Supplementary Figure 1 Fine particulate matter (PM2.5) interacts with Tau.

(A, B) Sedimentation analysis showing the interaction between PM2.5 and Tau. (A) Western blots assay of His. (B) The bar graph shows the quantification of the His levels in the pellet. Data are presented as mean ± SEM. $P$-values were determined by Student’s $t$-test. $n = 6$ biologically independent experiments. AU, arbitrary units.
Supplementary Figure 2 Filter membrane extracts without collection of PM2.5 have no effect on tau aggregation.

(A, B) Tau-HEK293 cells were pre-treated with or without the filter membrane extracts for 24 h, and transduced with PBS or Tau preformed fibrils (PFFs). (A) Shown are insoluble Tau aggregates at 48 h post-transduction. Scale bar: 20 μm. (B) Quantification of insoluble Tau aggregates in Tau-HEK293 cells. n = 6 independent biological experiments (each point represents the average of 10 random fields from each experiment). Data are presented as mean ± SEM. P-values were determined by one-way ANOVA followed by Turkey’s multiple comparisons test.
Supplementary Figure 3 PM2.5-Tau PFFs induce synaptic degeneration.

(A) The levels of synapsin I, synaptophysin, and PSD95 in neurons exposed to PBS, Tau PFFs, or PM2.5-Tau PFFs for 10 days. Right: The bar graph shows the quantification of synapsin I, synaptophysin, and PSD95 expression levels. n = 6 independent experiments.

(B) DiI staining of neurons exposed to PBS, pure Tau PFFs, or PM2.5-Tau PFFs for 10 days. Right: The bar graph shows the quantification of spine density. n = 6 independent experiments.

Supplementary Figure 3: PM2.5-Tau PFFs induce synaptic degeneration.

(A) The levels of synapsin I, synaptophysin, and PSD95 in neurons exposed to PBS, Tau PFFs, or PM2.5-Tau PFFs for 10 days. Right: The bar graph shows the quantification of synapsin I, synaptophysin, and PSD95 expression levels. n = 6 independent experiments.

(B) DiI staining of neurons exposed to PBS, pure Tau PFFs, or PM2.5-Tau PFFs for 10 days. Right: The bar graph shows the quantification of spine density. n = 6 independent experiments.
biological experiments (each point represents the average of 10 random fields from each experiment). Scale bars: 10 μm.

(C) Double immunofluorescence of NeuN and TUNEL in neurons treated with PBS, pure Tau PFFs, or PM2.5-Tau PFFs for 10 days. Right: The bar graph shows the quantification of the percentage of apoptotic cells. n = 6 independent biological experiments (each point represents the average of 10 random fields from each experiment). Scale bars: 20 μm.

Data are presented as mean ± SEM. P-values were determined by one-way ANOVA followed by Turkey’s multiple comparisons test.
Supplementary Figure 4 PM2.5-Tau PFFs have no effect on the propagation of Tau pathology in WT mice.

(A) Immunohistochemistry of phosphorylated Tau (AT8) in WT mice at 3 months after the injection of PBS, Tau PFFs, or PM2.5-Tau PFFs. Representative images of p-Tau (AT8) staining in the dentate gyrus and CA3 of the mouse hippocampus. Scale bars, 200 μm in the top panel, and 50 μm in the lower panels.
Supplementary Figure 5 Intranasal instillation of PM2.5 have no effect on Tau pathology in WT mice.

(A) Immunohistochemistry of phosphorylated Tau (AT8) in WT mice treated with PM2.5 for 4 months. Representative images of p-Tau (AT8) staining in the dentate gyrus and CA3 of the mouse hippocampus. Scale bars, 200 μm in the top panel, 50 μm in the lower panels.