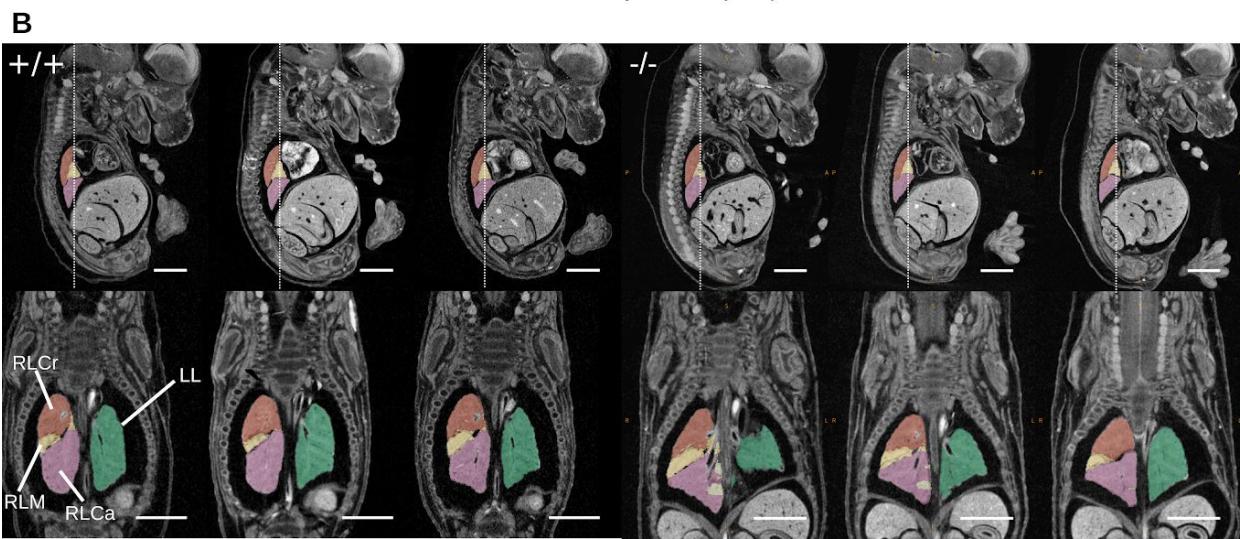
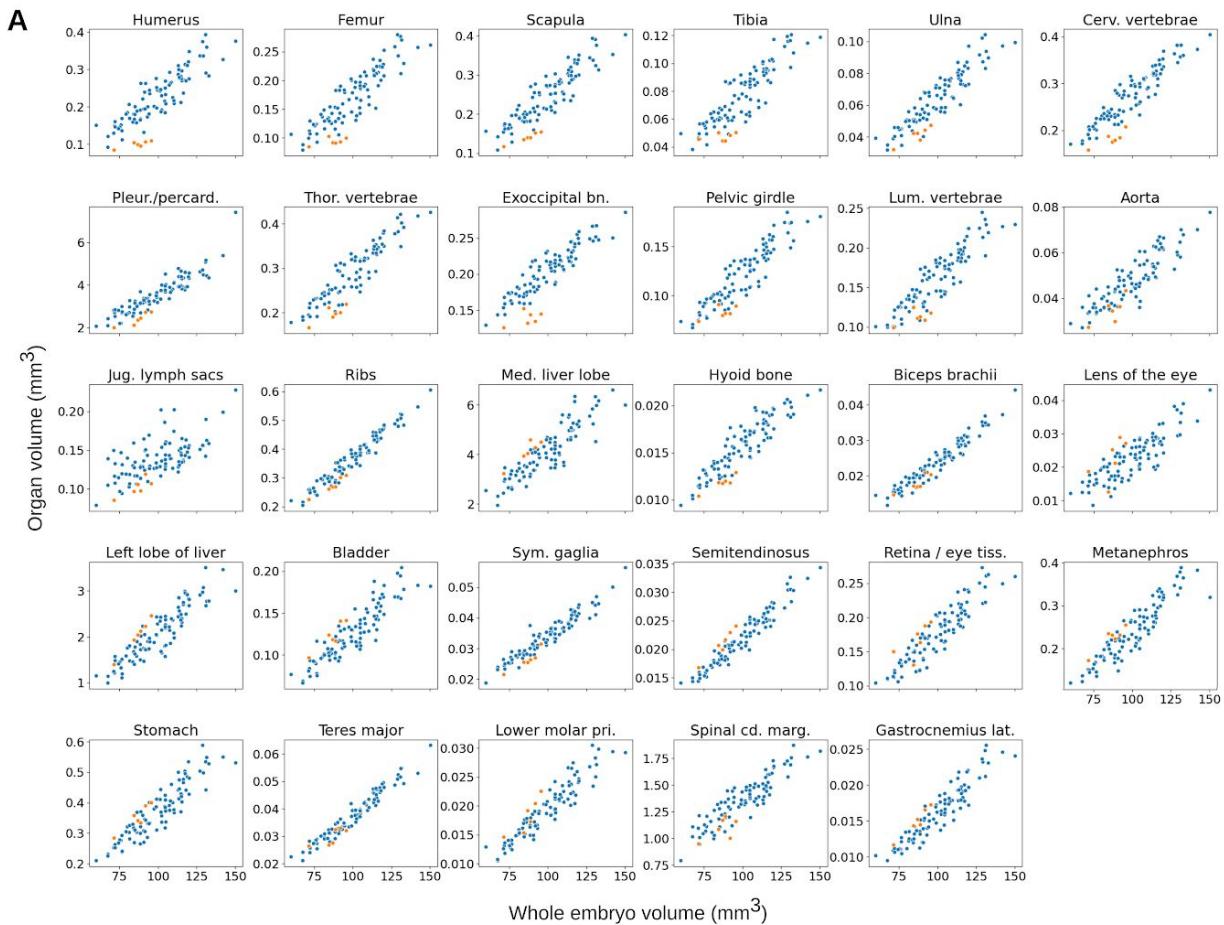
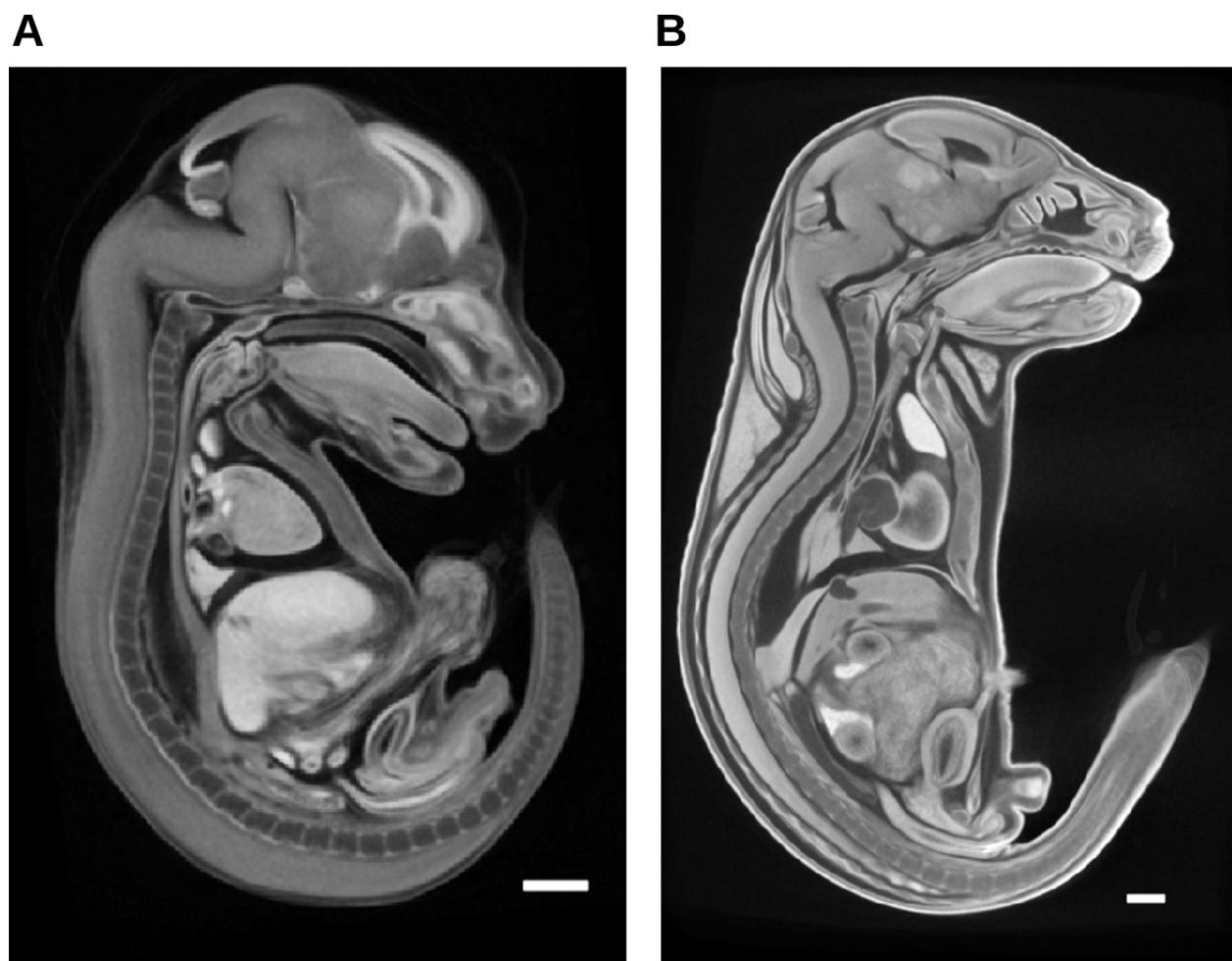
**Fig. S1. Sex differences in wild type embryos**

(A) Wild type embryos gonad examples. Sagittal sections of rigidly-aligned wild type embryo images showing the left gonad (LG) with the stomach (S) also indicated. Females (top) and males (bottom). (B) Representative sagittal sections of affinely-registered (normalised for overall embryo size) wild type specimens overlaid with automatically segmented lens label, illustrating difference in lens sizes between females (top rows) and males (bottom rows). (C) Plot of whole-embryo normalised organ volume against whole embryo volume (in voxels). numbers correspond to specimens in B. Scale bar: 1mm. A: anterior, P: posterior, S: superior, I: inferior.



**Fig S2.** (A) Plots of organs with significant *Acan*-/- genotype effect. X axis: whole embryo volume, y axis: organ volume in voxels, blue points: wild type specimens, orange points: *Acan*-/- specimens. (B) Comparison of wild type and *Acan*-/- mutant lungs. Rigidly-aligned specimens overlaid with individual lung lobe labels from automatic segmentation showing mutants (left 3) and stage-matched wild types (right 3). The top row shows a sagittal section. The bottom row shows a coronal section. The dotted line in the sagittal sections corresponds to the section chosen for the coronal view. Scale bar: 1mm, RLCr: right lung cranial lobe, LL: left lung lobe, RLM: right lung middle lobe, RLCA: right lung caudal lobe.



**Fig S3.** Sagittal sections of population averages from E15.5 (A) and E18.5 (B) wild type embryo data from the IMPC embryo pipeline. Scale bar: 1mm

**Table S1.** E14.5 Atlas label information

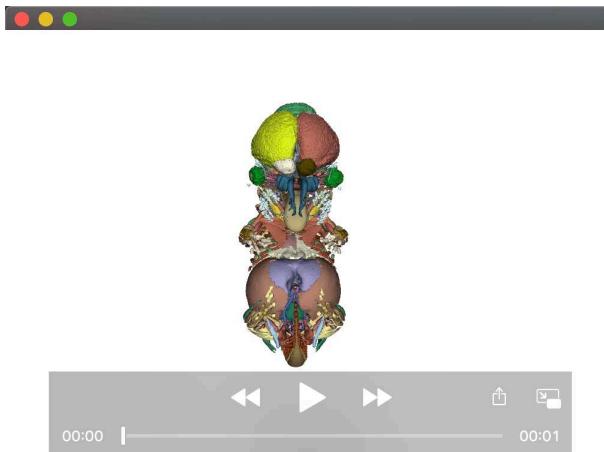
Columns - label: label number in atlas images, label\_name: the descriptive name, EMAPA term: Anatomical structure: associated EMAPA anatomical term, EMAPA organ system ID: the top level EMAP organ system ID, EMAPA organ system name: the top level EMAPA organ system name, Used in current analysis: If FALSE, not used in the current study.

[Click here to Download Table S1](#)

**Table S2.** Assessing the dependence of organ volume on WEV.

Results from fitting wild type organ volumes to linear model:  $\text{organ volume} / \text{WEV} \sim \text{WEV}$ . p: WEV effect p-value. q: Benjamini-Hochberg FDR-corrected p-value for WEV effect, t: WEV effect t-statistic.

[Click here to Download Table S2](#)



**Movie 1.** Volume rendered E14.5 atlas consisting of 184 segmented organs.