

## Life Sciences Reporting Summary

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## ► Experimental design

## 1. Sample size

Describe how sample size was determined.

Rare data from neurosurgical patients undergoing sleep deprivation were collected over 7 years. The main findings are highly significant statistically, and can be observed in data of individual participants.

## 2. Data exclusions

Describe any data exclusions.

N/A

## 3. Replication

Describe whether the experimental findings were reliably reproduced.

The main findings were reliably reproduced across individual sessions and subjects as can be seen in dots (Figure 3e, Figure 4e,f) and Supplementary Figure 6.

## 4. Randomization

Describe how samples/organisms/participants were allocated into experimental groups.

N/A

## 5. Blinding

Describe whether the investigators were blinded to group allocation during data collection and/or analysis.

N/A

Note: all studies involving animals and/or human research participants must disclose whether blinding and randomization were used.

## 6. Statistical parameters

For all figures and tables that use statistical methods, confirm that the following items are present in relevant figure legends (or in the Methods section if additional space is needed).

n/a Confirmed

- ☐ ☒ The exact sample size ( $n$ ) for each experimental group/condition, given as a discrete number and unit of measurement (animals, litters, cultures, etc.)
- ☐ ☒ A description of how samples were collected, noting whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
- ☐ ☒ A statement indicating how many times each experiment was replicated
- ☐ ☒ The statistical test(s) used and whether they are one- or two-sided (note: only common tests should be described solely by name; more complex techniques should be described in the Methods section)
- ☐ ☒ A description of any assumptions or corrections, such as an adjustment for multiple comparisons
- ☐ ☒ The test results (e.g.  $P$  values) given as exact values whenever possible and with confidence intervals noted
- ☐ ☒ A clear description of statistics including central tendency (e.g. median, mean) and variation (e.g. standard deviation, interquartile range)
- ☐ ☒ Clearly defined error bars

See the web collection on [statistics for biologists](#) for further resources and guidance.

## ► Software

Policy information about [availability of computer code](#)

### 7. Software

Describe the software used to analyze the data in this study.

Analysis was performed in Matlab using custom-developed analysis routines and using the publicly available software package EEGLAB

For manuscripts utilizing custom algorithms or software that are central to the paper but not yet described in the published literature, software must be made available to editors and reviewers upon request. We strongly encourage code deposition in a community repository (e.g. GitHub). *Nature Methods* [guidance for providing algorithms and software for publication](#) provides further information on this topic.

## ► Materials and reagents

Policy information about [availability of materials](#)

### 8. Materials availability

Indicate whether there are restrictions on availability of unique materials or if these materials are only available for distribution by a for-profit company.

N/A

### 9. Antibodies

Describe the antibodies used and how they were validated for use in the system under study (i.e. assay and species).

N/A

### 10. Eukaryotic cell lines

a. State the source of each eukaryotic cell line used.

N/A

b. Describe the method of cell line authentication used.

N/A

c. Report whether the cell lines were tested for mycoplasma contamination.

N/A

d. If any of the cell lines used are listed in the database of commonly misidentified cell lines maintained by [ICLAC](#), provide a scientific rationale for their use.

N/A

## ► Animals and human research participants

Policy information about [studies involving animals](#); when reporting animal research, follow the [ARRIVE guidelines](#)

### 11. Description of research animals

Provide details on animals and/or animal-derived materials used in the study.

N/A

Policy information about [studies involving human research participants](#)

### 12. Description of human research participants

Describe the covariate-relevant population characteristics of the human research participants.

Twelve patients (age 19–52 years, 5 females) with pharmacologically intractable epilepsy underwent monitoring with depth electrodes for seizure foci identification and potential surgical treatment. Patients provided written informed consent prior to participation in the research study, under the approval of the Medical Institutional Review Board at the University of California, Los Angeles, USA. Electrode location was based only on clinical criteria, and Dr. Itzhak Fried performed all surgeries. For each subject, localization of the seizure onset zone was based on recordings during hospital monitoring, in combination with prior functional and anatomical neuroimaging.