Review of: "Coupling between Human Brain Cortical Thickness and Glucose Metabolism from Regional to Connective level: a PET/MRI study"

David Ress[1]

1 Baylor College of Medicine

Potential competing interests: No potential competing interests to declare.

This is an interesting effort to retrospectively analyze FDG PET data and high-resolution fMRI data in order to compare metabolism and cortical thickness (CTh). Surprisingly, most subjects show significantly negative correlations, and such negative correlations increase with age. This observation seems initially counter-intuitive: why should thicker gray matter consume less glucose than thinner gray matter? This issue is not sufficiently addressed in the discussion. An effort is then made to estimate functional connectivity from the FDG data and structural connectivity from the CTh data, followed by detailed comparisons of the as a function of age. However, the group averaged CTh correlations were very low, calling this metric into question, yet this issue was not even mentioned. Altogether, the impact of the study seems greatly weakened by these odd and weak results.

Specific details:

1. Introduction, paragraph 2, says "unique and distant sources of variability." What does this mean?
2. Methods/Subjects: specify age ranges to divide age groups. Because younger group has range of 20--50 years, the two age ranges simply be termed “younger” and “older”. Why was subject sex not balanced?
3. Methods/Network properties: All of the equations are incorrectly typeset. The notion that global & local efficiency reflect “very precise physical meaning” seems an over-statement in this context of abstract methods to estimate poorly understood biological processes.
4. Results/Network similarity: The group-mean SC correlation values are very low, which seems to invalidate them as a valid metric.
5. Discussion, paragraph 3: I do not follow this logic. Why should thicker gray matter exhibit lesser metabolism than thinner gray matter? Also, please discuss why group-averaged correlations were so small.