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Reporting Summary

Nature Research 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 Research 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	The data were not collected by using a specifc software.
Data analysis	The statistical evaluation of the experiments were carried out in GraphPad Prism and SigmaPlot. Flow cytometry date were analysed with BD FACS DIVA Software and FlowJo. The quantification of histological stainings were performed by using Sysmex Quant Center software.

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 Research 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 list of figures that have associated raw data
- A description of any restrictions on data availability

All data are available from the authors.

Field-specific reporting

Life sciences study design

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

Sample size	The sample size for all animal experiments were determined by usage of power estimation. The human sample collection was approved by ethical comitee. All available human sample were included in the study, clinical data were also included if they were available (regarding timepoint and parameter).
Data exclusions	No sample was excluded from animal experiments or human sample collection.
Replication	In vivo Antibody depletions were performed in two independent experimental settings. RT-DC experiments were performed at least in 2 independent experiments. Each measured value represents an independent animal.
Randomization	No randomization was used for the experiments. Human samples were evaluated retrospectivly and classifyed by criteria of the revised atlanta classification.
Blinding	The functional experiments on the respective depletions were carried out in a blinded manner (histological evaluation, flow cytometry and blood gas analysis).

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
	☒ Human research participants
☒	Clinical data
☒	Dual use research of concern

Methods

n/a	Involved in the study
☒	ChIP-seq
	☒ Flow cytometry
☒	MRI-based neuroimaging

Antibodies

Antibodies used	The following antibodies were used for FACS staining, IHC staining and immunofluorescence staining: Anti-mouse CD4 BV650 (BioLegend 100546), anti-mouse-CD11b PerCP Cy55 (BioLegend, 101228), anti-mouse-Ly6G BV421 (BioLegend, 127628), anti-mouse-Ly6C BV605 (BioLegend 128036), anti-CD25-PECy7 (BioLegend, 102016), anti-CD69 BV510 (BioLegend, 104532), anti-CD8a BV605 (BioLegend, 100743), anti-FoxP3 APC (Miltenyi Biotec, 130-111-601), anti-mouse-CD11b (abcam, Ab133357), anti-mouse-CD68 (antibody-online, ABIN181836), anti-CCR2 (abcam, ab273050) anti-Ki67 (Bethyl, IHC-00375), anti-mouse-CD11b (abcam, Ab133357), anti-mouse-Ly6g (abcam, Ab25377), anti-mouse-Cystatin C (Novus biologicals, NB100-1033), anti-VE-cadherin (abcam, ab7047-50) anti-rabbit-HRP (DAKO, K4003), anti-mouse-HRP (DAKO, K4001).
Validation	All antibodies were comercial available and characterized by manufacturers. All antibodies which were used for flow cytometry analysis were characterized and evaluated in previouse projekts (Sendler, M. et al. NLRP3 Inflammasome Regulates Development of Systemic Inflammatory Response and Compensatory Anti-Inflammatory Response Syndromes in Mice With Acute Pancreatitis. Gastroenterology 158, 253-269.e14 (2020). or Glaubitz, J. et al. Experimental pancreatitis is characterized by rapid T cell activation, Th2 differentiation that parallels disease severity, and improvement after CD4+ T cell depletion. Pancreatology (2020)). All primary antibodies which were used for histology were validated in positive controls. anti-mouse Cystatin C antibody (used for urine dot blot) was testet in wildtype against Cystain C deficient mice for western blot.

Animals and other organisms

Policy information about studies involving animals; ARRIVE guidelines recommended for reporting animal research

Laboratory animals	Male C57Bl/6J mice were purchased from Charles River Laboratories (Sulzfeld, Germany). All animals were used at an age of 8-12 weeks. Animals were kept under controlled housing conditions; 21–24°C and 12-h light/12-h dark cycle. All animals were inspected daily for their physical conditions. Animals which showing signs moderate pain or suffering were euthanized based on pre-determined human endpoints.
Wild animals	No wild animals were used
Field-collected samples	No field collected samples were used

Ethics oversight	All animal experiments were carried out after prior review and approval by the local animal welfare commission (Lallf 7221.3-1-014/19, Lallf 7221.3-1-011/17 and Lallf 7221.3-1-008/21). All animal experiments were carried out in accordance with the Arrive guidelines and the 3R rules.

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

Human research participants

Policy information about studies involving human research participants

Population characteristics	Our patient population consisted of male and female patients between 18 and 74 years that were admitted to our hospital with a diagnosis of acute pancreatitis between the years 2008 and 2018.
Recruitment	Patients that were admitted to our clinic with a diagnosis of acute pancreatitis were recruited into the study. After they gave written informed consent they answered a questionaire concerning their disease symptoms. EDTA blood and serum samples were drawn at time points 0h, 24h, 48, and 72h.
Ethics oversight	Human samples were collected from consenting patients and all human studies were conducted under the approval of the Institutional Review Board of the University Medicine Greifswald (Reg. number: III UV91/03) and in accordance with the Declaration of Helsinki.

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

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	To analyse splenocytes, spleen was taken and mashed through a 70µm cell strainer. Cells were washed with PBS and centrifuged at 300g for 6 minutes. To lyse erythrocytes pellet was resuspended in 1 ml lysis buffer for 5 minutes. After washing with PBS and centrifugation at 300g for 6 minutes cells were stained with fluorescence antibodies. To analyse leucocytes from lung, lungs were removed from mice and were dissociated according to the protocol of lung dissociation kit from Miltenyi (130-095-927, Bergisch Gladbach, germany).
Instrument	For all Flow cytometry analysis we used BD™ LSR II Flow Cytometer System. High-throughput mechanical analysis was done by real-time fluorescence and deformability cytometry using the AcCellerator system with fluorescence extension (Zellmechanik Dresden GmbH).
Software	Flow cytometry was analysed by BD FACS DIVA Software and FlowJo. RT-DC data were analysed with the Software ShapeOut.
Cell population abundance	Lung monocytes were isolated (lung dissociation Kit, Miltenyi) by usage of monocytes isolation kit (EasySep mouse Monocyte Isolation Kit, Stemcell, 19861A). After isolation lung monocytes are resuspended in PBS (without Ca2+ and Mg2+) complemented with 0.6% (w/v) Methylcellulose to a concentration of approximately 10 x 106 cells per ml. Purity of cells was verified by flow cytometry analysis.
Gating strategy	*Describe the gating strategy used for all relevant experiments, specifying the preliminary FSC/SSC gates of the starting cell population, indicating where boundaries between "positive" and "negative" staining cell populations are defined.*

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