

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](#).

Please do not complete any field with "not applicable" or n/a. Refer to the help text for what text to use if an item is not relevant to your study.

For final submission: please carefully check your responses for accuracy; you will not be able to make changes later.

Statistics

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

n/a 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 ~~not applicable~~

Data analysis ~~not applicable~~

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 Pima-S6 genome assembly, Pima-S6 and Pima 3-79 leaves and roots RNA-seq data are available under NCBI BioProject accession PRJNA798371, with reviewer link:

<https://dataview.ncbi.nlm.nih.gov/object/PRJNA798371?reviewer=4hgaaevsjpg6lc4og7rk35l>

The Pima 3-79 RagTag assembly, Pima-S6 and Pima 3-79 RagTag unfiltered and filtered genome annotations, and Pima-S6, Pima 3-79 and TM-1 functional annotations are available to reviewers at Cyverse's Discovery Environment with the following public links:

https://data.cyverse.org/dav-anon/iplant/home/rchavez/cotton/ChavezMontes_Pima-S6_README.txt

https://data.cyverse.org/dav-anon/iplant/home/rchavez/cotton/PimaS6_annotation_pimas6ids.gff3.gz

https://data.cyverse.org/dav-anon/iplant/home/rchavez/cotton/gene_association.gobar526ragtag.nr.gz

https://data.cyverse.org/dav-anon/iplant/home/rchavez/cotton/gene_association.gohir527.nr.gz

Human research participants

Policy information about [studies involving human research participants and Sex and Gender in Research](#)

Reporting on sex and gender Population characteristics
 Recruitment Ethics oversight

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](https://www.nature.com/documents/nr-reporting-summary-flat.pdf)

Life sciences study design

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

Sample size
 Data exclusions
 Replication
 Randomization
 Blinding
 Behavioural & social sciences study design

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

Study description
 Research sample
 Sampling strategy
 Data collection
 Timing
 Data exclusions
 Non-participation
 Randomization
 Ecological, evolutionary & environmental sciences study design

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

Study description
 Research sample
 Sampling strategy
 Data collection
 Timing and spatial scale
 Data exclusions
 Reproducibility
 Randomization
 Blinding

Did the study involve field work? ☐ Yes ☒ No

Field work, collection and transport

Field conditions
 Location
 Access & import/export
 Disturbance

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

- n/a Involved in the study
- ☒ ☐ Antibodies
- ☒ ☐ Eukaryotic cell lines
- ☒ ☐ Palaeontology and archaeology
- ☒ ☐ Animals and other organisms
- ☒ ☐ Clinical data
- ☒ ☐ Dual use research of concern

Methods _{n/a}

- Involved in the study
- ☒ ☐ ChIP-seq
- ☒ ☐ Flow cytometry
- ☒ ☐ MRI-based neuroimaging

Antibodies Validation

Eukaryotic cell lines Policy information about [cell lines and Sex and Gender in Research](#)

Cell line source(s) Authentication Mycoplasma contamination

Commonly misidentified lines
(See [ICLAC](#) register)

Palaeontology and Archaeology Specimen provenance Specimen deposition

Dating methods

Tick this box to confirm that the raw and calibrated dates are available in the paper or in Supplementary Information.

Ethics oversight

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

Animals and other research organisms

Policy information about [studies involving animals; ARRIVE guidelines](#) recommended for reporting a [in Research](#)

Laboratory animals

Wild animals

Reporting on sex

Field-collected samples

Ethics oversight

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

Clinical data Policy information about [clinical studies](#)

All manuscripts should comply with the ICMJE [guidelines for publication of clinical research](#) and a completed [CONSORT checklist](#) must be included with all submissions.

Clinical trial registration Study protocol Data collection Outcomes

Dual use research of concern Policy information about [dual use research of concern](#) Hazards

Could the accidental, deliberate or reckless misuse of agents or technologies generated in the work, or the application of information presented in the manuscript, pose a threat to:

- | No | Yes |
|--------------------------|---|
| ☐ | ☐ Public health |
| ☐ | ☐ National security |
| ☐ | ☐ Crops and/or livestock |
| ☐ | ☐ Ecosystems |
| ☐ | ☐ Any other significant area |

Experiments of concern

Does the work involve any of these experiments of concern:

- | No | Yes |
|--------------------------|--|
| ☐ | ☐ Demonstrate how to render a vaccine ineffective |
| ☐ | ☐ Confer resistance to therapeutically useful antibiotics or antiviral agents |
| ☐ | ☐ Enhance the virulence of a pathogen or render a nonpathogen virulent |
| ☐ | ☐ Increase transmissibility of a pathogen |
| ☐ | ☐ Alter the host range of a pathogen |
| ☐ | ☐ Enable evasion of diagnostic/detection modalities |
| ☐ | ☐ Enable the weaponization of a biological agent or toxin |
| ☐ | ☐ Any other potentially harmful combination of experiments and agents |

ChIP-seq

Data deposition

Confirm that both raw and final processed data have been deposited in a public database such as [GEO](#).

Confirm that you have deposited or provided access to graph files (e.g. BED files) for the called peaks.

Data access links *undefined*

May remain private before publication.

Files in database submission *undefined*

Genome browser session

undefined

(e.g. [UCSC](#))

Methodology

Replicates *undefined*

Sequencing depth *undefined*

Antibodies *undefined*

Peak calling parameters *undefined*

Data quality *undefined*

Software *undefined*

Flow Cytometry

Plots

Confirm that:

The axis labels state the marker and fluorochrome used (e.g. CD4-FITC).

The axis scales are clearly visible. Include numbers along axes only for bottom left plot of group (a 'group' is an analysis of identical markers).

All plots are contour plots with outliers or pseudocolor plots.

A numerical value for number of cells or percentage (with statistics) is provided.

Methodology

Sample preparation *undefined*

Instrument *undefined*

Software *undefined*

Cell population abundance *undefined*

Gating strategy *undefined*

Tick this box to confirm that a figure exemplifying the gating strategy is provided in the Supplementary Information.

Magnetic resonance imaging

Experimental design

Design type *undefined*

Design specifications *undefined*

Behavioral performance measures *undefined*

Acquisition

Imaging type(s) *undefined*

Field strength *undefined*

Sequence & imaging parameters *undefined*

Area of acquisition *undefined*

Diffusion MRI

☐ Used

☐ Not used

Preprocessing

Preprocessing software *undefined*

Normalization *undefined*

Normalization template *undefined*

Noise and artifact removal *undefined*

Volume censoring *undefined*

Statistical modeling & inference

Model type and settings *undefined*

Effect(s) tested *undefined*

Specify type of analysis: ☐ Whole brain ☐ ROI-based ☐ Both

Statistic type for inference

undefined

(See [Eklund et al. 2016](#))

Correction *undefined*

Models & analysis

n/a Involved in the study

- ☐ ☐ Functional and/or effective connectivity
- ☐ ☐ Graph analysis
- ☐ ☐ Multivariate modeling or predictive analysis

Functional and/or effective connectivityundefined

Graph analysisundefined

Multivariate modeling and predictive analysisundefined