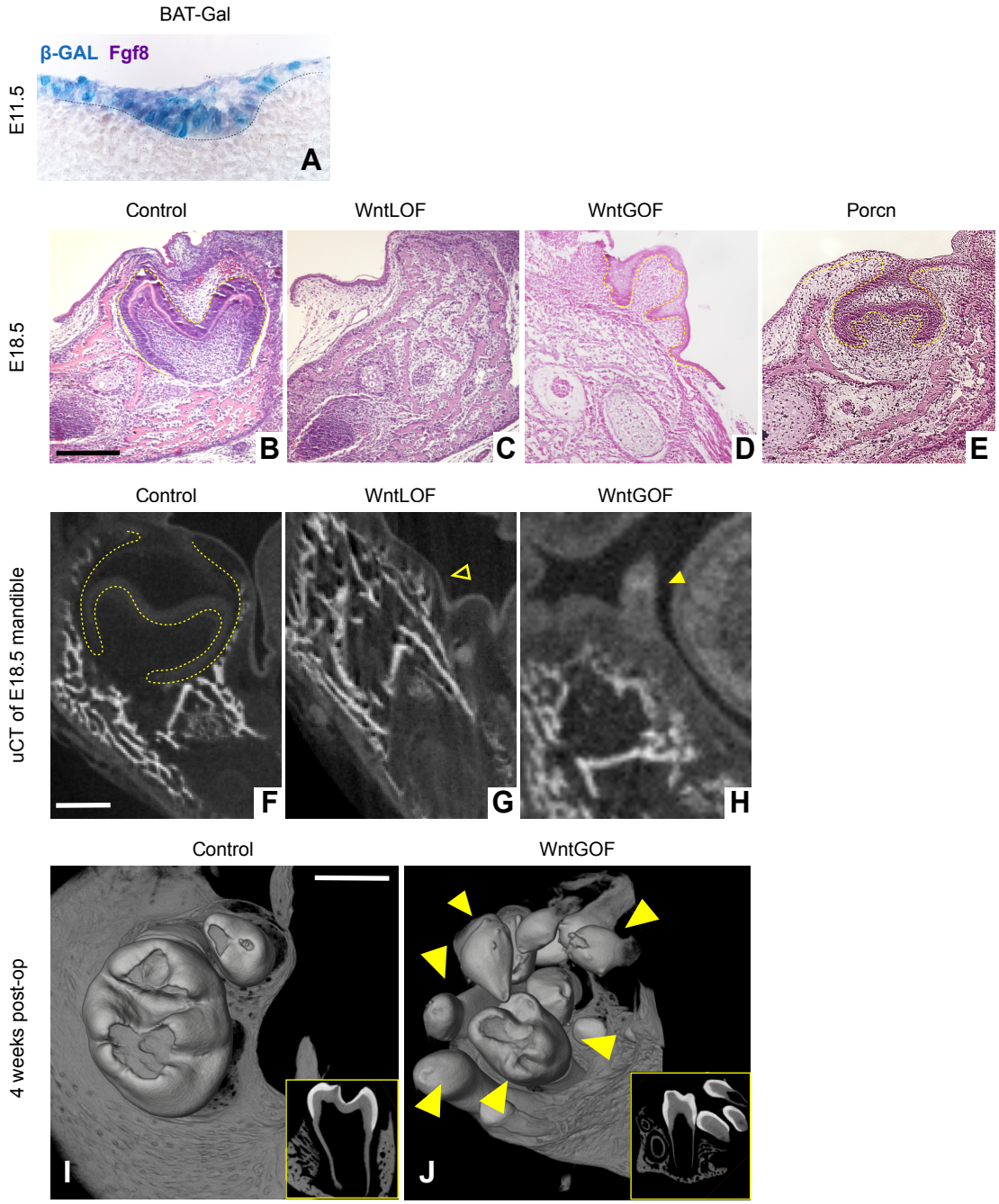


Fig. S1. WntLOF leads to anodontia and WntGOF induces supernumerary teeth formation. (A) Co-localization of *BAT-GAL* and *Fgf8* mRNA expression. (B-H) Histological sections (B-E) and µCT (F-H) of presumptive molar field at E18.5. Yellow dotted line: epithelial-mesenchymal border. Open arrowhead, presumptive molar site in WntLOF (G). Filled arrowhead, evaginating structure in WntGOF (H). (I and J) µCT of explants of WntGOF and littermate control 4 weeks post-renal graft. Scale bar: 100 µm for B-H; 500 µm for I and J.

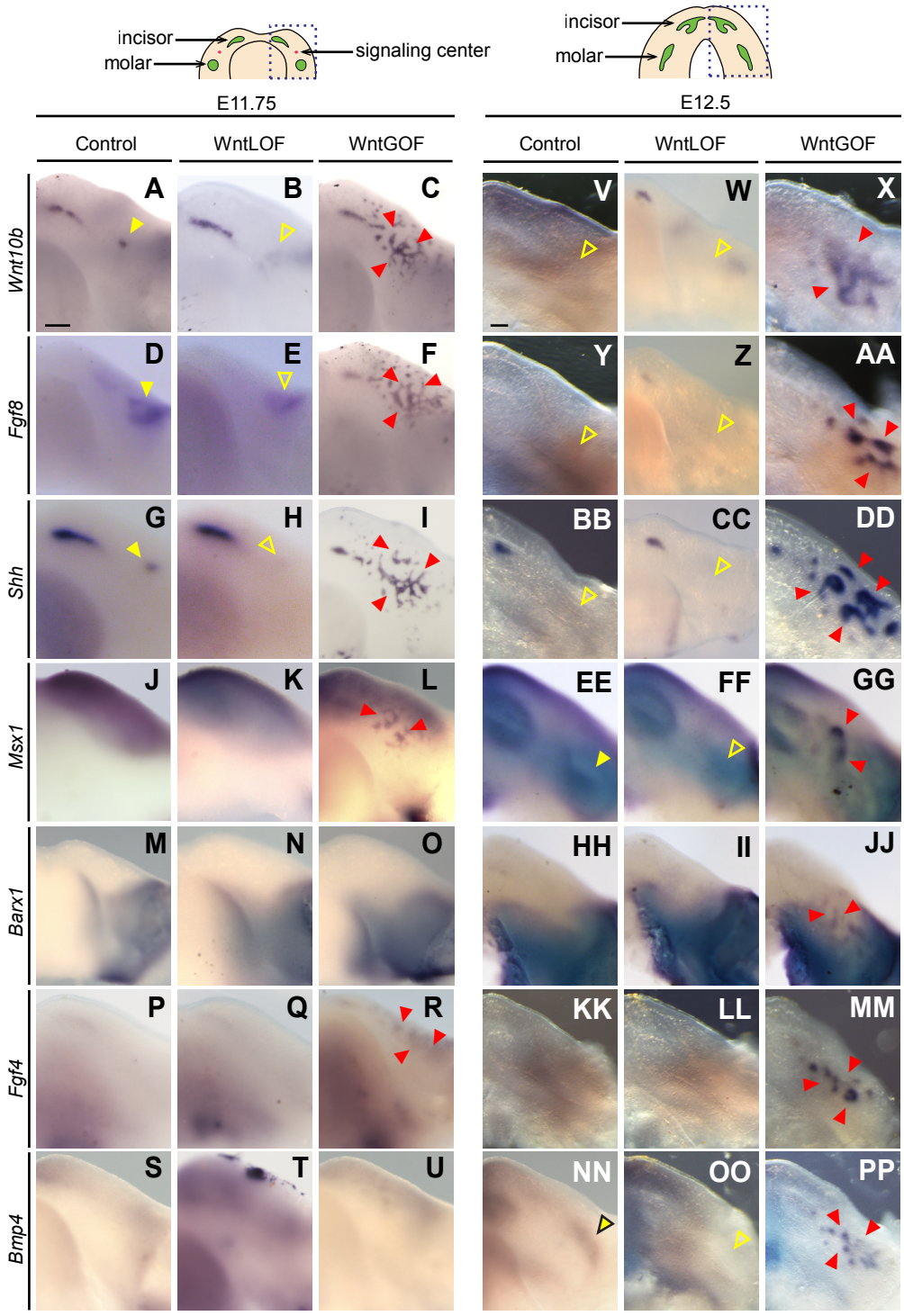


Fig. S2. Expression of odontogenic genes are perturbed in WntGOF and WntLOF mutants. (A-PP) Oral surface view of odontogenic gene expressions in control, WntLOF and WntGOF at E11.75 (A-U) and E12.5 (V-PP). Filled yellow arrowheads, expression in molar tooth germ (D and BB) and signaling center (A and G). Red arrowheads, ectopic expression. Open arrowheads, reduced expression. Scale bar 1mm.

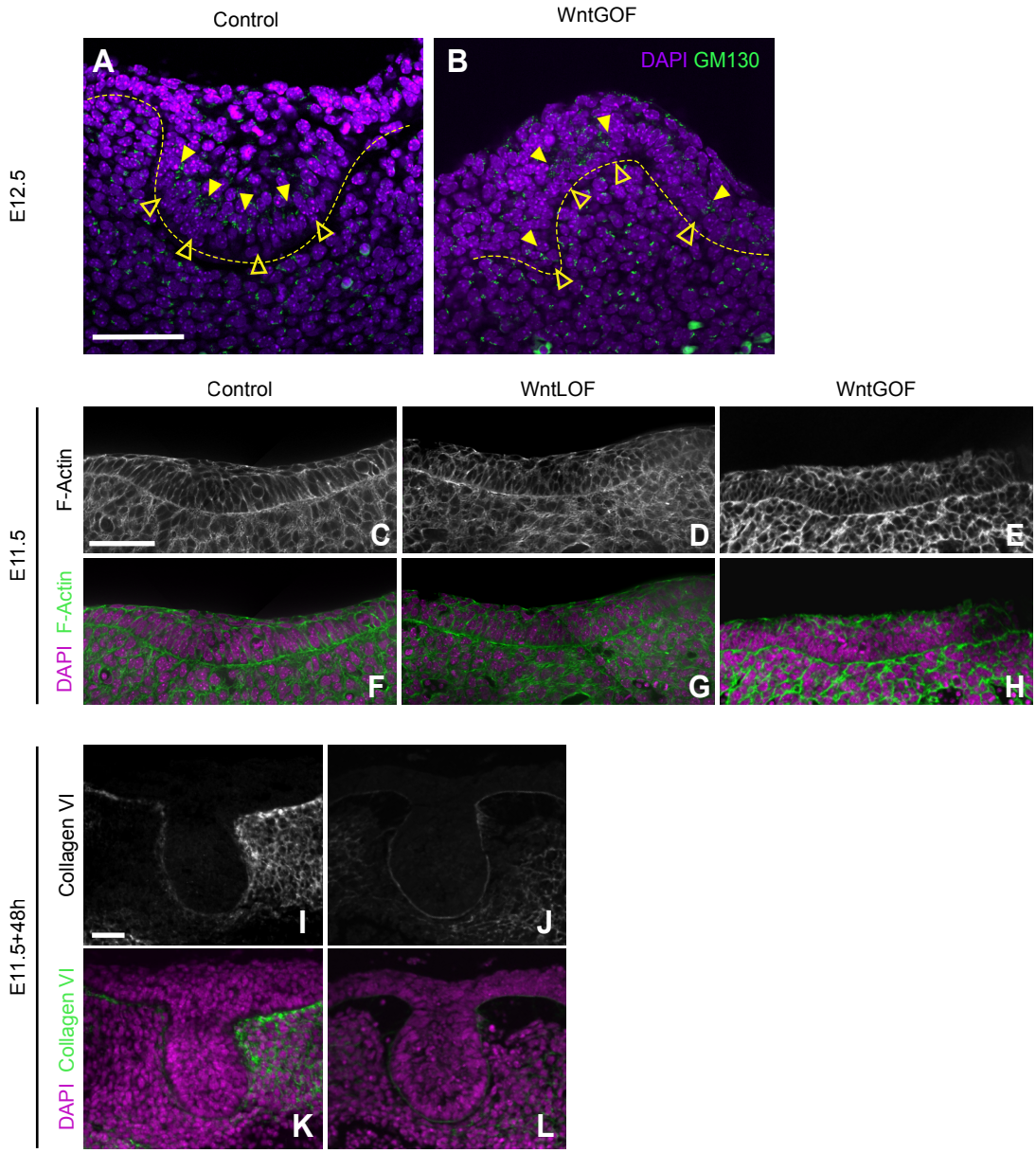
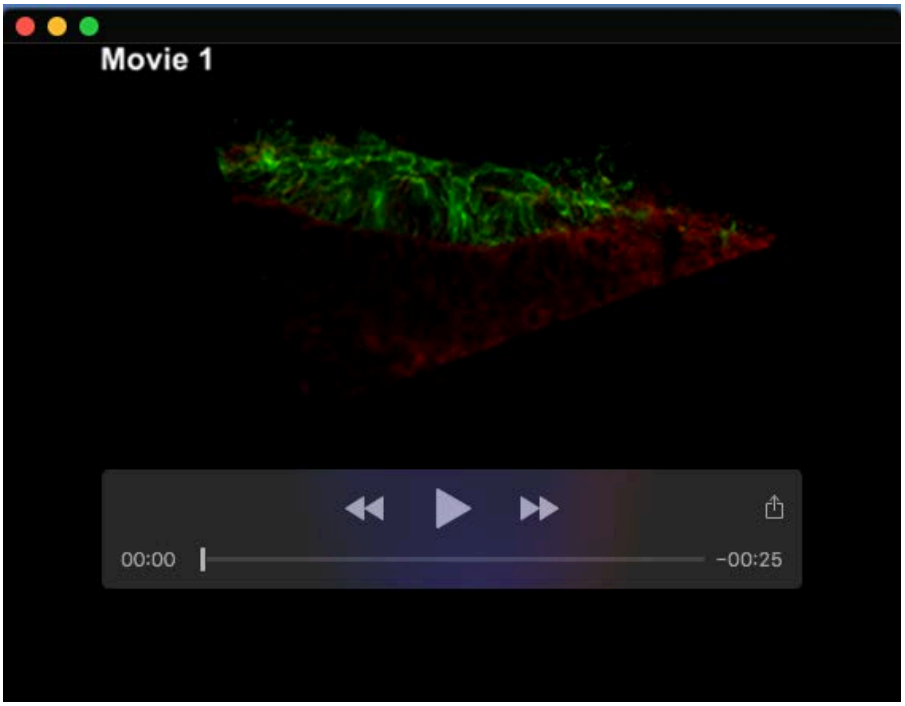
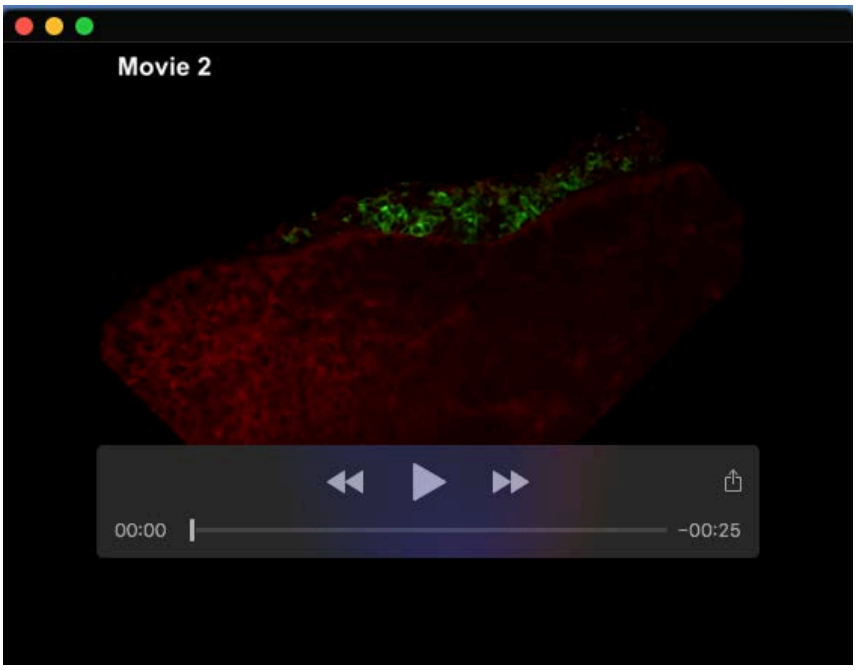


Fig. S3. The epithelial basoapical polarity is maintained in WntGOF and Mithramycin A inhibits collagen VI expression. (A-B) GM130 expression in E12.5 tooth germ in control and WntGOF. Closed arrowhead, GM130. Open arrowhead, basal cell nuclei. (C-H) F-actin staining of presumptive tooth germ of control, WntLOF and WntGOF at E11.5. (I-L) Collagen VI expression in Mithramycin A treated control explants at E11.5+48h. Scale bar: 50 μm for A-L.



Movie 1. The control molar epithelium becomes narrower and deeper as it invaginates into underlying mesenchyme. Time-lapse imaging of frontal tissue section of E11.5 control mandible (*Fgf8*^{CreER};*R26*$^{mT/mG}$) for 16 hours. Green (mG-positive): dental epithelial cells; red (mT-positive): non-dental epithelial cells.



Movie 2. The WntLOF molar epithelium remains shallow and wide. Time-lapse imaging of fontal section of E11.5 WntLOF mandible (*Fgf8*^{CreER};*Ctnnb1*$^{fl/fl}$;*R26*$^{mT/mG}$) for 16 hours. Green: dental epithelial cells; red: non-dental epithelial cells.