

1 **Supplemental Figure 1.**

2 (A) Immunofluorescence staining showing SOX9 (green), and DAPI (blue) expression in
3 airway stem cells. Scale bars represent 100 μm .

4 (B) Representative images of pig airway stem cells transduced with Venus-Akaluc, shown by
5 phase contrast microscopy (left) and fluorescence microscopy (right). Scale bars
6 represent 100 μm .

7 (C) Representative images of pig airway stem cell-derived organoids transduced with Venus-
8 Akaluc, shown by bright-field microscopy (left) and fluorescence microscopy (right).
9 Scale bars represent 100 μm .

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11 **Supplemental Figure 2.**

12 (A) Quantitative comparison of Akaluc signal intensity between PA injection and bronchial
13 injection (n=3). There was a significant difference between the two groups ($p < 0.01$, two-
14 way ANOVA).

15 (B) Representative histological images of transplanted organoids following PA injection,
16 shown by hematoxylin and eosin (H&E) staining and GFP immunohistochemistry. Some
17 cells were observed migrating beyond the vascular boundary (\rightarrow indicates migrating
18 cells). Scale bars represent 50 μm .

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20 **Supplementary Figure 3.**

21 (A) CT scan image of the pig lung on day -7, day 0, and day 7.

22 (B) Bioluminescence detection of Akaluc signals in the pig lung on day 7 using the Xenogen
23 IVIS Spectrum system.

24 (C) Time-course of blood cyclosporin A levels during the transplantation period.

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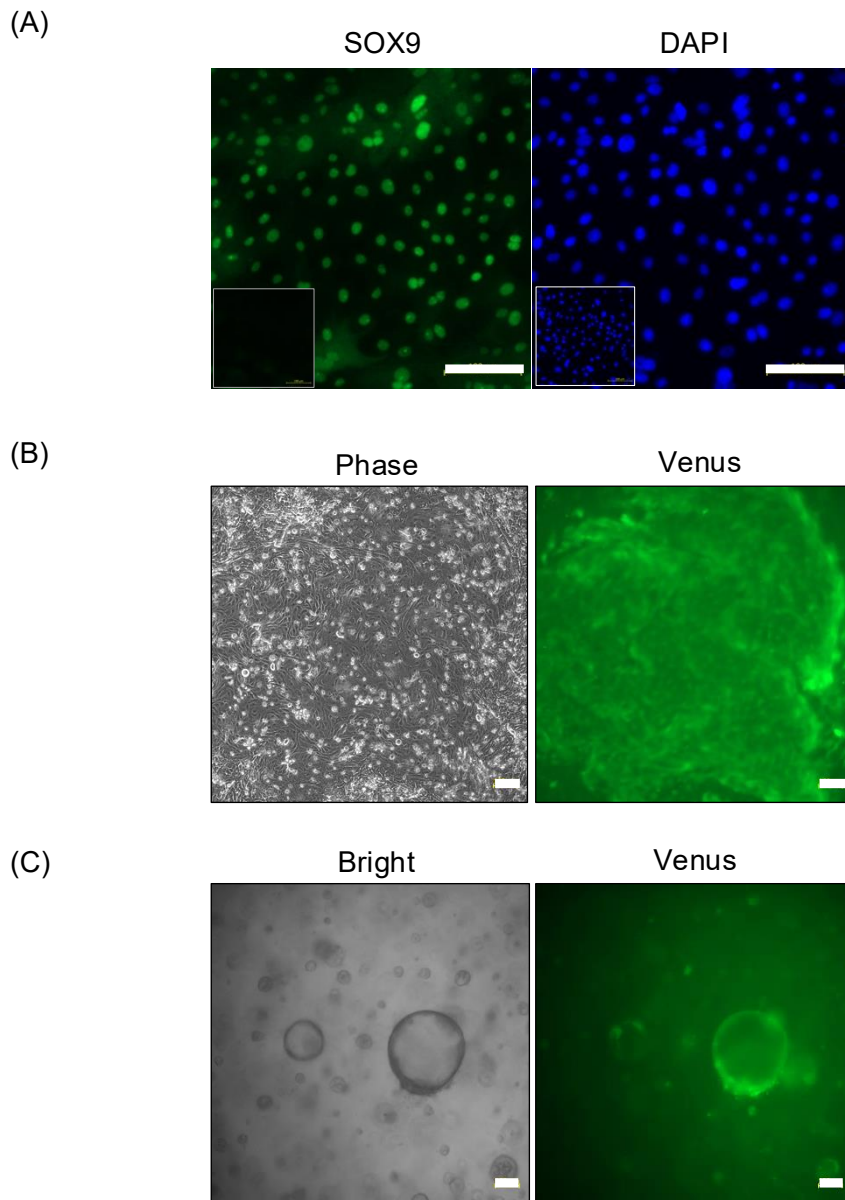
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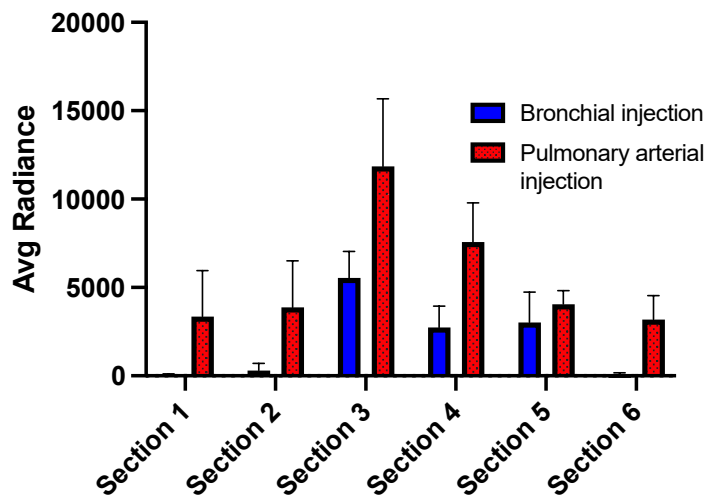
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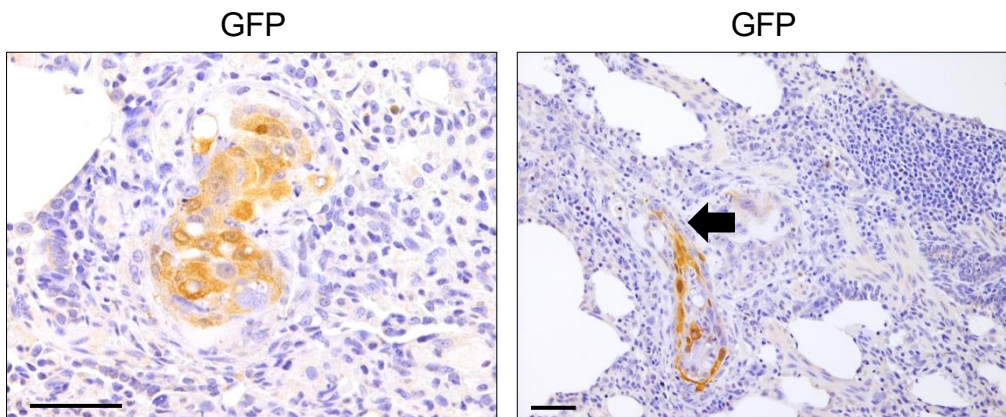
Supplementary Figure 1.

- (A) Immunofluorescence staining showing SOX9 (green), and DAPI (blue) expression in airway stem cells. Scale bars represent 100 μ m.
- (B) Representative images of pig airway stem cells transduced with Venus-Akaluc, shown by phase contrast microscopy (left) and fluorescence microscopy (right). Scale bars represent 100 μ m.
- (C) Representative images of pig airway stem cell-derived organoids transduced with Venus-Akaluc, shown by bright-field microscopy (left) and fluorescence microscopy (right). Scale bars represent 100 μ m.

(A)

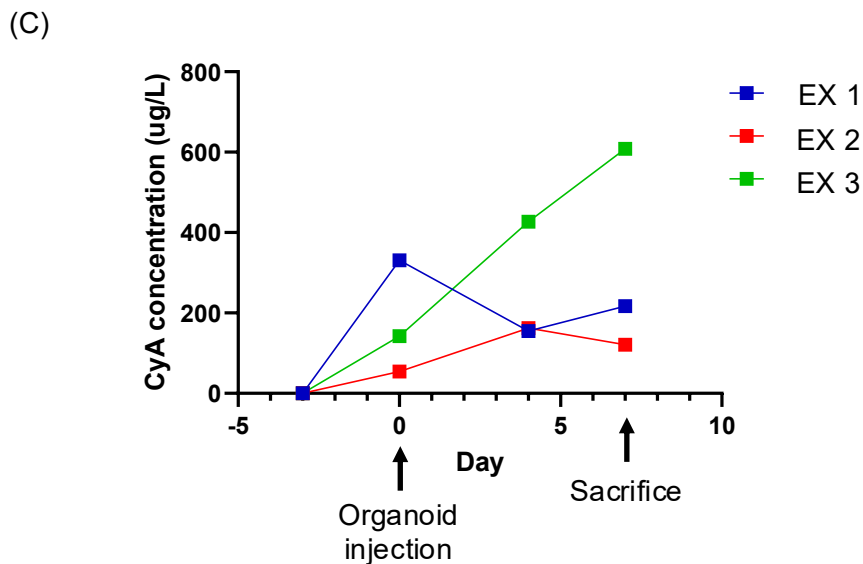
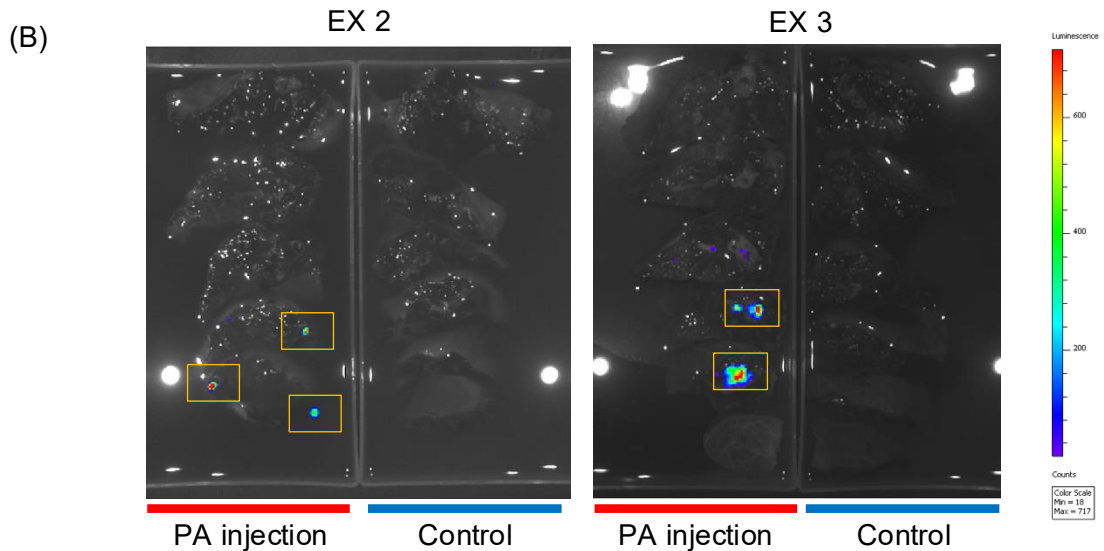
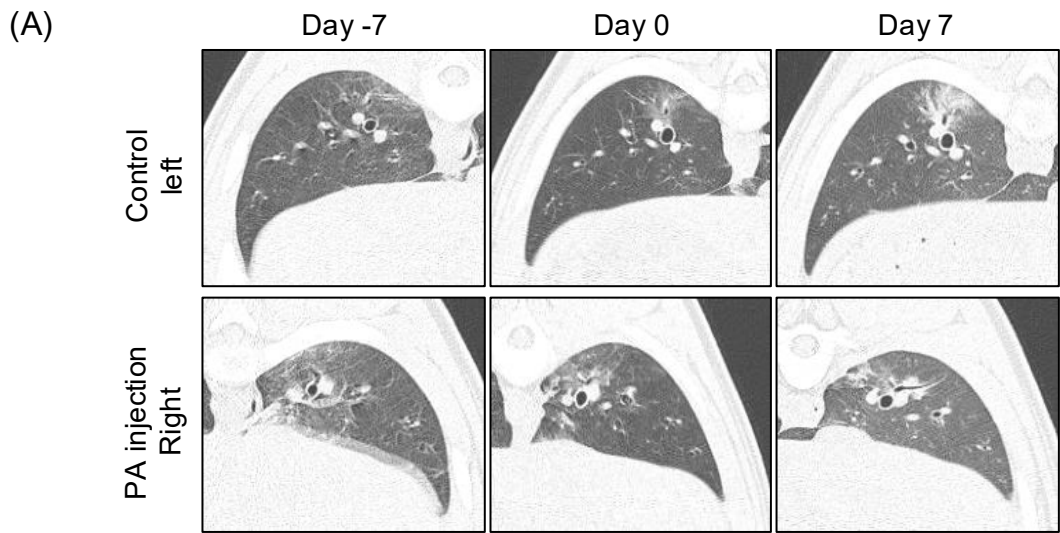


(B)



Supplementary Figure 2.

- (A) Quantitative comparison of Akaluc signal intensity between PA injection and bronchial injection. There was a significant difference between the two groups ($p < 0.01$, two-way ANOVA).
- (B) Representative histological images of transplanted organoids following PA injection, shown by hematoxylin and eosin (H&E) staining and GFP immunohistochemistry. Some cells were observed migrating beyond the vascular boundary (➔ indicates migrating cells). Scale bars represent 50 μm .



Supplementary Figure 3.

(A) CT scan image of the pig lung.

(B) Bioluminescence detection of Akaluc signals in the pig lung on day 7 using the Xenogen IVIS Spectrum system.

(C) Time-course of blood cyclosporin A levels during the transplantation period.