Reporting Summary

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Statistics

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

- 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
- 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 | GE Unicorn v6.3, SoftMaxPro v7.0.2, Biacore T200 control software v2.0, Attune NxT flow cytometry software v3.1.2, Microsoft Excel v2008 |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------|
| Data analysis   | UCSF ChimeraX v0.94, GE Unicorn v6.3, SoftMaxPro v7.0.2, Biacore T200 evaluation software v2.0, Graphpad Prism v8.4, Microsoft Excel v2008, SeqBuilder Pro v16 and v17, SeqMan Pro v16 and v17, FlowJo v10.6.2 with the following plugins: Downsample v3.2, UMAP v2.2, and X-shift v1.3 |

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/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

Raw data for all main and extended data figures are included in the manuscript as source files.
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 | No statistical method was used to predetermine sample size. For in vivo experiments, based on preliminary studies that determined experimental variation in survival following infection and mAb treatment, we have performed power calculations and determined that at least n=6 mice/group is sufficient to detect differences among experimental groups (powered at 80% for 5% significance level; survival assessed by log-rank (Mantel-Cox) test). |
| Data exclusions | No data were excluded |
| Replication | The reported findings have been confirmed in large groups of mice/experimental group in multiple (>2) experiments. The enhanced protective activity of the Fc engineered variants was confirmed in multiple experiments using a variety of mAbs that target different epitopes on HA and NA. Also, two different challenge virus strains have been used (PR8 and Neth/09) to minimize strain-specific effects. |
| Randomization | Mice were randomized based on age and weight. Prior to treatment, we ensured that the mean weight and age were comparable among the various treatment groups. No randomization was used for the in vitro experiments, as it is not applicable to the study design. |
| Blinding | Blinding is not relevant for this study, as this is an observational (not case-control) study. Whenever possible (not always, due to limited access of lab staff in BSL-2 animal facilities), the treatment groups were blinded to the person involved in monitoring mouse survival and weight upon challenge (applicable to data presented in Figures 1d and 4). |

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 |
|---------------------------------|---------|
| n/a | Involved in the study | n/a | Involved in the study |
| Antibodies | | ChIP-seq |
| Eukaryotic cell lines | | Flow cytometry |
| Palaeontology | | MRI-based neuroimaging |
| Animals and other organisms | | |
| Human research participants | | |
| Clinical data | | |

Antibodies

The clones of the recombinant anti-influenza antibodies are reported in the manuscript and their characteristics are also described in previously published studies (relevant citations included in the manuscript). The anti-HIV Env mAb (3BNC117) used in PK studies (Extended Data Figure 4) has been characterized in previous studies (Bournazos S et al. Cell. 2014;158(6):1243-1253.). For generating NP-anti-NP IgG immune complexes (Extended Data Figures 1e and 7j), the high affinity anti-NP (4-hydroxy-3-nitrophenylacetyl) mAb 3B62 was synthesized using the previously published sequence (Allen D et al. EMBO J. 1988;7(7):1995-2001). Another anti-NP mAb (clone 3C13) described in this publication was also cloned and used as isotype control in this study.

For ELISA assays, the following antibodies were used: HRP-conjugated goat F(ab’2) anti-human IgG (H+L)(Jackson ImmunoResearch, 109-036-088, Lot: 138297, 1:5000); HRP-conjugated goat F(ab’2) anti-mouse IgG (H+L)(Jackson ImmunoResearch, 115-035-146, Lot: 144209, 1:5000); Biotin-conjugated goat F(ab’2) anti-human IgG (Fab’2-specific)(Jackson ImmunoResearch, 109-066-097, Lot: 127106, 5 μg/ml).

For microneutralization assays, cells were stained with biotinylated mouse anti-influenza NP (nucleoprotein)(EMD Millipore, MA68257B, clone A1, lot: 3286064, 1:2000).

For cellular depletion studies, all monoclonal antibodies were obtained from Bioxcell. The following mAbs were used: rat Ig2b isotype control (clone LTF-2, BE0090, lot: 7071191 and 651117D1), anti-mouse CD4 (clone GK1.5, BE0003-1, lot: 689518A1),
The following antibodies were used for flow cytometry (unless otherwise noted, all antibodies were used at 1:250 dilution):

(i) for the characterization of the FcγRIIa expression of the FcγRIIa+ mouse strain:
- anti-CD11c-eFluor506 (ThermoFisher, 69-0114-82, clone N41B8)
- anti-CD11b-BrilliantViolet605 (Biolegend, 101215, clone M1/70)
- anti-SiglecF-SuperBright645 (ThermoFisher, 64-1702-82, clone 1RNM44N)
- anti-CD8b-BrilliantViolet711 (Biolegend, 125633, clone 2E7)
- anti-CD103-PE/eFluor610 (ThermoFisher, 61-1031-82, clone 2E7)
- anti-K1.1-PE/Cy7 (ThermoFisher, 25-5941-82, clone PK136)
- anti-CD4-AlexaFluor647 (ThermoFisher, 100530, clone RM4-5)
- anti-CD19-AlexaFluor700 (Biolegend, 115527, clone 6D5)
- anti-CD11c-eFluor506 (ThermoFisher, 69-0114-82, clone N41B8)

(ii) for the evaluation of FcγRI expression on innate effector leukocytes:
- anti-CD11c-eFluor506 (ThermoFisher, 69-0114-82, clone N41B8)
- anti-human FcγRII-BrilliantViolet605 (Biolegend, 305034, clone 10.1, used at 1:100 dilution)
- anti-Ly6G-BrilliantViolet711 (Biolegend, 127643, clone 1A8)
- anti-CD11b-BrilliantViolet785 (Biolegend, 101243, clone M1/70)
- anti-human FcγRili-FITC (Stercell technologies, 60012F, clone IV.3, used at 1:50 dilution)
- anti-Ly6C-PerCP/Cy5.5 (ThermoFisher, 45-5932-82, clone 1RNM44N)
- anti-human FcγRili/b-PE (ThermoFisher, MHCD1604, clone 3G8, used at 1:100 dilution)
- anti-CD103-PE/eFluor610 (ThermoFisher, 61-1031-82, clone 2E7)
- anti-K1.1-PE/Cy7 (ThermoFisher, 25-5941-82, clone PK136)

(iii) for the evaluation of FcγRIIa expression and activation status of DCs:
- anti-CD11c-eFluor506 (ThermoFisher, 69-0114-82, clone N41B8)
- anti-human FcγRII-BrilliantViolet605 (Biolegend, 305034, clone 10.1, used at 1:100 dilution)
- anti-Ly6G-BrilliantViolet711 (Biolegend, 127643, clone 1A8)
- anti-CD11b-BrilliantViolet785 (Biolegend, 101243, clone M1/70)
- anti-human FcγRili-FITC (Stercell technologies, 60012F, clone IV.3, used at 1:50 dilution)
- anti-Gr-1-PerCP/Cy5.5 (ThermoFisher, 45-5932-82, clone 1RNM44N)
- anti-human FcγRili/b-PE (ThermoFisher, MHCD1604, clone 3G8, used at 1:100 dilution)
- anti-CD103-PE/eFluor610 (ThermoFisher, 61-1031-82, clone 2E7)
- anti-CD8-PE/Cy7 (ThermoFisher, 25-0862-82, clone GL1)
- anti-human FcγRili-BrilliantViolet605 (clone 2B8, produced in house and conjugated with Dylight650, used at 10 μg/ml)
- Mouse IgG1 kappa isotype control-Dylight650 (ThermoFisher, MA1-191-D650, clone MOPC-21, used at 10 μg/ml)
- Mouse IgG2b kappa isotype control - FITC (ThermoFisher, 11-4732-42, clone eBMG2b, used at 1:50 dilution)
- Mouse IgG1 kappa isotype control-PE (ThermoFisher, 100530, clone MOPC-21, used at 1:100 dilution)

(iv) for the evaluation of CD8 or CD4 depletion:
- anti-CD3e-eFluor506 (ThermoFisher, 69-0032-82, clone 1A72)
- anti-CD19-BrilliantViolet605 (Biolegend, 115540, clone 6D5)
- anti-CD8b-BrilliantViolet711 (Biolegend, 125633, clone 2E7)
- anti-CD11b-BrilliantViolet785 (Biolegend, 101243, clone M1/70)
- anti-K1.1-PE/Cy7 (ThermoFisher, 25-5941-82, clone PK136)
- anti-CD4-FITC (ThermoFisher, 69-0032-82, clone 1A72)
- anti-CD19-AlexaFluor700 (Biolegend, 115540, clone 6D5)
- anti-CD3e-eFluor506 (ThermoFisher, 69-0032-82, clone 1A72)
- anti-CD19-BrilliantViolet605 (Biolegend, 115540, clone 6D5)
- anti-CD8b-BrilliantViolet711 (Biolegend, 125633, clone 2E7)
- anti-CD11b-BrilliantViolet785 (Biolegend, 101243, clone M1/70)
- anti-K1.1-PE/Cy7 (ThermoFisher, 25-5941-82, clone PK136)

(v) for the evaluation of neutrophil depletion by anti-Gr-1 mAb:
- anti-CD11c-BrilliantViolet605 (Biolegend, 101215, clone M1/70)
- anti-SiglecF-SuperBright645 (ThermoFisher, 64-1702-82, clone 1RNM44N)
- anti-CD86-FITC (ThermoFisher, 25-5941-82, clone 2B7)
- anti-CD103-PE/eFluor610 (ThermoFisher, 61-1031-82, clone 2E7)
- anti-CD8-PE/Cy7 (ThermoFisher, 25-0862-82, clone GL1)
- anti-human FcγRili-BrilliantViolet605 (clone 2B8, produced in house and conjugated with Dylight650, used at 10 μg/ml)
- Mouse IgG1 kappa isotype control-Dylight650 (ThermoFisher, MA1-191-D650, clone MOPC-21, used at 10 μg/ml)
- Mouse IgG2b kappa isotype control - FITC (ThermoFisher, 11-4732-42, clone eBMG2b, used at 1:50 dilution)
- Mouse IgG1 kappa isotype control-PE (ThermoFisher, 100530, clone MOPC-21, used at 1:100 dilution)
- Mouse IgG1 kappa isotype control-Brilliant Violet605 (Biolegend, 400162, clone MOPC-21, used at 1:100 dilution)

(vi) for the evaluation of CD8+ or CD4+ depletion:
- anti-CD3e-eFluor506 (ThermoFisher, 69-0032-82, clone 17A2)
- anti-CD19-BrilliantViolet605 (Biolegend, 115540, clone 6D5)
- anti-CD8b-BrilliantViolet711 (Biolegend, 125633, clone YTS156.7.7)
- anti-CD11b-BrilliantViolet785 (Biolegend, 101243, clone M1/70)
- anti-K1.1-PE/Cy7 (ThermoFisher, 25-5941-82, clone PK136)
- anti-CD4-FITC (ThermoFisher, 11-4732-42, clone eBMG2b, used at 1:50 dilution)
- anti-CD8-PE/Cy7 (ThermoFisher, 25-0862-82, clone RA3-682)

(vii) for the evaluation of neutrophil depletion by anti-Gr-1 mAb:
- anti-CD11c-BrilliantViolet605 (Biolegend, 101215, clone M1/70)
- anti-SiglecF-SuperBright645 (ThermoFisher, 64-1702-82, clone 1RNM44N)
- anti-Ly6G-BrilliantViolet711 (Biolegend, 127643, clone 1A8)
- anti-CD11b-BrilliantViolet785 (Biolegend, 101243, clone M1/70)
- anti-K1.1-PE/Cy7 (ThermoFisher, 25-5941-82, clone PK136)
- anti-CD4-FITC (ThermoFisher, 11-4732-42, clone eBMG2b, used at 1:50 dilution)
- anti-CD8-PE/Cy7 (ThermoFisher, 25-0862-82, clone RA3-682)
anti-CD45-AlexaFluor700 (ThermoFisher, 56-0451-82, clone 30-F11)

(vi) for the assessment of FcγR expression on T cells:
- anti-B220-BrilliantViolet421 (Biolegend, 103240, clone RA3-6B2)
- anti-CD3-BrilliantViolet510 (Biolegend, 100353, clone 145-2C11)
- anti-human FcγRI (clone 10.1)-BrilliantViolet605 (Biolegend, 305034, clone 10.1, used at 1:100 dilution)
- anti-CD86-BrilliantViolet711 (Biolegend, 100748, clone 53-6-7)
- anti-CD4-BrilliantViolet785 (Biolegend, 100453, clone GK1.5)
- anti-human FcγRIIa (clone IV.3)-FITC (Stemcell technologies, 60012FI, clone IV.3, used at 1:50 dilution)
- anti-NK1.1-PerCP/Cy5.5 (Biolegend, 108720, clone PK136)

(vii) for the characterization of DC populations following mAb treatment:
- anti-CD103-FITC (Biolegend, 121420, clone 2E7)
- anti-Ly6C-PerCP/Cy5.5 (ThermoFisher, 45-5932-82, clone HK1.4)
- anti-CD103-BrilliantViolet510 (Biolegend, 103040, clone IM7)
- anti-CD103-BrilliantViolet711 (Biolegend, 104441, clone MEI-14)
- anti-CD25-BrilliantViolet605 (Biolegend, 102036, clone PC61)
- anti-CD27-BrilliantViolet650 (Biolegend, 124233, clone LG.3A10)
- anti-CD86-BrilliantViolet711 (Biolegend, 100748, clone S3-6.7)
- anti-CD11b-BrilliantViolet650 (Biolegend, 301336 clone ICRF44)
- anti-CD11c-PerCP-Cy5.5 (Biolegend, 301624, clone 3.9)

(viii) for the characterization of T-cell populations following mAb treatment:
- anti-CD4-AlexaFluor488 (Biolegend, 100423, clone GK1.5)
- anti-CD4-AlexaFluor647 (Biolegend, 100218, clone 17A2)
- anti-CD4-AlexaFluor700 (Biolegend, 100218, clone 17A2)
- anti-CD4-BrilliantViolet605 (Biolegend, 305034, clone 10.1)
- anti-CD8-BrilliantViolet650 (Biolegend, 301336 clone ICRF44)
- anti-CD69-PE/Cy7 (Biolegend, 104512, clone H1.2F3)

(ix) for the assessment of FcγR expression on human T cells (all antibodies were used at 1:100 dilution unless otherwise stated):
- anti-CD14-BrilliantViolet510 (Biolegend, 301841, clone M5E2)
- anti-CD19-BrilliantViolet510 (Biolegend, 302242, clone HIB19)
- anti-CD20-BrilliantViolet510 (Biolegend, 344729, clone SK1)
- anti-CD86-BrilliantViolet711 (Biolegend, 100453, clone CRF44)
- anti-CD11b-BrilliantViolet785 (Biolegend, 101243, clone M1/70)

(x) for the evaluation of ex vivo DC maturation of human monocyte-derived DCs (all antibodies were used at 1:100 dilution unless otherwise stated):
- anti-CD14-BrilliantViolet510 (Biolegend, 301841, clone M5E2)
- anti-CD19-BrilliantViolet510 (Biolegend, 302242, clone HIB19)
- anti-CD20-BrilliantViolet510 (Biolegend, 344729, clone SK1)
- anti-CD86-BrilliantViolet711 (Biolegend, 100453, clone CRF44)
- anti-CD11b-BrilliantViolet785 (Biolegend, 101243, clone M1/70)
- anti-hCD11b-BrilliantViolet650 (Biolegend, 124233, clone LG.3A10)
- anti-CD11c-PerCP-Cy5.5 (Biolegend, 301624, clone 3.9)
- anti-CD86-BrilliantViolet711 (Biolegend, 100453, clone M1/70)
- anti-CD86-BrilliantViolet650 (Biolegend, 301336 clone ICRF44)
- anti-CD11b-BrilliantViolet785 (Biolegend, 101243, clone M1/70)

(xi) for the characterization of T-cell populations following mAb treatment:
- anti-CD4-AlexaFluor488 (Biolegend, 100423, clone GK1.5)
- anti-CD4-AlexaFluor647 (Biolegend, 100218, clone 17A2)
- anti-CD4-AlexaFluor700 (Biolegend, 100218, clone 17A2)
- anti-CD4-BrilliantViolet605 (Biolegend, 305034, clone 10.1)
- anti-CD8-BrilliantViolet650 (Biolegend, 301336 clone ICRF44)
- anti-CD69-PE/Cy7 (Biolegend, 104512, clone H1.2F3)
Validation

For recombinant anti-influenza mAbs, their antigenic specificity, HAI, and neutralization activity were assessed in in vitro assays (data presented in the manuscript Extended Data Figure 3) to ensure that changes in the Fc domain have no impact of their Fab-mediated activities. Purity of recombinant proteins was assessed by SDS-PAGE followed by SafeStain blue staining (ThermoFisher). All antibody preparations were >90% pure and endotoxin levels were <0.05 EU/mg, as determined by the Limulus Amebocyte Lysate (LAL) assay.

For commercially available antibodies, validation has been performed by the manufacturer and corresponding certificates of analysis are available at the manufacturer’s website. Reactivity of primary antibodies used in flow cytometry assays was validated by the manufacturer in immunocytochemistry and frozen immunohistochemistry. Antibodies used for microneutralization assay and ELISA were validated by the manufacturer for cross-reactivity to other influenza strains (for anti-NP mAb) or to immunoglobulins from other species. For antibodies used for in vivo cell depletion, antibody preparations have been validated by the manufacturer for specificity, purity, and endotoxin content.

Eukaryotic cell lines

Policy information about cell lines

Cell line source(s) | ATCC for MDCK, ThermoFisher for Expi293F and Expi-CHO cells, and Promega for NFAT reporter assays
Authentication | Cell lines were not authenticated after purchase. Cell lines obtained from Promega were authenticated by the manufacturer by STR analysis.
Mycoplasma contamination | All cell lines have been tested by the manufacturer and were tested negative for mycoplasma contamination. Certificates of analysis are available in manufacturer’s website. All cell lines were maintained for <10 passages to minimize mycoplasma contamination.
Commonly misidentified lines (See ICLAC register) | No commonly misidentified cell lines were used in this study.

Animals and other organisms

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

Laboratory animals | C57Bl/6 were purchased from The Jackson Laboratory. FcγR humanized mice (FcγRnull, hFcγRI+, FcγRIIaR131+, FcγRIIb+, FcγRIIIaF158+, and FcγRIIIb+) were generated in the C57Bl/6 background and extensively characterized in previous studies. FcRn humanized mice (B6.Cg-Fcgrtm1Dcr Tg(FCGRT)32Dcr/DcrJ) were purchased from The Jackson Laboratory and are deficient in mouse FcRn and express human FcRn as transgene. FcγR/FcRn humanized mice were generated by crossing the FcγR humanized strain to the FcRn humanized mice. FcγRnull+ mice were generated on a mouse FcγR KO background (mouse FcγR null; C57Bl/6). For in vivo experiments, female or male, 6-12 wk old mice were used. Mice were housed at a controlled ambient temperature environment with 12-hour light/dark cycle.
Wild animals | No wild animals were used in this study.
Field-collected samples | No field-collected samples were used in this study.
Ethics oversight | All in vivo experiments were performed in compliance with federal laws and institutional guidelines and have been approved by the Rockefeller University Institutional Animal Care and Use Committee.

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 | Mice (strains described in animal section) were euthanized and lungs were perfused by injection of PBS (containing 10 U/ml)
Sample preparation

Heparin was injected into the right cardiac ventricle. Lungs were excised and homogenized using the gentleMACS dissociator (Miltenyi), according to the manufacturer’s recommendations. Mouse blood was collected from the retro-orbital venous plexus. Spleens were excised from mice and homogenized by mechanical shearing. Following RBC lysis (RBC lysis buffer; Biolegend), single cell suspensions were labelled with the LIVE/DEAD Fixable Near-IR (ThermoFisher) and resuspended in PBS containing 0.5% (w/v) BSA and 5 mM EDTA. Cells were labelled with mixtures of fluorescently labelled antibodies incubated at 4°C for 15 min and washed twice with PBS containing 0.5% (w/v) BSA and 5 mM EDTA prior to analysis. Human PBMCs and monocyte-derived DCs were prepared for flow cytometry analysis as described above.

Instrument

0A29009 Attune NxT Acoustic Focusing Cytometer (Lasers: BRV6Y)

Software

For data acquisition, Attune NxT flow cytometry software v3.1.2 was used. For data analysis, FlowJo v10.6.2 with the following plugins: Downsample v3.2, UMAP v2.2, and X-shift v1.3 was used.

Cell population abundance

No sorting performed

Gating strategy

The gating strategies are presented in Extended Data Figures 5–9. Single cells were identified in FSC-A vs. FSC-H plots and live cells based on LIVE/DEAD staining vs. FSC-A. For characterization of FcRIIa expression on lung-resident leukocytes, live single cells are plotted as NK1.1 vs. CD11b and NK cells were identified as NK1.1+/CD11b-. From the NK1.1- gate, cells are plotted as CD11c vs. CD11b. From CD11b+/CD11c- cells, neutrophils are defined as Gr-1+/SSCChigh and monocytes as SSclo/Gr-1 int or negative. From the CD11c+ gate, alveolar macrophages are identified as SiglecF+/CD11b-, whereas SiglecF- events are further gated and MHCII+ events are selected. MHCII+ cells are divided into cDC1 and cDC2 based on CD103 and CD11b expression (cDC1: CD103+/CD11b-; cDC2: CD103+/CD11b+). From the CD11b+/CD11c- gate, B cells are identified as CD19+/MHCII+, whereas CD19- events are gated based on CD3. CD3+ events are plotted as CD8 vs. CD4 to identify CD8 (CD8+/CD4-) and CD4 (CD4+/CD8+) T cells. The gating strategy and boundaries are presented in Extended Data Figure 5a.

For experiments assessing FcR expression in the lungs of influenza-infected mice, NK cells are identified as NK1.1+/CD11b-; from the NK1.1- gate, cells are plotted as CD11c vs. CD11b. From CD11b+/CD11c- cells, neutrophils are defined as Ly6G+/Ly6Cint, Ly6Chi monocytes as Ly6Ch/Ly6G- and Ly6Cint monocytes as Ly6Cint/Ly6G- events. From the Ly6C-Ly6G- gate, eosinophils are defined as SSclo/SiglecF+ cells. From the CD11c+ gate, alveolar macrophages are defined as CD11b-/SiglecF- cells. The gating boundaries are presented in Extended Data Figure 6a.

Lung-resident DC populations are identified based on the following gating strategy: CD11c+ cells are plotted as Siglec F vs. CD11b. From the Siglec F- gate, MHCII+ cells are selected and plotted as CD103 vs. CD11b. CD1c are identified as CD103+/CD11b- cells. CD11b+/CD103- cells are further separated into Gr-1 positive and negative cells, representing tipDCs (Gr-1+) and cDC2 (Gr-1-), respectively. The gating strategy and boundaries for identifying DC populations are presented in Extended Data Figure 7.

For analysis of FcR expression on mouse blood T cells, single cell lymphocytes (identified based on FSC-A vs. FSC-H and FSC-A-SSC-A plots) are gated as CD11b-/Gr-1- cells, which are further gated as B220-/NK1.1-. The resulting population is then gated to select CD3 T cells, which are plotted as CD8 vs. CD4 to identify CD8 (CD8+/CD4-) and CD4 (CD4+/CD8-) T cells. CD11b+ and B220 + cells are also selected from the single cell gate and used as controls for FcR staining. The gating strategy and boundaries are presented in Extended Data Figure 9c.

For analysis of FcR expression on mouse spleen and lung T cells, live single cells (identified based on FSC-A vs. FSC-H and Live/dead staining) are gated as CD11b vs. B220 to identify CD11b+ and B220+ cells. To identify T cells, NK1.1-/Gr-1- cells are gated as CD11b vs. B220. CD11b-/B220- events are gated to select CD3+ T cells. CD3+ events are plotted as CD8 vs. CD4 to identify CD8 (CD8+/CD4-) and CD4 (CD4+/CD8+) T cells. The gating strategy and boundaries are presented in Extended Data Figure 9e.

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