

### **Description of Additional Supplementary Files**

**Supplementary Movie 1.** Alignment and scrolling of serial sections through >120 day old *Sox9-CreER<sup>T2</sup>*; *Rosa26<sup>YFP</sup>*; *Vil1-Grem1* mouse small intestinal gut roll with anti YFP staining (brown) and automated false colorisation of tracing ribbons (green).

**Supplementary Movie 2.** Rotation of reconstructed polyp to show spatial segregation of crypt basal and ectopic crypt lineage tracing ribbons, to exclude interconnection of ribbons in three-dimensional space.