Reporting Summary

Nature Portfolio wishes to improve the reproducibility of the work that we publish. This form provides structure for consistency and transparency in reporting. For further information on Nature Portfolio policies, see our Editorial Policies and the Editorial Policy Checklist.

Statistics

For all statistical analyses, confirm that the following items are present in the figure legend, table legend, main text, or Methods section.

- Confirmed
  - The exact sample size (n) for each experimental group/condition, given as a discrete number and unit of measurement
  - A statement on whether measurements were taken from distinct samples or whether the same sample was measured repeatedly
  - The statistical test(s) used AND whether they are one- or two-sided
    - Only common tests should be described solely by name; describe more complex techniques in the Methods section.
  - A description of all covariates tested
  - A description of any assumptions or corrections, such as tests of normality and adjustment for multiple comparisons
  - A full description of the statistical parameters including central tendency (e.g. means) or other basic estimates (e.g. regression coefficient) AND variation (e.g. standard deviation) or associated estimates of uncertainty (e.g. confidence intervals)
  - For null hypothesis testing, the test statistic (e.g. F, t, r) with confidence intervals, effect sizes, degrees of freedom and P value noted
    - Give P values as exact values whenever suitable.
  - For Bayesian analysis, information on the choice of priors and Markov chain Monte Carlo settings
  - For hierarchical and complex designs, identification of the appropriate level for tests and full reporting of outcomes
  - Estimates of effect sizes (e.g. Cohen’s d, Pearson’s r), indicating how they were calculated

Our web collection on statistics for biologists contains articles on many of the points above.

Software and code

Policy information about availability of computer code

Data collection  Data was collected with the Open E-phys GUI and FLIR’s SDK “Spinnaker C++”.

Data analysis  All the code used to analyze the results will be deposited at https://github.com/EvolutionaryNeuralCodingLab/Temperature-robust-REM-and-SWS-in-Laudakia-vulgaris upon acceptance

For manuscripts utilizing custom algorithms or software that are central to the research but not yet described in published literature, software must be made available to editors and reviewers. We strongly encourage code deposition in a community repository (e.g. Github). See the Nature Portfolio guidelines for submitting code & software for further information.

Data

Policy information about availability of data

All manuscripts must include a data availability statement. This statement should provide the following information, where applicable:
- Accession codes, unique identifiers, or web links for publicly available datasets
- A description of any restrictions on data availability
- For clinical datasets or third party data, please ensure that the statement adheres to our policy

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.
Human research participants

Policy information about studies involving human research participants and Sex and Gender in Research.

Reporting on sex and gender
Use the terms sex (biological attribute) and gender (shaped by social and cultural circumstances) carefully in order to avoid confusing both terms. Indicate if findings apply to only one sex or gender; describe whether sex and gender were considered in study design whether sex and/or gender was determined based on self-reporting or assigned and methods used. Provide in the source data disaggregated sex and gender data where this information has been collected, and consent has been obtained for sharing of individual-level data; provide overall numbers in this Reporting Summary. Please state if this information has not been collected. Report sex- and gender-based analyses where performed, justify reasons for lack of sex- and gender-based analysis.

Population characteristics
Describe the covariate-relevant population characteristics of the human research participants (e.g. age, genotypic information, past and current diagnosis and treatment categories). If you filled out the behavioural & social sciences study design questions and have nothing to add here, write “See above.”

Recruitment
Describe how participants were recruited. Outline any potential self-selection bias or other biases that may be present and how these are likely to impact results.

Ethics oversight
Identify the organization(s) that approved the study protocol.

Note that full information on the approval of the study protocol must also be provided in the manuscript.

Field-specific reporting

Please select the one below that is the best fit for your research. If you are not sure, read the appropriate sections before making your selection.

☒ Life sciences  ☐ Behavioural & social sciences  ☐ Ecological, evolutionary & environmental sciences

For a reference copy of the document with all sections, see nature.com/documents/nr-reporting-summary-flat.pdf

Life sciences study design

All studies must disclose one these points even when the disclosure is negative.

Sample size
Experiments were conducted until further experiments yielded no new knowledge. To reach this point, the number of experiments varied depending on the features tested and the difficulty of the experiment [with a minimum of 9 data points].

Data exclusions
Experiments focus on measurements from animals implanted with electrodes. Animals that died during the implantation procedure or ones for which the implantation procedure failed, were not included in the analysis. Other exclusions were made on the basis of stringent criteria. These criteria are specified in the manuscript. In cases were videos were analyzed, only videos with reliable syncing with electrophysiological data were included.

Replication
Our experimental results were successfully replicated.

Randomization
Allocation of lizard to the experimental group was random.

Blinding
All lizards were part of one group - no blinding required.

Reporting for specific materials, systems and methods

We require information from authors about some types of materials, experimental systems and methods used in many studies. Here, indicate whether each material, system or method listed is relevant to your study. If you are not sure if a list item applies to your research, read the appropriate section before selecting a response.
Materials & experimental systems

Methods

| Involved in the study |
|-----------------------|
| n/a                   |

- Antibodies
- Eukaryotic cell lines
- Palaeontology and archaeology
- Animals and other organisms
- Clinical data
- Dual use research of concern

- Involved in the study
- ChiP-seq
- Flow cytometry
- MRI-based neuroimaging

Animals and other research organisms

Policy information about studies involving animals: ARRIVE guidelines recommended for reporting animal research, and Sex and Gender in Research.

| Laboratory animals | Wild caught, adult, Laudakia vulgaris from both sexes were used in this study (age unknown) |
|--------------------|-----------------------------------------------------------------------------------------------|
| Wild animals       | Adult Laudakia vulgaris from both sexes (unknown age) were caught in the wild by an Animal Capture Professional under the approval of the Israel Nature and Parks Authority [Approval number: 2021/42698]. At the end of the study, animals were sacrificed in accordance with our ethics protocol [Approval number: 04-21-034]. |
| Reporting on sex   | Sex was not considered in this study. Both male and female lizards were used. |
| Field-collected samples | The study did not involve samples collected from the field. |
| Ethics oversight   | All experiments were approved by Tel Aviv University ethical committee [Approval number: 04-21-034]. |

Note that full information on the approval of the study protocol must also be provided in the manuscript.