electrodes.

2. A major feature of this was a large decrease in coordination across hemispheres, suggesting a breakdown in interhemispheric communication.

3. We speculate that any tendency of areas to lose communication or break away from coordinated brain activity might predispose to seizures in these areas.

Acknowledgments

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