

## Supplemental material

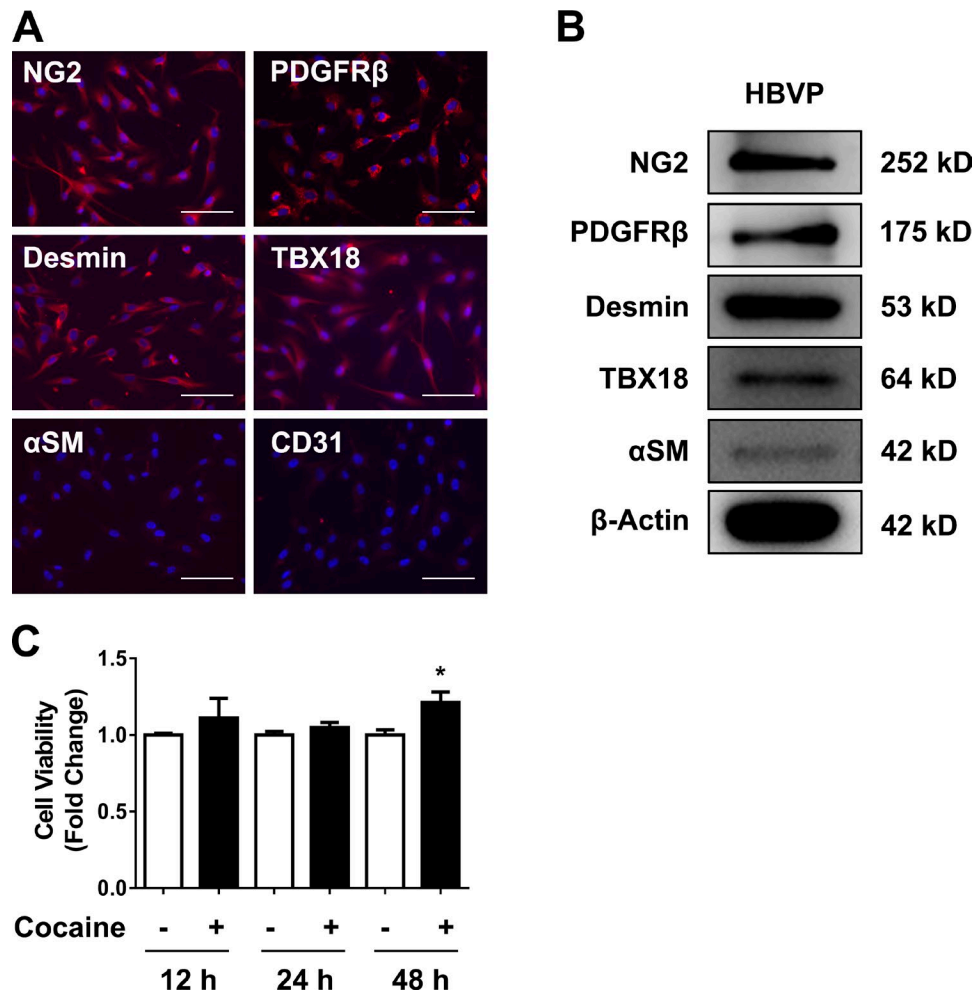
Niu et al., <https://doi.org/10.1083/jcb.201712011>

Figure S1. **Immunostaining of different cell markers in HBVPs and MTS cell-viability assay of HBVPs.** (A) Immunostaining of HBVPs using various cell-specific markers: pericyte markers, NG2, PDGFR- $\beta$ , Desmin, TBX18; smooth muscle cell marker,  $\alpha$ SM; endothelial cell marker, CD31. Bars, 50  $\mu$ m. (B) Representative Western blot of expression levels of various cell-specific markers in HBVPs: pericyte markers, NG2, PDGFR- $\beta$ , Desmin, TBX18; smooth muscle cell marker,  $\alpha$ SM. (C) Cell viability of HBVPs exposed to cocaine for 12, 24, and 48 h was determined by the MTS colorimetric assay. Two-tailed Student's *t* test. All data are presented as means  $\pm$  SD of four individual experiments (biological replicates). \*,  $P < 0.05$  versus control group.

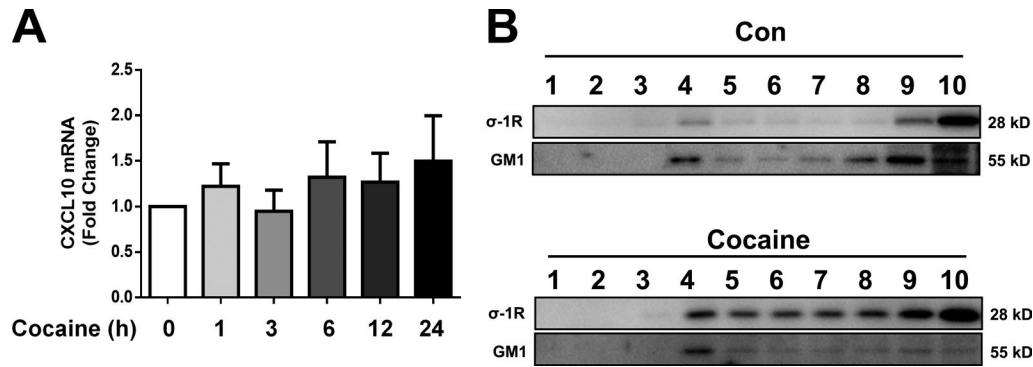


Figure S2. **CXCL10 mRNA expression levels in HEK293 cells and  $\sigma$ -1R expression levels in lipid raft isolation fractions of HBVPs.** **(A)** CXCL10 mRNA expression levels in HEK293 cells exposed to cocaine were examined by real-time PCR. One-way ANOVA followed by Bonferroni's post hoc test was used to determine the statistical significance among multiple groups. **(B)** Representative Western blot of  $\sigma$ -1R and GM1 in 1–10 lipid raft isolation fractions of HBVPs exposed to cocaine. One-way ANOVA followed by Bonferroni's post hoc test was used to determine the statistical significance among multiple groups. Data are presented as means  $\pm$  SD of three or four individual experiments (biological replicates).

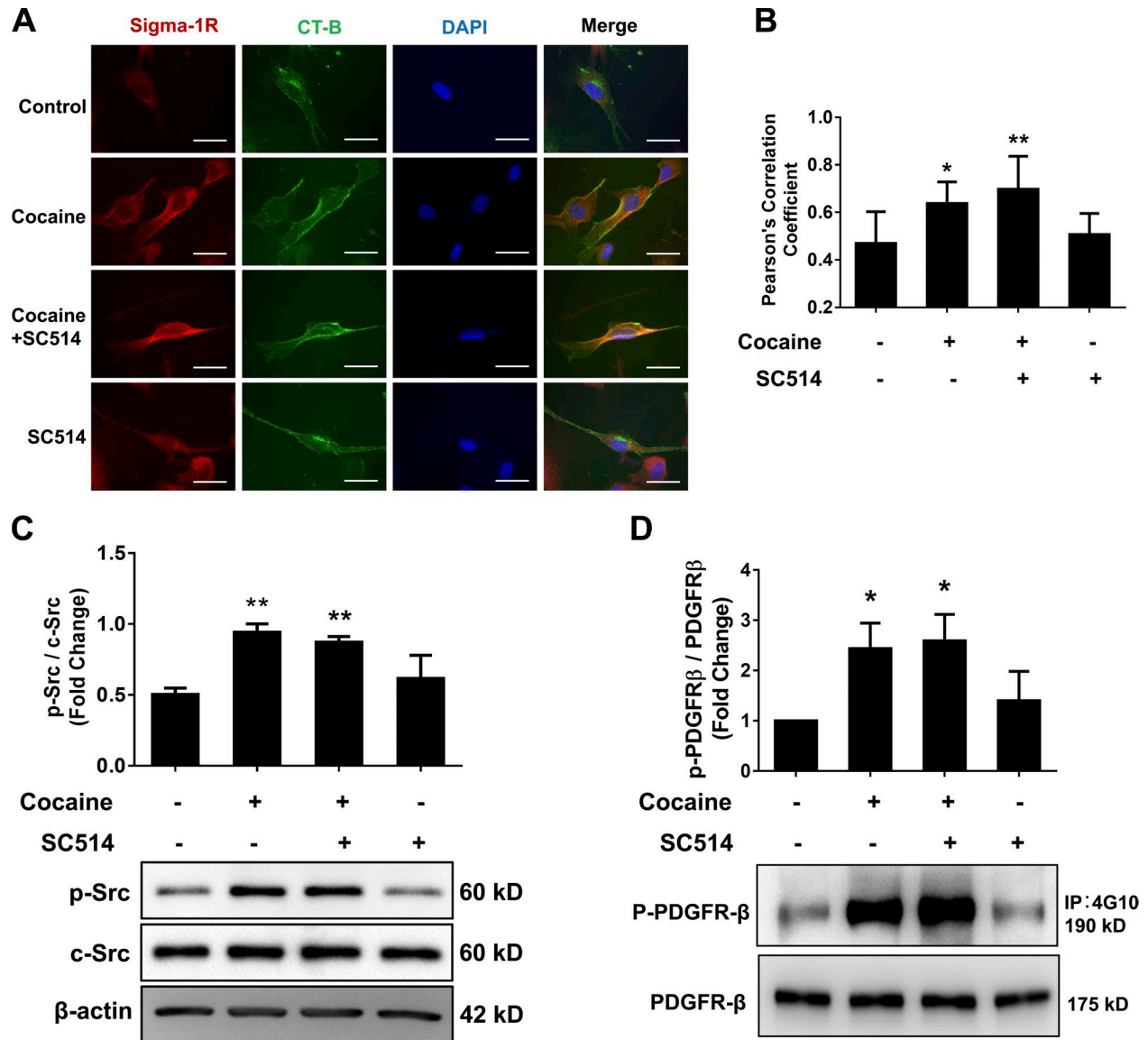


Figure S3. Pretreatment of HBVPs with the IKK-2/NF-κB inhibitor SC514 failed to abrogate cocaine-mediated lipid raft translocation of  $\sigma$ -1R, Src phosphorylation, and PDGFR- $\beta$  phosphorylation. (A) Representative images of HBVPs stained with anti- $\sigma$ -1R antibody and CT-B conjugated Alexa Fluor 488 specific for the ganglioside GM1-lipid raft marker. Bar, 20  $\mu$ m. (B) Quantification of colocalization of  $\sigma$ -1R and CT-B. One-way ANOVA followed by Bonferroni's post hoc test was used to determine the statistical significance among multiple groups. (C) Representative Western blot and quantification of p-Src levels in HBVPs pretreated with SC514 for 1 h, followed by cocaine exposure for an additional 15 min. One-way ANOVA followed by Bonferroni's post hoc test was used to determine the statistical significance among multiple groups. (D) Representative Western blot and quantification of p-PDGFR- $\beta$  levels in HBVPs pretreated with SC514 for 1 h, followed by cocaine exposure for an additional 15 min. One-way ANOVA followed by Bonferroni's post hoc test was used to determine the statistical significance among multiple groups. All data are presented as means  $\pm$  SD of three or four individual experiments (biological replicates). \*,  $P < 0.05$ , \*\*,  $P < 0.01$  versus control group.

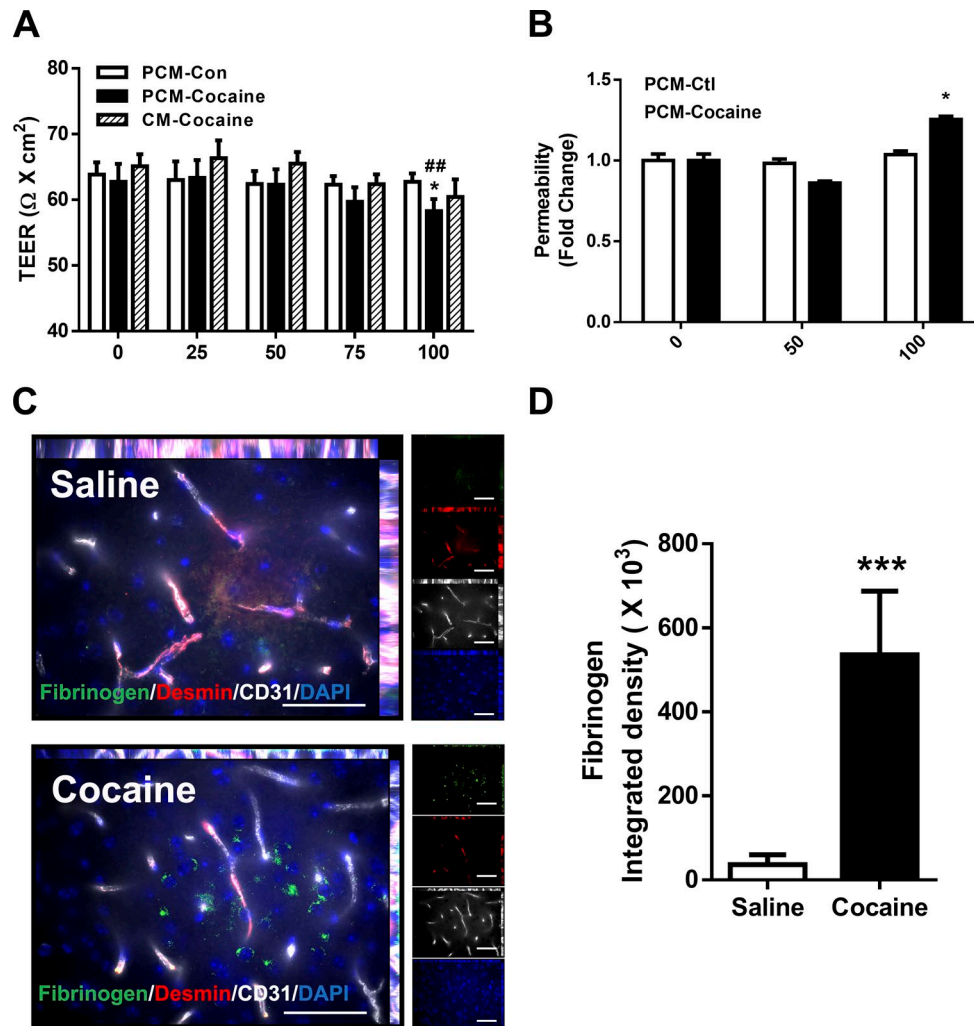


Figure S4. **The effect of cocaine on permeability of BBB in vitro and in vivo.** (A) TEER values of HBMECs cultured in the Transwell and exposed to different concentrations of PCM-Con, PCM-cocaine, and CM-cocaine (without HBVPs) were examined by the Millicell ERS-2 Voltammeter. One-way ANOVA followed by Bonferroni's post hoc test was used to determine the statistical significance among multiple groups. \*,  $P < 0.05$  versus 0% PCM group. ##,  $P < 0.01$  versus PCM-Con group. (B) The permeability of HBMECs exposed to different concentrations of PCM-Con and PCM-cocaine. Two-tailed Student's  $t$  test. (C) Representative images of brain sections from saline or cocaine-administered mice and stained for anti-fibrinogen, anti-Desmin, and anti-CD31 antibodies. Bar, 50  $\mu\text{m}$ . (D) Quantification of fibrinogen fluorescent intensity in the brains of mice administrated saline or cocaine. Two-tailed Student's  $t$  test. All data are presented as means  $\pm$  SD of three or four individual experiments (biological replicates). \*,  $P < 0.05$ , \*\*\*,  $P < 0.001$  versus saline or control group.

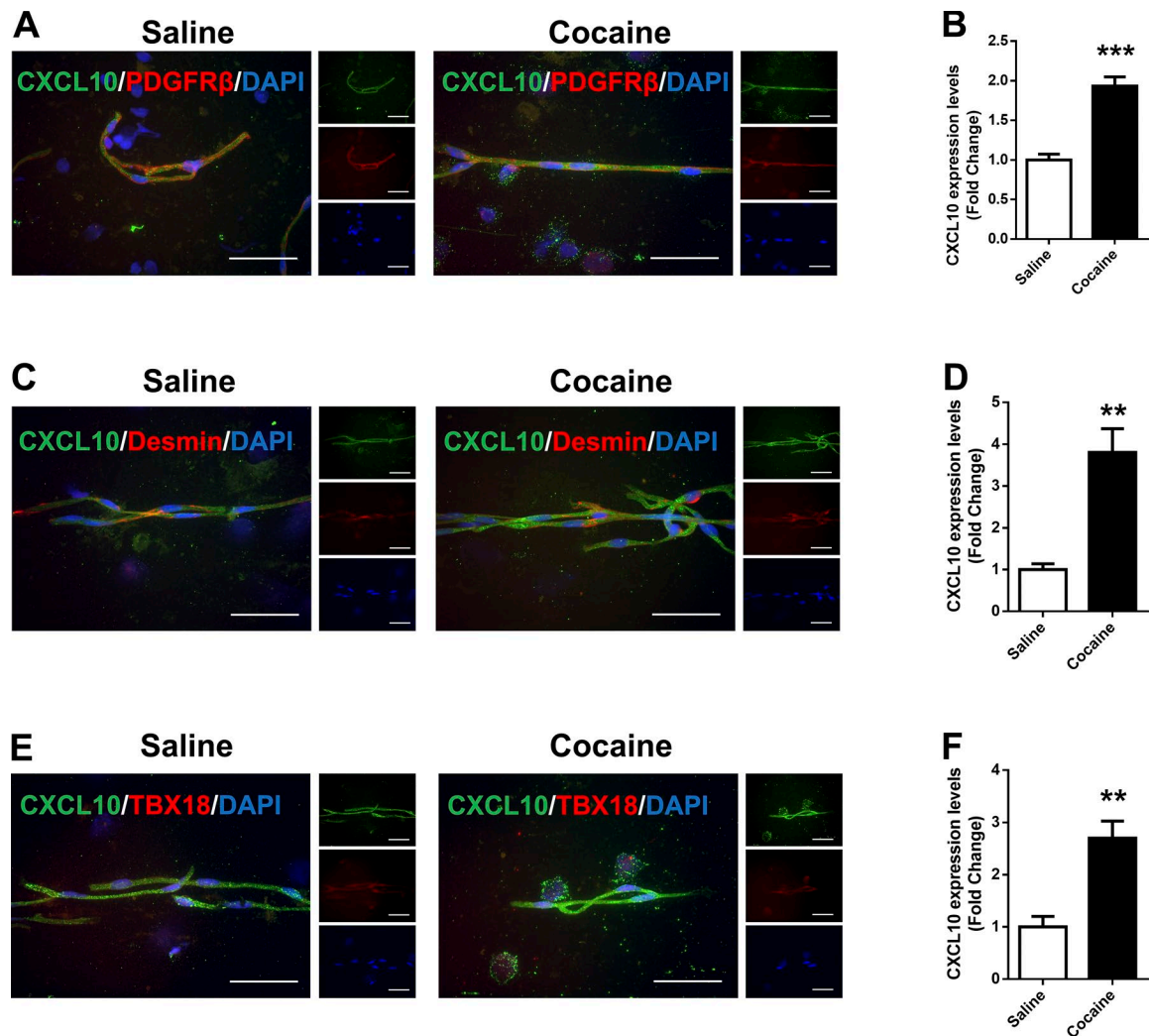


Figure S5. **CXCL10 expression levels in pericytes of MIVs isolated from brains of mice administrated with saline or cocaine.** (A) Representative images of MIVs, isolated from brains of mice administrated saline or cocaine and stained with anti-CXCL10 and anti-PDGFR- $\beta$ . Bar, 50  $\mu$ m. (B) Quantification of fluorescent intensities of CXCL10 staining in PDGFR- $\beta$ <sup>+</sup> cells. Two-tailed Student's *t* test. (C) Representative images of MIVs isolated from brains of mice administrated saline or cocaine and stained with anti-CXCL10 and anti-Desmin. Bars, 50  $\mu$ m. (D) Quantification of fluorescent intensities of CXCL10 staining in Desmin<sup>+</sup> cells. Two-tailed Student's *t* test. (E) Representative images of MIVs isolated from brains of mice administrated saline or cocaine and stained with anti-CXCL10 and anti-TBX18. Bar, 50  $\mu$ m. (F) Quantification of fluorescent intensities of CXCL10 staining in TBX18<sup>+</sup> cells. Two-tailed Student's *t* test. All data are presented as means  $\pm$  SEM of three or four individual experiments (biological replicates). \*\*, *P* < 0.01, \*\*\*, *P* < 0.001 versus saline group.

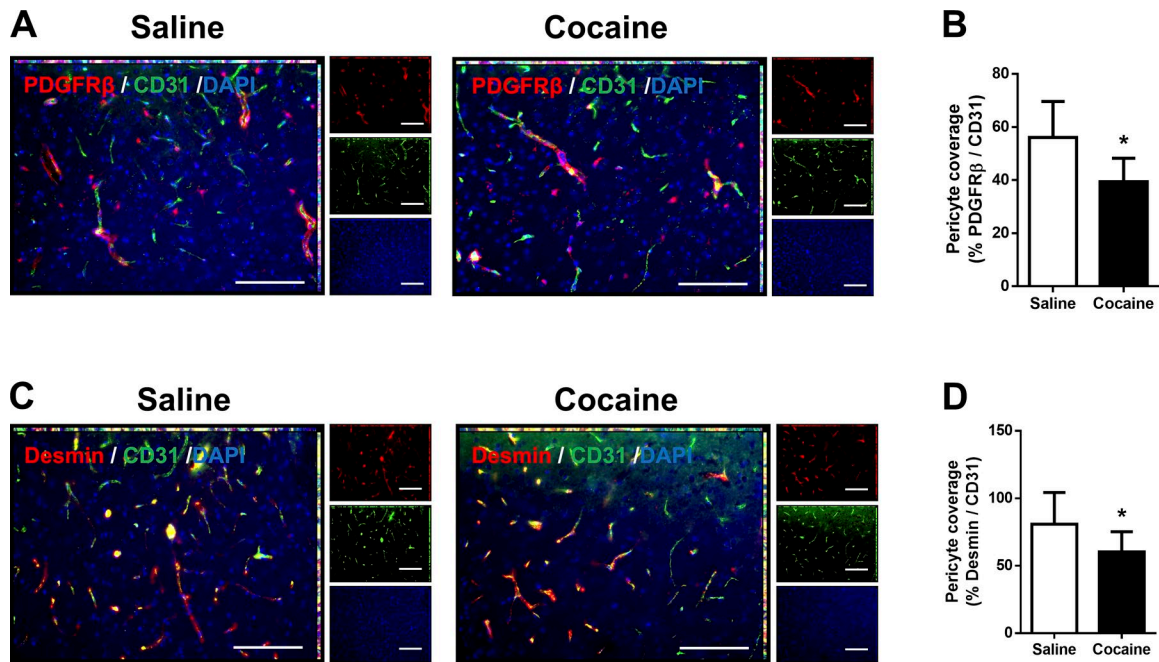


Figure S6. **Pericyte coverage in MIVs from brains of mice administrated either saline or cocaine.** (A) Representative images of MIVs in the brains of mice administrated either saline or cocaine and immunostained with anti-PDGFR- $\beta$  and anti-CD31 antibodies. Bar, 100  $\mu$ m. (B) Percentage of PDGFR- $\beta$ <sup>+</sup> surface area covering CD31<sup>+</sup> capillary surface area. Two-tailed Student's *t* test. (C) Representative images of MIVs in the brains of mice administrated either saline or cocaine and immunostained with anti-Desmin and anti-CD31 antibodies. Bar, 100  $\mu$ m. (D) Percentage of Desmin<sup>+</sup> surface area covering CD31<sup>+</sup> capillary surface area. Two-tailed Student's *t* test. All data are presented as means  $\pm$  SD of three or four individual experiments (biological replicates). \*, *P* < 0.05 versus saline group.



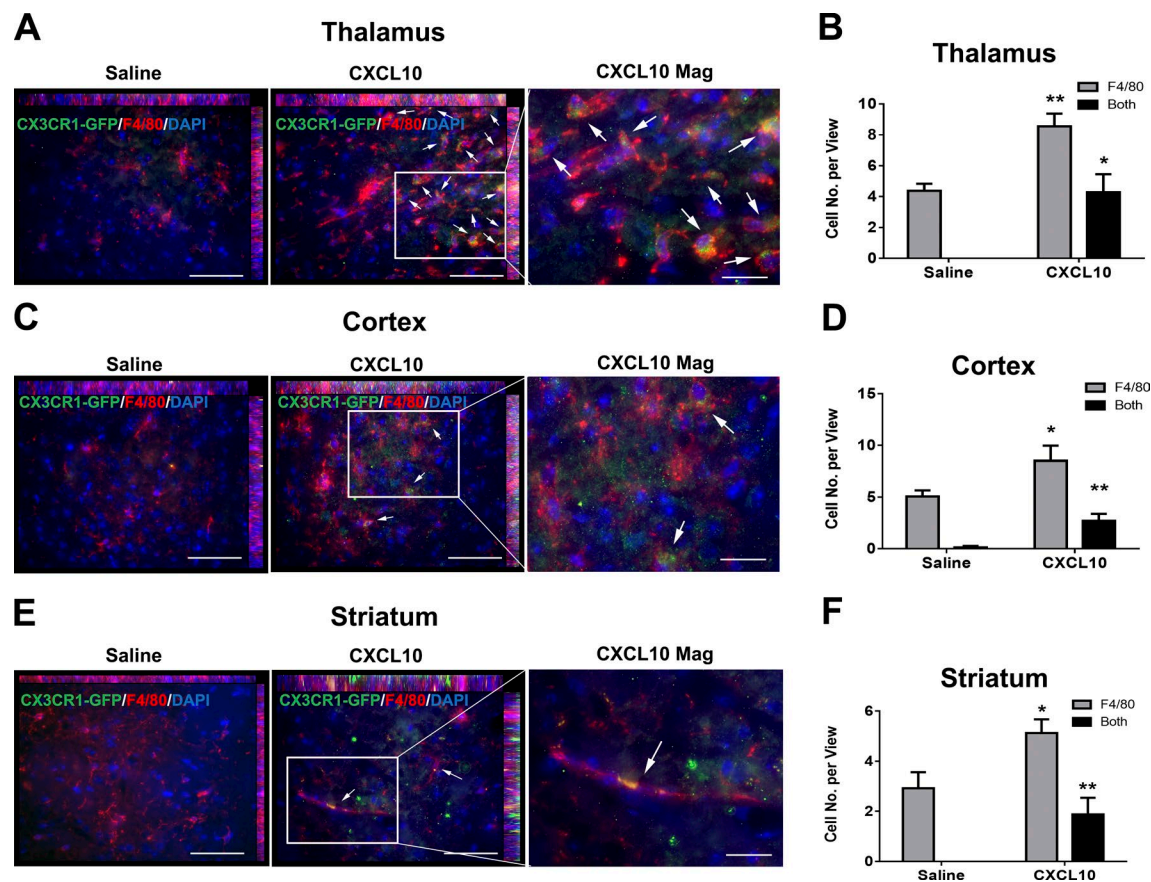


Figure S7. **CX3CR1-GFP<sup>+</sup> BMMs transmigration in the brain of mice administrated CXCL10.** (A) Representative images of F4/80<sup>+</sup> and GFP<sup>+</sup>/F4/80<sup>+</sup> cells in the thalamus of mice administrated saline or CXCL10. Arrow: GFP<sup>+</sup>/F4/80<sup>+</sup> cells. Bar, 50  $\mu$ m; enlarged images, 20  $\mu$ m. (B) Quantification of F4/80<sup>+</sup> and GFP<sup>+</sup>/F4/80<sup>+</sup> cells in the thalamus of mice administrated saline or CXCL10. Two-tailed Student's *t* test. (C) Representative images of F4/80<sup>+</sup> and GFP<sup>+</sup>/F4/80<sup>+</sup> cells in the cortex of mice administrated saline or CXCL10. Arrow: GFP<sup>+</sup>/F4/80<sup>+</sup> cells. Bar, 50  $\mu$ m; enlarged images, 20  $\mu$ m. (D) Quantification of F4/80<sup>+</sup> and GFP<sup>+</sup>/F4/80<sup>+</sup> cells in the cortex of mice administrated saline or CXCL10. Two-tailed Student's *t* test. (E) Representative images of F4/80<sup>+</sup> and GFP<sup>+</sup>/F4/80<sup>+</sup> cells in the striatum of mice administrated saline or CXCL10. Arrows: GFP<sup>+</sup>/F4/80<sup>+</sup> cells. Bar, 50  $\mu$ m; enlarged images, 20  $\mu$ m. (F) Quantification of F4/80<sup>+</sup> and GFP<sup>+</sup>/F4/80<sup>+</sup> cells in the striatum of mice administrated saline or CXCL10. Two-tailed Student's *t* test. All data are presented as means  $\pm$  SD of three or four individual experiments (biological replicates). \*,  $P < 0.05$ , \*\*,  $P < 0.01$  versus saline group.

Table S1. **Clinical data for human brain tissue samples**

Case number	Dependence, current	Age (years)	Gender	Race	Cause of death
1 (101)	Nil	64	Male	Caucasian	Natural
2 (102)	Nil	18	Male	Caucasian	Natural
3 (108)	Nil	61	Male	Caucasian	Accident
4 (110)	Nil	26	Male	Caucasian	Accident
5 (113)	Alcohol-cocaine	24	Male	Caucasian	Accident
6 (114)	Alcohol-cocaine	39	Male	Caucasian	Suicide
7 (118)	Cocaine	37	Male	Caucasian	Suicide
8 (119)	Cocaine	45	Male	Caucasian	Suicide