

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 (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 analysis

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](#)

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	McGill University (animal ethics committee) and McGill University Health Centre (approved for collections of blood from healthy volunteers and transplantation patients)

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 on these points even when the disclosure is negative.

Sample size	human PBMCs samples n=7+9+3=19 for mice ~200
Data exclusions	N/A
Replication	In vitro experiments at least 2 independent repetitions per experiment an
Randomization	in animal study animals were randomly distributed into group follow the surgery
Blinding	Blinding was performed in some animal experiments . The Th17 polarization over time the samples were blinded for prior sensitization status and cPRA

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
<input type="checkbox"/>	<input checked="" type="checkbox"/> Antibodies
<input checked="" type="checkbox"/>	<input type="checkbox"/> Eukaryotic cell lines
<input checked="" type="checkbox"/>	<input type="checkbox"/> Palaeontology and archaeology
<input type="checkbox"/>	<input checked="" type="checkbox"/> Animals and other organisms
<input type="checkbox"/>	<input checked="" type="checkbox"/> Clinical data
<input checked="" type="checkbox"/>	<input type="checkbox"/> Dual use research of concern
<input checked="" type="checkbox"/>	<input type="checkbox"/> Plants

Methods

n/a	Involved in the study
<input checked="" type="checkbox"/>	<input type="checkbox"/> ChIP-seq
<input type="checkbox"/>	<input checked="" type="checkbox"/> Flow cytometry
<input checked="" type="checkbox"/>	<input type="checkbox"/> MRI-based neuroimaging

Antibodies

Antibodies used	The antibodies used in flowcytometry staining for human PBMCs. antigen conjugate channel laser supplier catalogue no. CD3 BV510 Amcyan violet Biolegend 300447
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CD4 Alexa Fluor 488 FITC blue Life technologies 11-0048-41
 CD8 PE-Cy7 PE-Cy7 yellow Life technologies 25-0084-82
 CD25 BV786 Qdot800 violet BD biosciences 563701
 CD127 PE-Cy5 PE-Cy5 Yellow Life technologies 15-1278-42
 FOXP3 PerCP-Cy5.5 PerCP-Cy5.5 blue BD biosciences 561493
 IFN γ APC-eFluor 780 APC-Cy7 red Life technologies 47-7319-42
 IL17A PE PE yellow BD biosciences 560487
 IL21 APC APC red BD biosciences 560493
 IL22 PerCP-eFluor 710 PerCP-Cy5.5 blue Life technologies 46-7229-42
 ROR γ t BV650 Qdot655 violet BD biosciences 563424
 Viability fixable dye eFluor 455 (UV) Indo-1 (violet) UV Life technologies 65-0868-14

The antibodies used in the flow cytometry staining for mouse splenocytes.

antigen conjugate channel laser supplier catalogue no.
 CD3 BV510 Amcyan violet Biolegend 100233
 CD4 Alexa Fluor 488 FITC blue Life technologies 53-0041-82
 CD8 PE-Cy7 PE-Cy7 yellow Life technologies 25-0081-81
 CD45 APC-Cy7 APC-Cy7 red BD biosciences 561037
 CD117 APC APC red BD biosciences 561074
 CD127 PerCP-eFluor 710 PerCP-Cy5.5 blue Life technologies 46-1271-80
 CD138 PerCP-Cy5.5 PerCP-Cy5.5
 CD169 FITC FITC blue Life technologies MA5-28189
 IFN γ APC-eFluor 780 APC-Cy7 red Life technologies 47-7311-80
 IgG3 Alexa Fluor 594 Texas red yellow BD biosciences A-21155
 IgM Alexa Fluor 350 Indo-1 (violet) UV Life technologies A-31552
 IL17A PE PE yellow Life technologies 12-7177-81
 IL21 APC APC red Life technologies 17-7211-80
 IL22 PerCP-eFluor 710 PerCP-Cy5.5 blue Life technologies 46-7221-80
 Linage (Lin) eFluor 450 Alexa Fluor 405 violet Life technologies 88-7772-72
 Ly6G FITC FITC blue Life technologies 11-9668-80
 ROR γ t BV650 Qdot655 violet BD biosciences 564722
 Viability fixable dye eFluor 455 (UV) Indo-1 (violet) UV Life technologies 65-0868-14
 Viability fixable dye eFluor 506 Amcyan violet Life technologies 65-0866-14
 Viability
 fixable dye eFluor 780 APC-Cy7 red Life technologies 65-0865-14

The antibodies used for immune fluorescence staining of mouse spleen sections.

antigen excitation emission supplier catalogue no.
 IgM 343 nm 441 nm Life technologies A-31552
 IgG 590 nm 618 nm Life technologies A-21155
 Ly6G 498 nm 517 nm Life technologies 11-9668-80
 The antibodies used in immunohistochemistry for mouse skin sections.
 antigen supplier catalogue no.
 CD4 Santa Cruz sc-19641
 IL17A R&D Systems AF317-NA
 Ly6G BD biosciences 551459

Other materials used in human PBMCs polarization experiments.

Item supplier catalogue no.
 Human CD3/CD28 dynabeads Life technologies 11161D
 Human IL-17A ELISA Biolegend 433914
 Human IL21 ELISA Biolegend 433804

Other materials used in mouse experiments.

Item supplier catalogue no.
 Cell stimulation cocktail Life technologies 00-4975-93
 Easysep mouse T Cell isolation kit Stemcell 19851
 Mouse CD3/CD28 dynabeads Life technologies 11456D
 IgG (total) mouse ELISA kit Life technologies 88-50400-22
 IgG3 mouse ELISA kit Life technologies 88-50440-22

Validation

For all antibodies validation can be accessed on manufacturer's website using the catalogue number

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

C57BL/6 and Balb/c mice

Wild animals

N/A

Reporting on sex

N/A

Field-collected samples	Patients samples were collected from the hospital sites and processed within 1 hour of collection
Ethics oversight	McGill University and McGill University Health Centre In vitro experiments using blood samples animal study (animal ethics committee)

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	N/A
Study protocol	N/A
Data collection	N/A
Outcomes	N/A

Plants

Seed stocks	N/A
Novel plant genotypes	N/A
Authentication	N/A

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	PBMCs, Th1, Treg, Th17 polarized PBMCs Mouse splenocytes isolated activated and cytokines stained intracellularly
Instrument	BD LSR-Fortessa flow cytometer
Software	BD FACSDiva™ Software
Cell population abundance	The least cell count 15000 and up to 200000 cell per sample per acquisition
Gating strategy	Cells>single cells>live cells>CD3+>CD4+>IL17A, IL21, IL22, IFN Cells>single cells>live cells>CD3+>CD4+>IL17A, IFN Cells>single cells>live cells>CD3+>CD4+>CD25hi>CD127lo>Foxp3+ (gating provided) mouse splenocytes Cells>single cells>live cells>CD3+>CD4+>IL17A, IL21, IL22 or IFN Cells>single cells>live cells>CD3->Lin->CD117+>CD127+ Cells>single cells>live cells>CD3->CD19+>CD183+>IgM vs IgG3

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