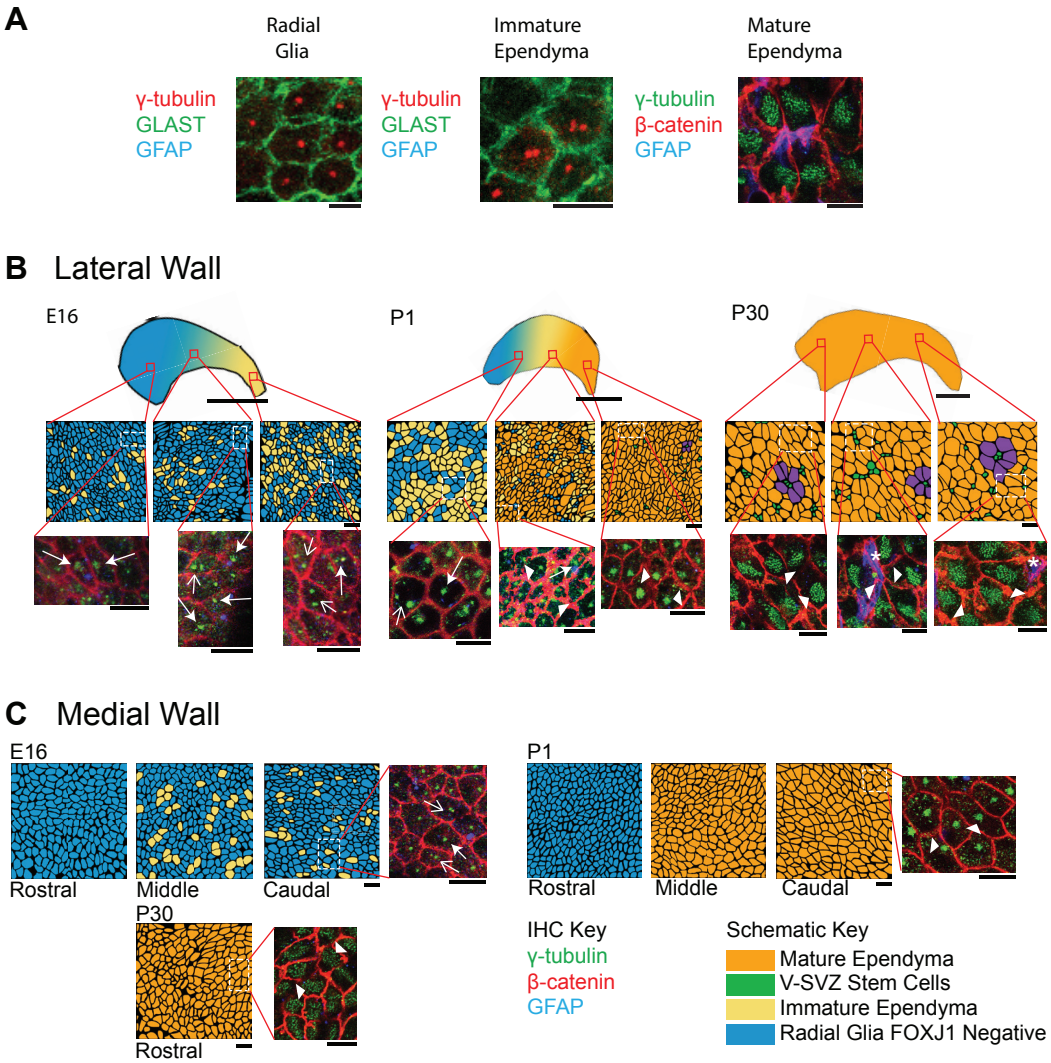
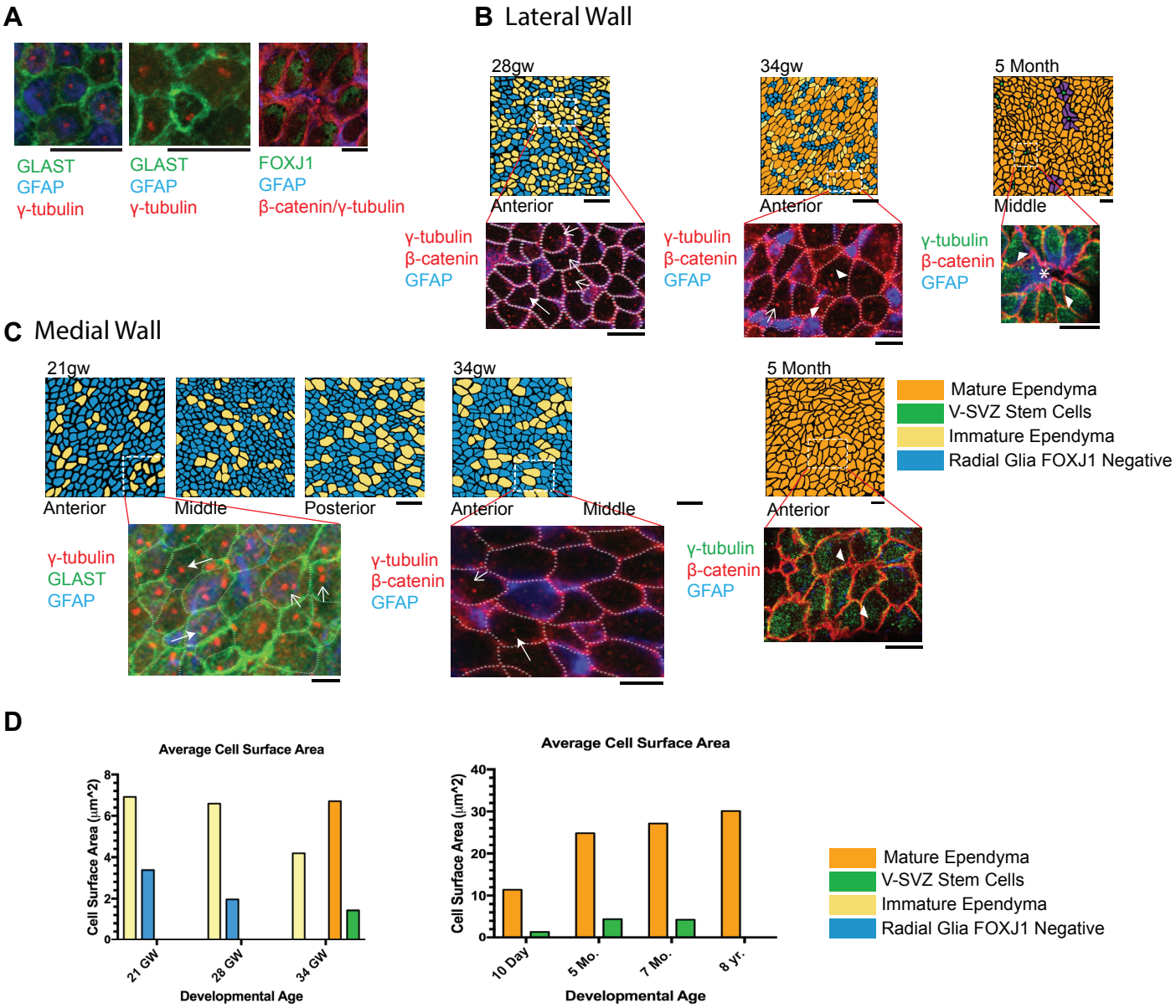


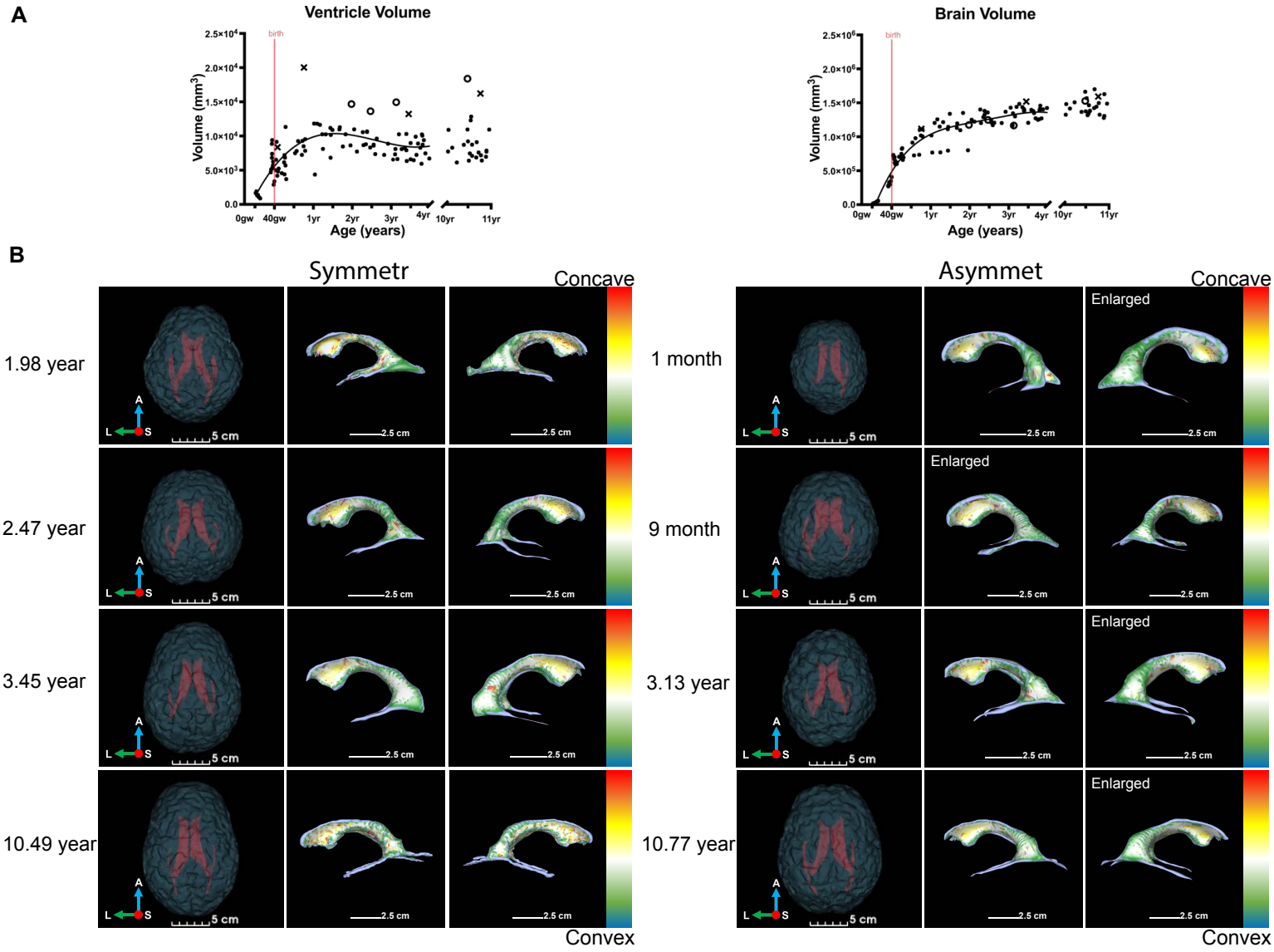
Supplemental Figure 1: Characterization of mouse V-SVZ cell types, pinwheel organization, and medial wall ependymogenesis

(**A**) Characterization of radial glia cells [γ-tubulin$^+$ single cilium, GLAST$^+$, GFAP$^-$, FOXJ1$^-$ (not shown)], immature ependymal cells [γ-tubulin$^+$ two or more cilia, GLAST$^+$, GFAP$^-$, FOXJ1$^+$ (not shown)] and a pinwheel unit (right), comprised of mature ependymal cells [γ-tubulin$^+$ multicilia clusters, β-catenin$^+$, FOXJ1$^+$ (not shown)] surrounding a core of V-SVZ stem cells (GFAP$^+$, γ-tubulin$^+$ single cilium, β-catenin$^+$) (scale bar = 10μm). (**B**) Traces of lateral ventricles (2D projections) at E16, P1 and P30 show caudal to rostral wave of ependymogenesis (E16 scale bar = 1mm, P1, P30 scale bar = 500μm). Immunohistochemistry of representative microscope images (scale bars = 10μm) and their associated schematics (scale bar = 20μm) highlight ependymal cell development along caudal, middle, and rostral regions of the lateral ventricle wall. Basal bodies of cilia were used to identify apical surface cell types. Pinwheel organization is highlighted in purple. (**C**) Schematic representations of microscope images show ependymal cell development along caudal, middle, and rostral regions (13,567.59 μm^2 areas) of the medial wall of the lateral ventricle (scale bar = 20 μm). By P30, the entire wall is covered by mature ependyma, shown by a representative rostral region. Schematic Key: Radial glia (blue), immature ependymal cells (pale yellow), stem cells (green), mature ependymal cells (orange).



Supplemental Figure 2: Characterization of human SVZ cell types, cell surface area, and medial wall formation.

Characterization of each cell type in human (**A**) distinguishes radial glia (GFAP$^+$, GLAST$^+$, γ-tubulin$^+$, single cilium) (left), immature ependymal cells (FOXJ1$^+$, γ-tubulin$^+$, two or more cilia) (middle). Pinwheel units (right) are observed with mature ependymal cells (FOXJ1$^+$, γ-tubulin$^+$, multi-cilia clusters) surrounding a core of neural stem cells (GFAP$^+$, γ-tubulin$^+$, single cilium). scale bar = 10μm (**B**) Schematic representations (scale bar = 20μm) of microscope images (scale bar = 10μm) show ependymal cell development along posterior, middle, and anterior regions (3,391.90 μm^2 area) of the lateral wall of the lateral ventricle. Radial glia (blue), immature ependymal cells (pale yellow), stem cells (green), mature ependymal cells (orange). (**C**) Schematic representations (scale bar = 20μm) of the medial wall are shown for ages 21gw, 34gw and 5-months (IHC scale bar = 10μm). (**D**) Average cell surface area in μm^2 was plotted for each of the four cell types (radial glia, stem cells, immature ependyma, mature ependyma) for 21gw-34gw and 10-day to 8-year time points.



Supplemental Figure 3: Symmetrically and asymmetrically enlarged ventricles. (**A**) Scatterplots of ventricle volume and brain volume (mm^3) across fetal and postnatal development. Birth is depicted by red line. Symmetric (O) and asymmetrically (X) enlarged ventricles are located above the regression curve in the ventricle volume graph, but do not show an increased brain volume. (**B**) Symmetrically enlarged ventricles (left) were from normal patients at 1.98, 2.47, 3.45, and 10.49 years and asymmetric enlarged ventricles (right) were from normal patients at 1 month, 9 months, 3.13 year, and 10.77 year. 3D reconstructions show lateral ventricle (red) and whole brain (blue) volumes in the superior view (scale bar = 5cm). Curvature heat maps of the lateral ventricle surface depicts the range of curvature from concave (red) to convex (blue) (scale bar = 2.5cm). The enlarged side of the asymmetrically enlarged ventricles is denoted.