**Supplementary Materials**

**Figure S1. The clinical significance of TAZ expression in TNBC patients. (A, B)** Prognostic values of TAZ expression for overall survival **(A)** and recurrence-free survival **(B)** using the Kaplan-Meier Plotter. Kaplan-Meier analysis in **(A)** and **(B)**. TAZ: transcriptional coactivator with PDZ-binding motif; TNBC: triple-negative breast cancer.

**Figure S2. Role of TAZ in the immunosuppressive microenvironment and progression of TNBC. (A)** Representative image of xenograft tumors derived from 4T1 and E0771 cells with TAZ silencing vector lentivirus (shTAZ) or control vector lentivirus (shCtrl). **(B)** Tumor weight of xenograft tumors derived from 4T1-shCtrl and -shTAZ cells, and E0771-shCtrl and -shTAZ cells at the time of mice sacrifice. **(C)** Diameter of the largest metastatic nodules in the lung from the shCtrl and shTAZ 4T1 metastasis assay and from the shCtrl and shTAZ E0771 metastasis assay. **(D, E)** Representative images and quantification of IHC staining of Ly6G, MPO, and Foxp3 in 4T1-derived (D) and E0771-derived (E) xenograft tumors. Scale bars, 100μm. \*\* *P* < 0.01, Student’s *t*-test in **(B)** and **(C)**, and two-way ANOVA in **(D)** and **(E)**. ANOVA: analysis of variance; IHC: immunohistochemistry; Ly6G: lymphocyte antigen 6 complex locus G6D; MPO: myeloperoxidase; Foxp3: forkhead box protein P3; TAZ: transcriptional coactivator with PDZ-binding motif; TNBC: triple-negative breast cancer.

**Figure S3. Gating strategy in the flow cytometry analysis of tumor-infiltrating immune cells.** Cells were gated on FSC/SCC parameters. T cells were analyzed based on their expression of both CD45 and CD3 and then separated into CD4+ or CD8+ groups. Macrophages were analyzed based on their expression of both CD11b and F4/80, and M2 TAMs were gated based on their expression of CD206. PD-L1-positive cells were gated based on their expression of PD-L1 and absence of CD45 cell surface markers. Values shown are percentages of the parent gate. FSC/SCC: forward scatter/side scatter; PD-L1: programmed death ligand 1; TAM: tumor-associated macrophage.

**Figure S4. Role of TAZ in IL-34 expression. (A)** Heatmap of cytokines/chemokines showing the fold change of expression in SUM1315-shTAZ cells compared with SUM1315-shCtrl cells (left), or BT549-shTAZ cells compared with BT549-shCtrl cells (right). **(B)** Representative images of IHC staining of TAZ and IL-34 in E0771-derived xenograft tumors. Scale bars, 100μm. **(C)** 4T1 cells with shTAZ or shCtrl lentivirus vector and 4T1 cells with or without S89A lentivirus vector were transfected with an IL-34 promoter-dependent luciferase construct, and the luciferase activities were measured. **(D)** E0771 cells with shTAZ or shCtrl lentivirus vector and E0771 cells with or without S89A lentivirus vector were transfected with an IL-34 promoter-dependent luciferase construct, and the luciferase activities were measured. **(E)** Chromatin immunoprecipitation-qPCR of TAZ on the IL-34 promoter. **(F)** Pearson correlation analysis between IL-34 mRNA expression and CD68+ TAMs in TNBC samples. **(G)** Prognostic values of the IL-34 expression for overall survival in TNBC patients. \*\*\* *P* < 0.001, Pearson’s correlation test in **(F)**, two-way ANOVA in **(C-E)**, and Kaplan-Meier analysis in **(G)**. ANOVA: analysis of variance; IHC: immunohistochemistry; IL-34: interleukin 34; TAZ: transcriptional coactivator with PDZ-binding motif; TCGA: The Cancer Genome Atlas; TNBC: triple-negative breast cancer.

**Figure S5. Role of TAZ in PD-L1 expression. (A)** Flow cytometry analysis of PD-L1 expression in E0771 xenograft tumors. **(B)** Representative images of IHC staining of TAZ and PD-L1 in E0771-derived xenograft tumors. Scale bars, 100μm. **(C)** 4T1 cells with shTAZ or shCtrl lentivirus vector and 4T1 cells with or without S89A lentivirus vector were transfected with a PD-L1 promoter-dependent luciferase construct, and the luciferase activities were measured. **(D)** E0771 cells with shTAZ or shCtrl lentivirus vector and E0771 cells with or without S89A lentivirus vector were transfected with a PD-L1 promoter-dependent luciferase construct, and the luciferase activities were measured. **(E)** Chromatin immunoprecipitation-qPCR of TAZ on the PD-L1 promoter.

**(F-G)** Prognostic values of PD-L1 expression for OS and DFS in TNBC samples \*\* *P* < 0.01 and \*\*\* *P* < 0.001, and two-way ANOVA in **(C-E)**. Kaplan-Meier analysis in **(F-G)**. ANOVA: analysis of variance; CTLA-4: cytotoxic T-lymphocyte associated protein 4; IHC: immunohistochemistry; LAG-3: lymphocytes activation gene 3; PD-1: programmed death 1; PD-L1: programmed death ligand 1; PD-L2: programmed death ligand 2; RT-qPCR: real-time quantitative polymerase chain reaction; TAZ: transcriptional coactivator with PDZ-binding motif; TIM-3: T-cell immunoglobulin and mucin domain-containing protein 3.

**Figure S6. Effect of the TAZ/IL-34 axis on TAM infiltration and TNBC metastasis. (A)** RT-qPCR and western blot validation of TAZ and IL-34 expression in 4T1 (left) and E0771 (right) -shCtrl, -shIL-34, -shTAZ-Ctrl, and -shTAZ-IL-34 cells. **(B)** Representative image of xenograft tumors derived from 4T1 and E0771 cells. **(C)** Tumor weight of xenograft tumors derived from 4T1 and E0771 cells at the time of mice sacrifice. **(D)** Diameter of the largest metastatic nodules in the lung from the 4T1 and E0771 metastasis assay. **(E)** Expression of markers associated with M1 and M2 polarization in 4T1-derived and E0771-derived xenograft tumors. \* *P* < 0.05, \*\* *P* < 0.01 and \*\*\* *P* < 0.001, one-way ANOVA in **(A)**, **(C)** and **(D)**, and two-way ANOVA in **(E)**. ANOVA: analysis of variance; IL-34: interleukin 34; RT-qPCR: real-time quantitative polymerase chain reaction; TAM: tumor-associated macrophage; TAZ: transcriptional coactivator with PDZ-binding motif; TNBC: triple-negative breast cancer.

**Figure S7. Combination of CSF-1R blockade and anti-PD-L1 had no effect on liver and kidney functions in mice. (A, B)** Schematic diagrams of the tumor growth model based on the orthotopic inoculation of 4T1 or E0771 cells into mice (A) and the metastasis model based on the injection of 4T1 or E0771 cells into the tail veins of mice (B). The mice were then randomly assigned to the isotype control, pexidartinib (40 mg/kg orally once a day), anti-PD-L1 (200 μg injected intraperitoneally every 3 days), or pexidartinib plus anti-PD-L1 group until the study endpoint. **(C)** Mice body weight changes in four treatment groups of 4T1 xenograft tumors. **(D, E)** Effects of pexidartinib and/or anti-PD-L1 on liver (D) and kidney functions (E) in mice with 4T1 tumors. Two-way ANOVA in **(C)**, and one-way ANOVA in **(D)** and **(E)**. ANOVA: analysis of variance; CSF-1R: colony-stimulating factor 1 receptor; PD-L1: programmed death ligand 1.

**Figure S8. CSF-1R blockade sensitized TNBC to anti-PD-L1-mediated immunotherapy. (A)** Representative image of E0771-derived xenograft tumors at the time of mice sacrifice. **(B, C)** Representative bioluminescence images of xenograft tumors at day 28 after injection of E0771 cells (B) and tumor growth (C) in each treatment group. **(D, E)** Tumor weight of E0771-derived (D) and 4T1-derived (E) xenograft tumors at the time of mice sacrifice in each treatment group. **(F, G)** Representative images of H&E staining of lung tissues (F) and the number of lung metastatic nodules (G) from the E0771 metastasis assay. Scale bars, 100μm. **(H, I)** Diameters of the largest metastatic nodules in the lung from the E0771 (H) and 4T1 (I) metastasis assays. \* *P* < 0.05, \*\* *P* < 0.01 and \*\*\* *P* < 0.001, two-way ANOVA in **(C)**, and one-way ANOVA in **(D)**, **(E)** and **(G-I)**. ANOVA: analysis of variance; CSF-1R: colony-stimulating factor 1 receptor; H&E: hematoxylin-eosin; PD-L1: programmed death ligand 1.

**Figure S9. Combination of CSF-1R blockade and anti-PD-L1 decreased TAM recruitment and increased intratumoral T cell infiltration. (A)** Representative images and quantification of IHC staining of CD8, F4/80, and CD206 in xenograft tumors from each treatment group. Scale bars, 100μm. **(B)** Representative images and quantification of immunofluorescence confocal microscopy of CD8+ T cells in xenograft tumors. **(C)** Representative images and quantification of flow cytometry analysis of tumor-infiltrating CD8+ T cells and F4/80+ CD206+ TAMs in xenograft tumors from each treatment group. \*\* *P* < 0.01 and \*\*\* *P* < 0.001, one-way ANOVA in **(A)** and **(B)**, and two-way ANOVA in **(C)**. ANOVA: analysis of variance; CSF-1R: colony-stimulating factor 1 receptor; IHC: immunohistochemistry; PD-L1: programmed death ligand 1; TAM: tumor-associated macrophage.

**Figure S10. Combination of CSF-1R blockade and anti-PD-L1 mitigated proliferation, promoted apoptosis, and inhibited angiogenesis in TNBC. (A, B)** Representative images and quantification of IHC staining of Ki-67, caspase-3, and CD31 in 4T1-derived (A) and E0771-derived (B) xenograft tumors. Scale bars, 100μm. \*\* *P* < 0.01 and \*\*\* *P* < 0.001, and one-way ANOVA in **(A)** and **(B)**. ANOVA: analysis of variance; CSF-1R: colony-stimulating factor 1 receptor; IHC: immunohistochemistry; PD-L1: programmed death ligand 1; TAM: tumor-associated macrophage.