

Supporting Information

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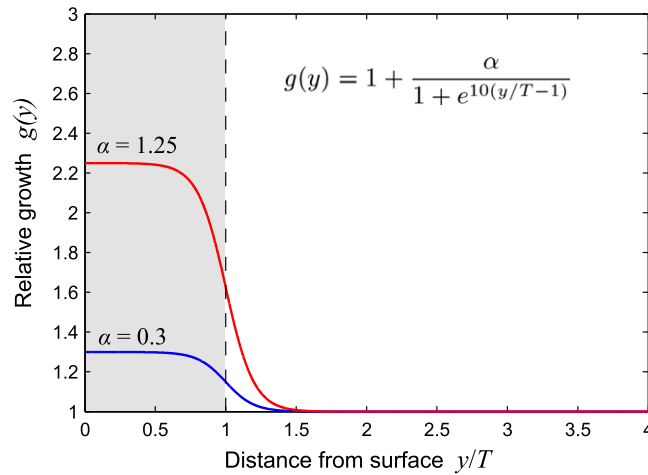
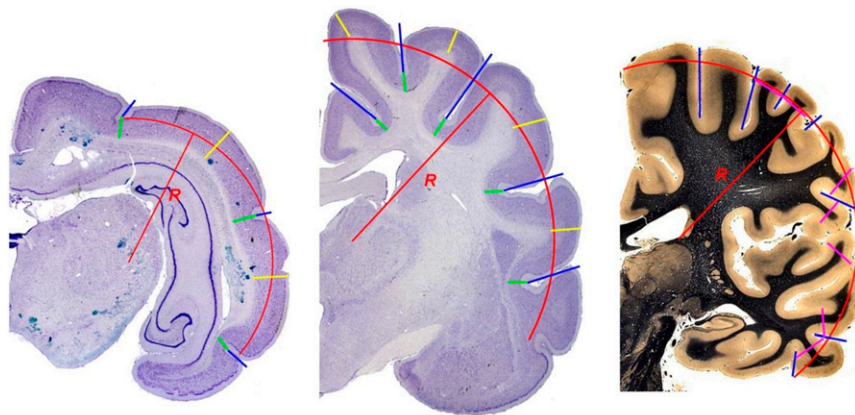


Fig. S1. Tangential growth profiles for $\alpha = 0.3$ and $\alpha = 1.25$ applied in simulations of Fig. 2 A and B, respectively.



		Porcupine	Cat	Human
Radius	R [mm]	6.5	9.2	52
Gray matter thickness	T [mm]	1.1	0.9	2.1
Tangential expansion	g	1.3	2.0	2.7
Radius (normalized)	R/T	5.9	10.2	25
Gyral width	W/T	6.9 ± 0.9	4.5 ± 1.1	4.0 ± 0.4
Sulcal depth	D/T	0.8 ± 0.2	3.0 ± 0.6	5.2 ± 2.5
GM thickness ratio	T_g/T_s	1.6 ± 0.2	1.6 ± 0.2	2.0 ± 0.4

Fig. S2. Geometric parameters from brain sections of a porcupine, cat, and human. Brain radius R is indicated by the red arcs. Gyral widths in the porcupine and cat are determined as the length of the red arc over each gyrus. In the human the sulcal geometry is more complicated and some gyri are inclined with respect to the sectioning plane. Therefore, in the human gyral widths are determined more selectively as indicated by magenta line segments. Sulcal depths are indicated by blue line segments (the sylvian fissure and sulci that are clearly inclined with respect to the sectioning plane are excluded in the human). The thickness of the gray matter at the gyri is indicated by the yellow line segments, and thickness of the gray matter at the sulci by the green line segments (not shown for the human). The undeformed thickness of the gray matter is approximated by $T = T_g/1.5$ using the mean thickness T_g of the gray matter at the gyri. Tangential expansion g is estimated by dividing the length of the surface contour by the length of the red arc (excluding the sylvian fissure in the human). The data shown for W/T , D/T , and T_g/T_s are given as the mean \pm SD. All images are cell-stained (porcupine and cat) or fiber-stained (human) coronal sections from www.brainmuseum.org.

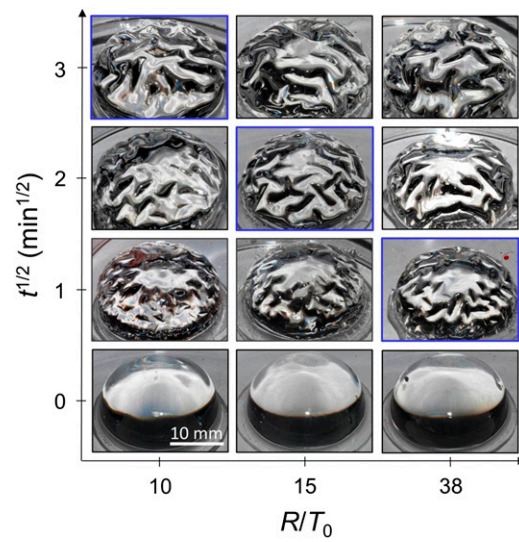


Fig. S3. For the swelling gel model that mimics the growing brain, we show the sulcal patterns as a function of the scaled initial radius R/T_0 and solvent exposure time t . The sulcal spacing of the patterns increases with decreasing R/T_0 and increasing t in qualitative agreement with our theoretical predictions. The images highlighted with a blue border represent states where the solvent penetration depth is comparable with the upper layer thickness.