

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.

n/a	Confirmed
☒	☒ The exact sample size (<i>n</i>) 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 <i>Only common tests should be described solely by name; describe more complex techniques in the Methods section.</i>
☒	☐ 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. <i>F</i> , <i>t</i> , <i>r</i>) with confidence intervals, effect sizes, degrees of freedom and <i>P</i> value noted <i>Give P values as exact values whenever suitable.</i>
☒	☐ 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 <i>d</i> , Pearson's <i>r</i>), 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	No software was used for data collection.
Data analysis	Following softwares were used to analyze RNA-seq data. Splice Transcripts Alignments to Reference (STAR) version 2.7.0a method (Dobin et al., 2013), EdgeR (Robinson et al., 2010), FastQC http://www.bioinformatics.babraham.ac.uk/projects/fastqc/ , R www.r-project.org , For hypocotyl measurement imageJ NIH http://rsb.info.nih.gov/ij/ was used. The ComplexHeatmap (Gu et al., 2016) was used for Heatmap analysis. Enhanced Volcano R package (https://github.com/kevinblighe/EnhancedVolcano) was used for volcano plot.

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](#)

Gene Expression Omnibus database (accession number GSE262197)

Source data are provided with this paper.

Research involving human participants, their data, or biological material

Policy information about studies with [human participants or human data](#). See also policy information about [sex, gender \(identity/presentation\), and sexual orientation](#) and [race, ethnicity and racism](#).

Reporting on sex and gender N.A.

Reporting on race, ethnicity, or other socially relevant groupings N.A.

Population characteristics N.A.

Recruitment N.A.

Ethics oversight N.A.

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 Three independently harvested and dried Arabidopsis thaliana seeds were used for phenotypic analysis. Each experiment represents results from at least 10 seedlings as indicated in the method section. Sample sizes were chosen based on past experience and typical sample sizes reported in the literature.

Data exclusions No data exclusions.

Replication All phenotypic experiments were replicated at least three times. Some of the Western blots were repeated twice.

Randomization Experimental samples were numbered and experiments were performed by investigators.

Blinding Investigators were blinded to group allocation.

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

☐ ☒ Plants

Methods

n/a Involved in the study

☒ ☐ ChIP-seq

☒ ☐ Flow cytometry

☒ ☐ MRI-based neuroimaging

Antibodies

Antibodies used anti-HY5 (Abiocode, Cat. R1245-2), anti-NRT1.1 (Agrisera, Cat. AS12 2611), anti-Tubulin (Invitrogen, Cat. 32-2500), anti-mouse (Biorad, Cat. 170-6516), anti-rabbit (Agrisera, Cat. AS09 602)

Validation

Antibodies are commercially available from companies as indicated.
 anti-HY5 Cat. R1245-2 <https://www.abiocode.com/products/?type=detail&id=3184>
 anti-NRT1.1 Cat. AS12 2611 <https://www.agrisera.com/en/artiklar/nrt11-nitrate-transporter-11.html>
 anti-Tubulin Cat. 32-2500 <https://www.thermofisher.com/antibody/product/alpha-Tubulin-Antibody-clone-B-5-1-2-Monoclonal/32-2500>
 anti-mouse <https://www.bio-rad.com/en-us/sku/1706516-goat-anti-mouse-igg-h-l-hrp-conjugate?ID=1706516>
 anti-rabbit <https://www.agrisera.com/en/artiklar/goat-anti-rabbit-igg-hl.html>

Eukaryotic cell lines

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

Cell line source(s)

N.A.

Authentication

N.A.

Mycoplasma contamination

N.A.

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

N.A.

Plants

Seed stocks

hy5-215, chl1.5

Novel plant genotypes

hy5-215 chl1.5 double mutant

Authentication

hy5-215 chl1.5 double mutant was verified through genotyping.