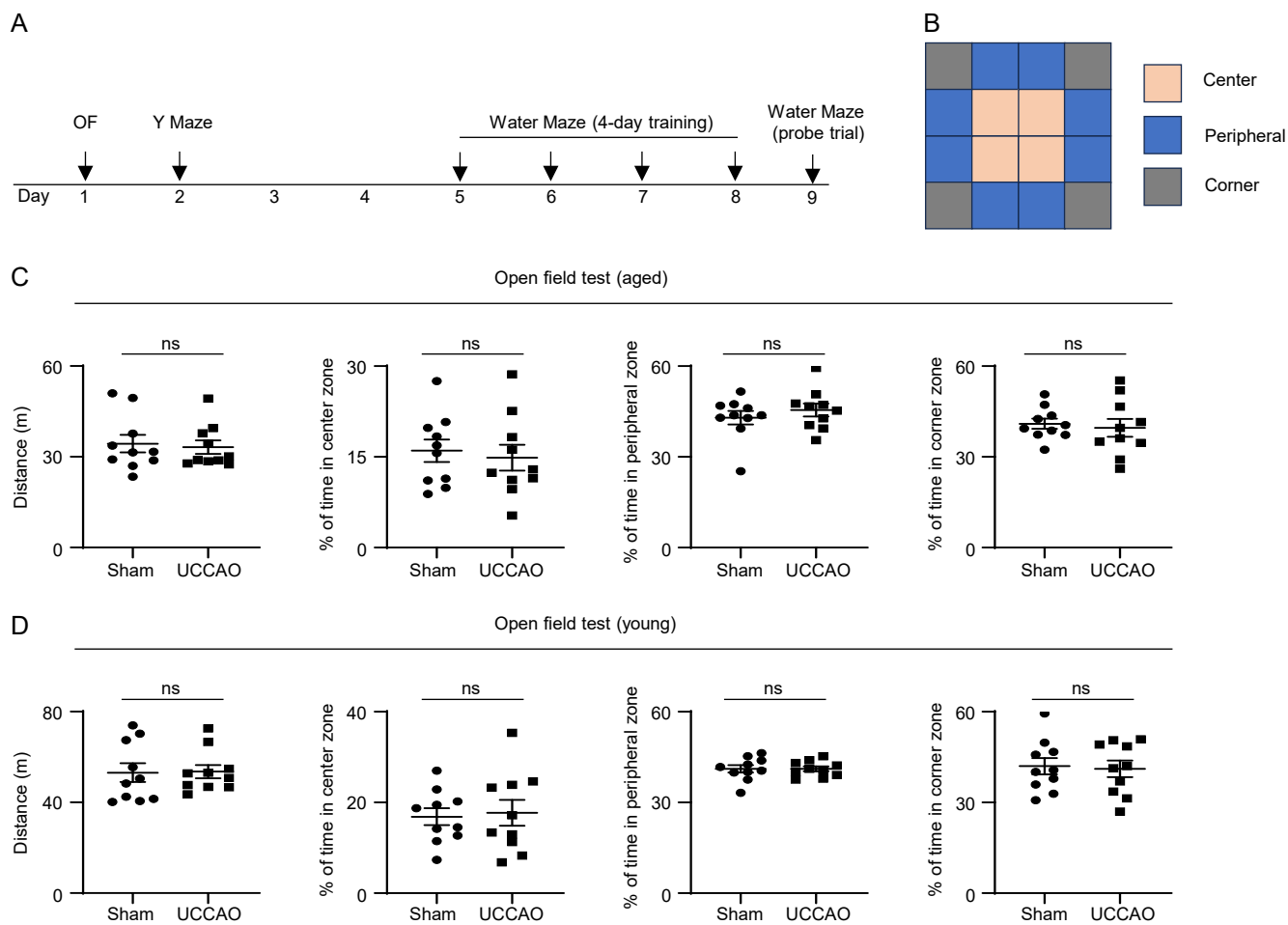


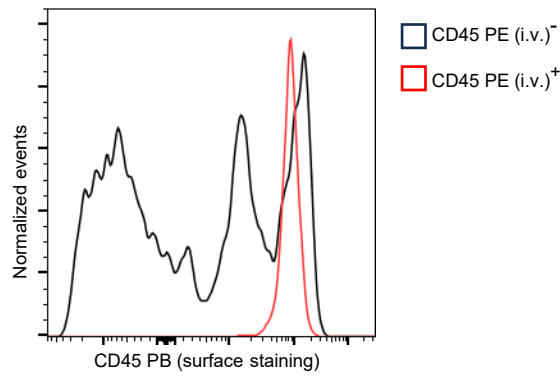
Supplementary Figure 1



Supplementary Figure 1: Behavior test details and supplementary data.

(A) Scheme of behavior tests. (B) Schematic illustration of the zone division in the open field test. (C) Total distance traveled, percentages of time spent in the center zone, the peripheral zone, and the corner zone during the open field test in aged mice at 2 months after UCCAO or sham surgery. (D) Total distance traveled, percentages of time spent in the center zone, the peripheral zone, and the corner zone during the open field test in young mice at 2 months after UCCAO or sham surgery. Data are from 10 female mice per group, representative of 2 independent experiments (A-D). Error bars = mean $\pm$ SEM (C-D). * $p < 0.05$.

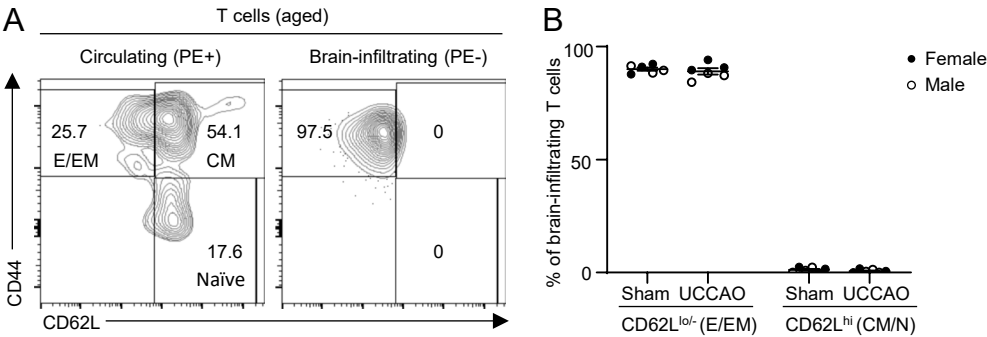
Supplementary Figure 2



Supplementary Figure 2: Intravascular CD45 labeling distinguishes circulating from brain-infiltrating immune cells in aged mice

Aged mice were injected i.v. with anti-CD45 PE antibody and euthanized 3 min later. Representative flow cytometry plot showing intravascular labeling with PE-conjugated anti-CD45 antibody and ex vivo surface staining with PB-conjugated anti-CD45 antibody to distinguish circulating from brain-infiltrating immune cells. Data represent 8 female and male mice, 2 independent experiment.

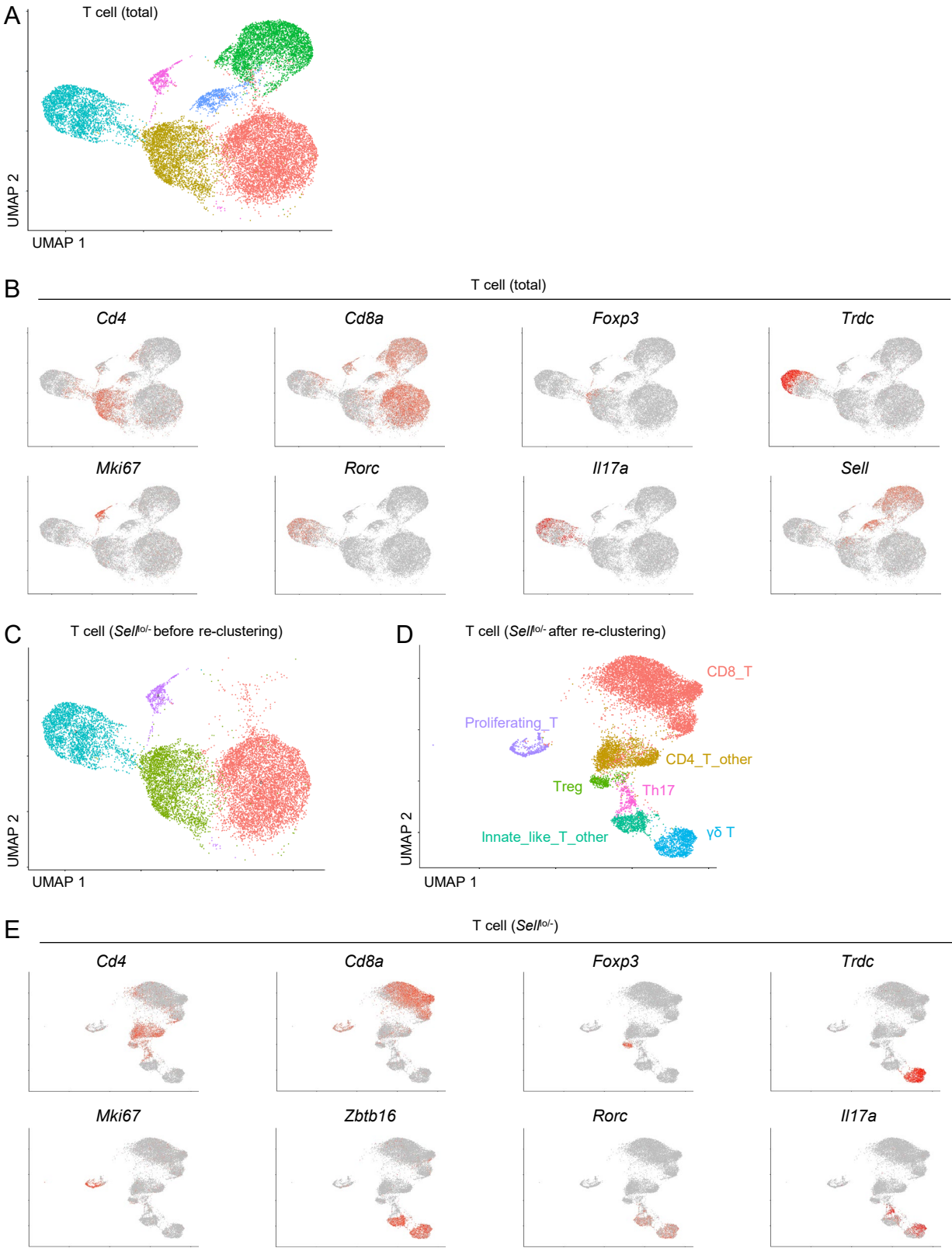
Supplementary Figure 3



Supplementary Figure 3: Phenotypic characterization of circulating and brain-infiltrating T cells in aged mice

(A) Representative flow cytometry profiles showing surface expression of CD62L and CD44 on circulating and brain-infiltrating T-cell subsets in aged mice. Plots were pre-gated on circulating (CD45-PE⁺) or brain-infiltrating (CD45-PE⁻) T cells, 3 min after intravascular labeling with anti-CD45-PE antibody. E/EM, effector/effector memory; CM, central memory; N, naïve. (B) Quantification of the percentages of brain-infiltrating T cells (anti-CD45-PE negative) among CD62L^{lo/lo} and CD62L^{hi} T cells in the ipsilateral brain of aged mice at 2 months after UCCAO or sham surgery. Data are from 6 sex-matched female and male mice per group, representative of 2 independent experiments (A-B). Error bars = mean ± SEM (B).

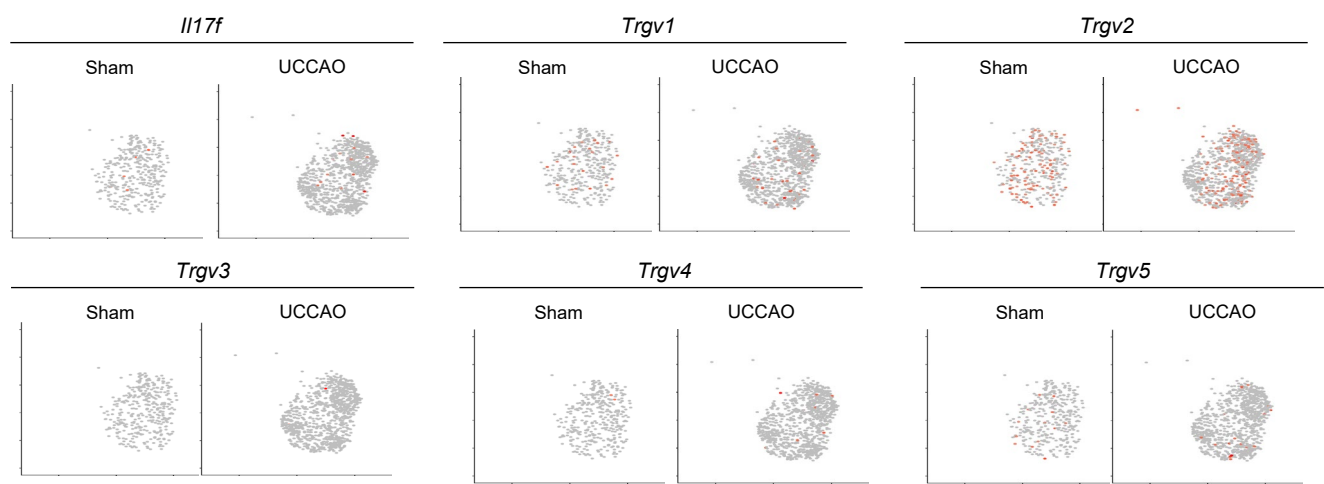
Supplementary Figure 4



Supplementary Figure 4: Identification and re-clustering *Sel*^{hi} T cells from the ipsilateral brain of aged mice

(A) UMAP of total T population from the ipsilateral brain of aged mice from the UCCAO and sham surgery groups, by scRNA-seq. (B) Feature plots showing expression of the indicated marker genes in the total T population. (C) UMAP of T cells after removal of *Sel*^{hi} population prior to re-clustering. (D) UMAP of *Sel*^{hi} T cells after re-clustering. (E) Feature plots showing the expression of indicated marker genes of *Sel*^{hi} T cells after re-clustering. Data are from 3 independent libraries (2 female mice pooled per library) per group.

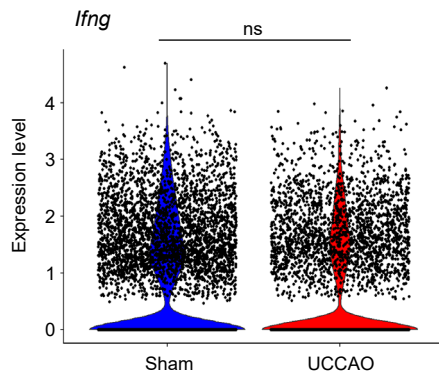
Supplementary Figure 5



Supplementary Figure 5: Gene expression in $\gamma\delta$ T cells.

$\gamma\delta$ T cells were sorted *in silico* from scRNA-seq data. Feature plots showing the expression of the indicated genes from the ipsilateral brain of aged mice at 2 months after UCCAO or sham surgery. Data are from 3 independent libraries (2 female mice pooled per library) per group.

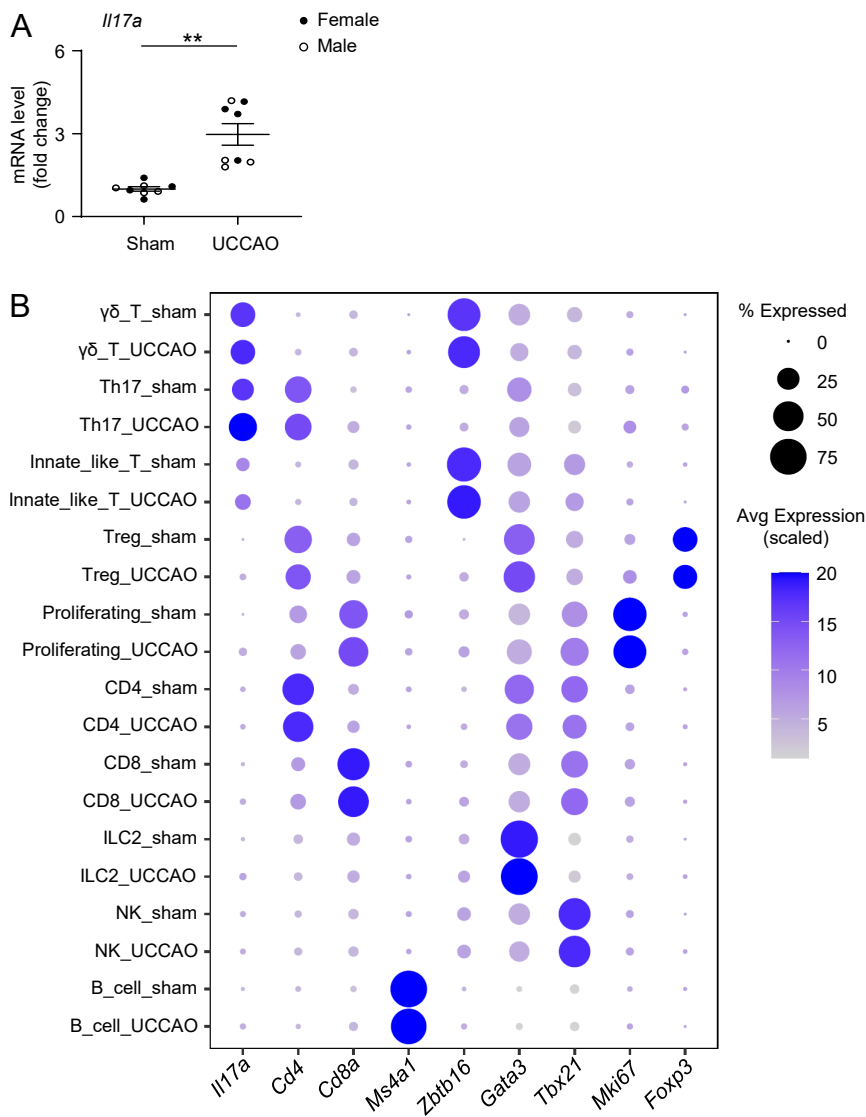
Supplementary Figure 6



Supplementary Figure 6: Gene expression analysis in total T cell population (*Sel*^{lo/-}).

Violin plot showing the expression level of *Ifng* of total T cell population (*Sel*^{lo/-}) from the ipsilateral brain of aged mice at 2 months after UCCAO or sham surgery, by scRNA-seq. Data are from 3 independent libraries (2 female mice pooled per library) per group. * $p < 0.05$.

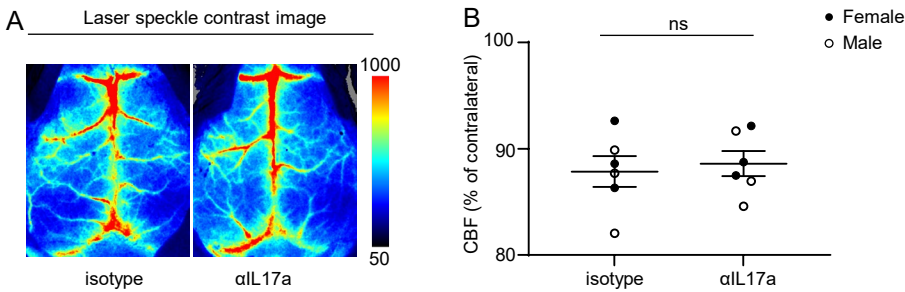
Supplementary Figure 7



Supplementary Figure 7: *Il17a* expression in brain-infiltrating T cells and marker gene expression across lymphocyte subsets.

(A) mRNA levels of the *Il17a* in sorted brain-infiltrating (anti-CD45 PE negative) T cells from ipsilateral brain of aged mice at 2 months after UCCAO or sham surgery, after 3 min of intravascular labeling with anti-CD45 PE antibody. (B) Dot plot showing the expression of the indicated genes across different lymphocyte subsets and experimental groups from the ipsilateral brain of aged mice at 2 months after UCCAO or sham surgery, by scRNA-seq. Data are from 8 sex-matched female and male mice per group pooled of 2 independent experiments (A), or are from 3 independent libraries (2 female mice pooled per library) per group (B). Error bars = mean ± SEM (A). ***p* < 0.01.

Supplementary Figure 8



Supplementary Figure 8: Effects of IL17a neutralization on cerebral blood flow after UCCAO.

(A) Representative laser speckle contrast images of cerebral blood flow (CBF) in aged mice at 2 months after right UCCAO surgery, treated with anti-IL17a antibody or isotype control. (B) Quantification of CBF changes in aged mice at 2 months after UCCAO surgery, treated with anti-IL17a antibody or isotype control. The ratio of CBF between the ipsilateral (right) and contralateral (left) hemispheres was calculated. Data are from 6 sex-matched female and male mice per group, representative of 2 independent experiments (A-B). Error bars = mean $\pm$ SEM (B). * p <0.05.