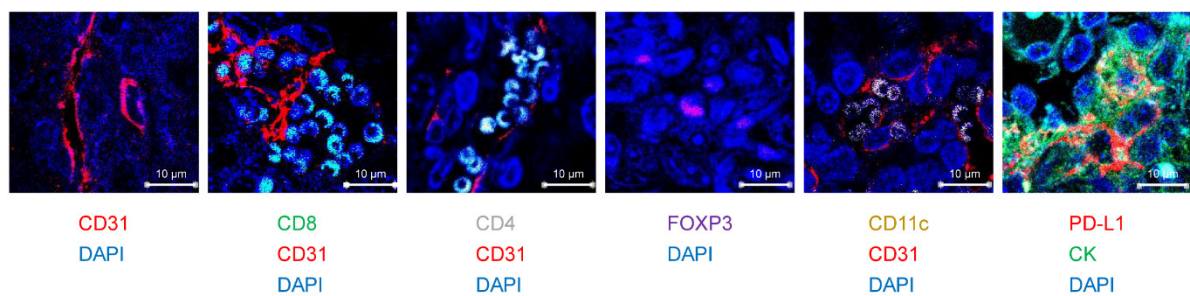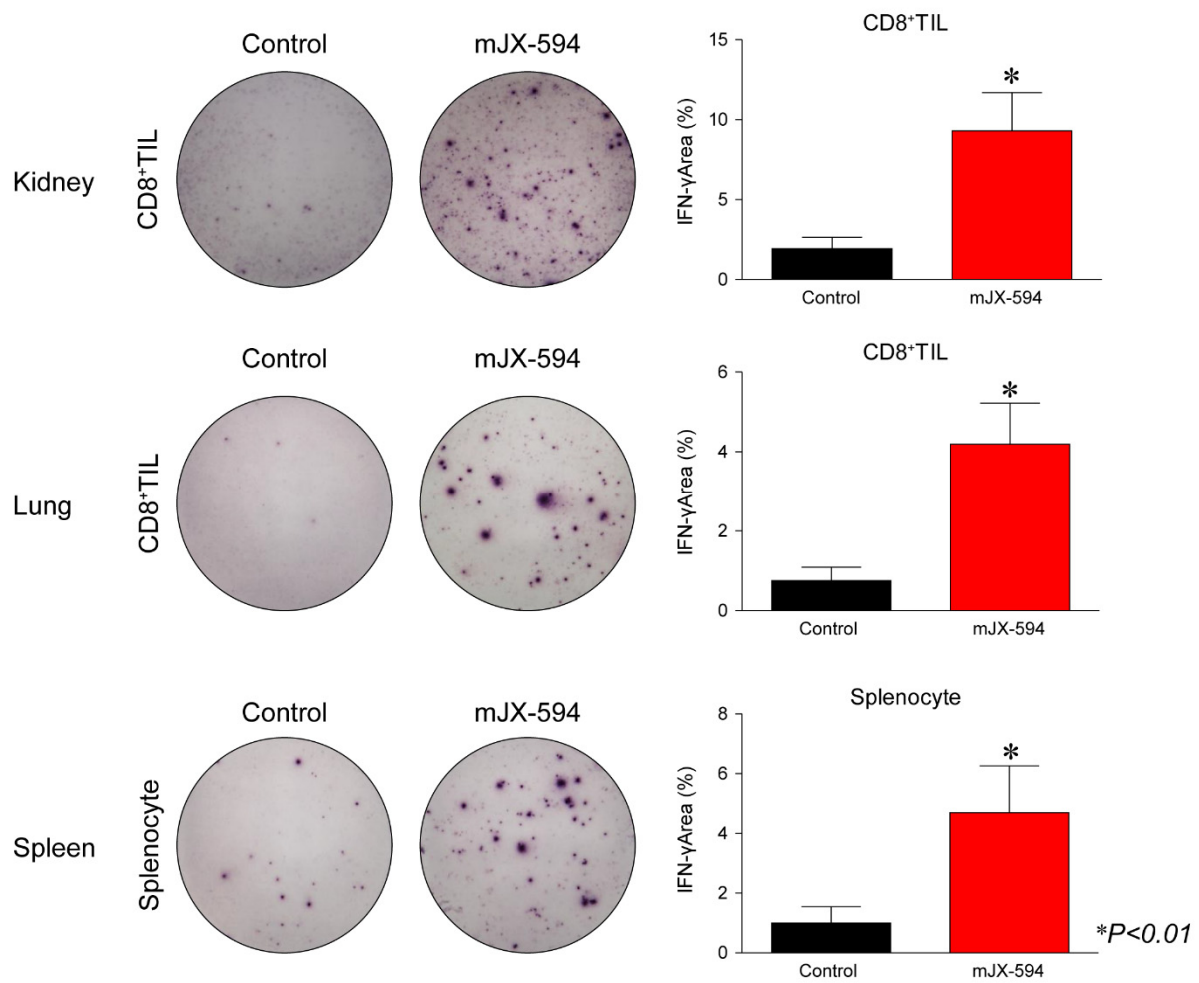**Supplementary Figure S1.** Mice weight over time, demonstrating no significant weight loss in JX-594 or sunitinib treatment group compared with control group according to (A) early-stage metastatic renal cell carcinoma (mRCC) model and (B) advanced-stage mRCC model.

Supplementary Figure S2. Representative high-magnified images of lung metastatic sites treated with mJX-594 systemic treatment. Tumor sections were stained for CD31, CD8, CD4, CD11c, Foxp3, and PD-L1. Scale bars, 10 μm.

Supplementary Figure S3. Images and comparisons of IFNγ ELISPOT in CD8+ tumor infiltrating lymphocytes (TILs) and splenocytes from control or JX-594 treated mice. CD8+ TILs were isolated from dissociated tumors with anti-CD8 antibody-coated magnetic beads. * P<0.01