

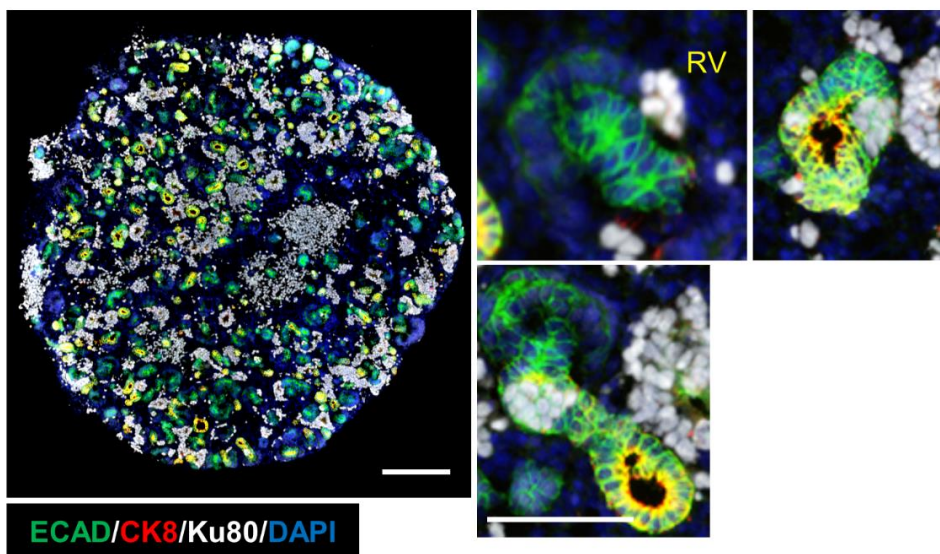
**Supplementary Figure 1. Evaluation of human-mouse chimeric renal organoids generated using existing protocols.**

**a.** Quality assessment of human NPCs used for human-mouse chimeric renal organoid experiments. Scale bar represents 200  $\mu$ m.

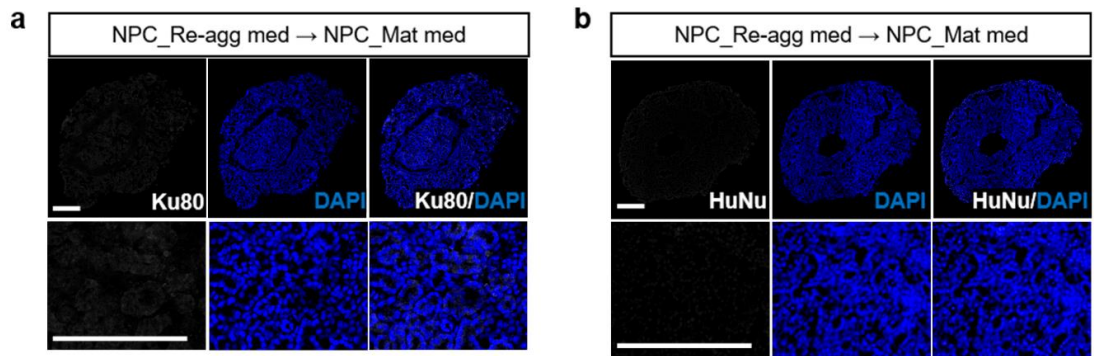
**b.** Bright-field images of human-mouse chimeric renal organoids, fetal mouse kidney organoids, and human NPC organoids generated using existing protocols. Scale bar represents 200  $\mu$ m.

**c.** Immunostaining images of human-mouse chimeric renal organoids generated using existing protocols. Scale bar represents 200  $\mu$ m.

**d.** Cell composition analysis and chimera formation analysis based on immunostaining of human-mouse chimeric renal organoids. Scale bar represents 200  $\mu$ m (n= 3 independent experiments; mean  $\pm$  s.d.; \*\*P< 0.01; two-tailed Student t-test).

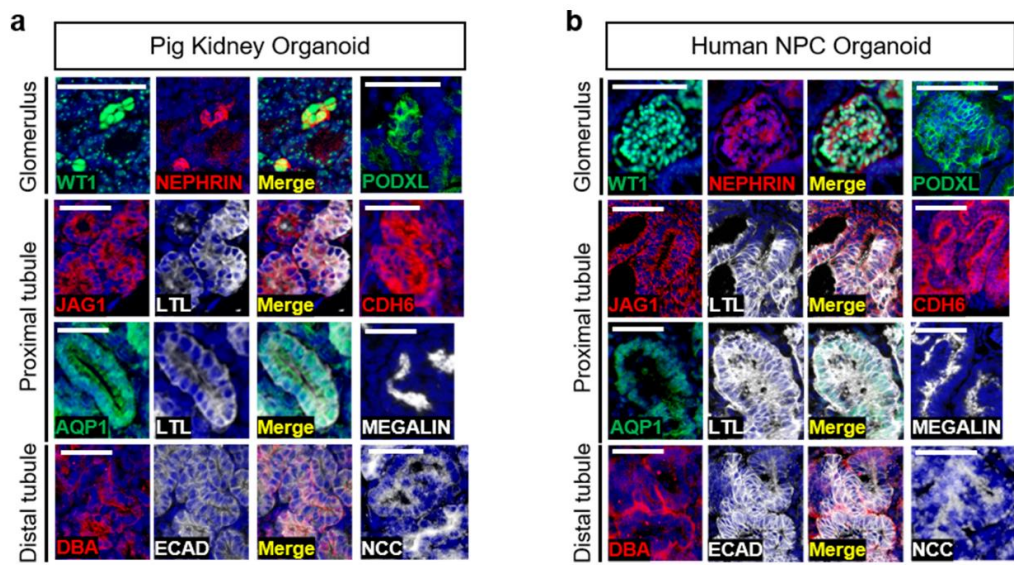


**Supplementary Figure 2. Evaluation of early-stage human-mouse chimeric renal organoids.** Immunostaining images of chimeric renal organoids at Day 2 cultured in the combination of NPC\_Re-agg and NPC\_Mat media. Scale bar represents 200  $\mu\text{m}$ .



**Supplementary Figure 3. Evaluation of fetal pig kidney organoids generated using identified culture conditions.**

**a, b.** Immunostaining images of pig kidney organoids at Day 6 that were stained by antibody against human cell markers, Ku80 (**a**) and HuNu (**b**). Scale bar represents 200  $\mu\text{m}$ .



**Supplementary Figure 4. Developmental evaluation of fetal pig kidney organoids and human NPC organoids cultured for 6 days under the identified culture conditions.**

**a, b.** Immunostaining images of fetal pig kidney organoids (**a**) and human NPC organoids (**b**) stained by antibodies at various developmental stages of each nephron segment. Scale bar represents 100  $\mu\text{m}$ .