Fold

The folds of the brain offer a particular challenge for the subarachnoid vascular grid. The primitive blood vessels that occupy this space, when the brain is flat, have to adapt to an everchanging geometry while constructing an efficient network. Surprisingly, the result is a non-redundant arterial system easily challenged by acute occlusions. Shalom et al. generalized the optimal network building principles of a flat surface growing into a folded configuration and generate an ideal middle cerebral artery (MCA) configuration that can be directly compared with the normal brain anatomy. They then described how the Sylvian fissure (the fold in which the MCA is buried) is formed during development and used the findings to account for the differences between the ideal and the actual shaping pattern of the MCA. The results reveal that folding dynamics condition the development of arterial anastomosis yielding a network without loops and poor response to acute occlussions ¹⁾.

1)

Shalom DE, Trevisan MA, Mallela A, Nuñez M, Goldschmidt E. Brain folding shapes the branching pattern of the middle cerebral artery. PLoS One. 2021 Jan 7;16(1):e0245167. doi: 10.1371/journal.pone.0245167. PMID: 33411825.

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