Adverse Experiences, Hippocampal Connectivity, and Epigenetic Modifications in Adolescent Depression

Xiaodi X [1], Ying Z [1], Xiao H [2], Yunyan Z [1], Fangyi W [1], Linlu M [1], Xiangyu L [1], Li Y [1], Shu Y [1], Jieheng C [1], Tanwei Z [1], Yuanyuan J [1], Keyi W [1], Shengai T [1], Yutong W [1], Yixiao F [1,3]

[1] Department of Psychiatry, The First Affiliated Hospital of Chongqing Medical University, Chongqing, China
[2] Department of Clinical Medicine, Chongqing Medical and Pharmaceutical College, Chongqing, China
[3] Key Laboratory of Major Brain Disease and Aging Research, Chongqing Medical University, Chongqing, China

Hypothesis

Adverse experiences during adolescence (as environmental factors) may influence brain activity and epigenetic modifications, potentially contributing to the onset and progression of depression.

Study Design

This study employed a case-control design, recruiting 139 adolescents diagnosed with depression (BDI scores: Median = 29.0 (IQR: 21.0–35.0)) and 59 healthy controls (BDI scores: Median = 3.0 (IQR: 1.0–5.0)). Participants underwent structured assessments to evaluate adverse experiences during adolescence. DNA methylation was assessed from peripheral blood samples. Resting-state functional connectivity (rs-FC) analyses were performed using a seed-based approach, with the bilateral hippocampus as the region of interest (voxel-level $p < 0.001$, cluster-level $p < 0.05$, GRF corrected).

Results

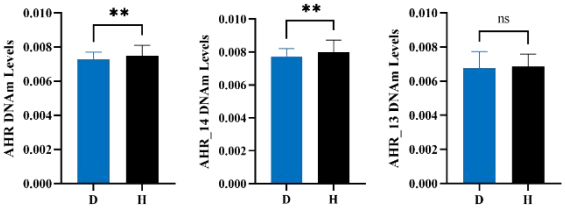

Fig. 1 DNA Methylation Analysis

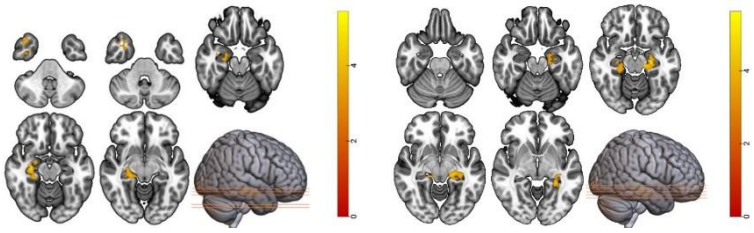

Fig. 2 rs-FC with Bilateral Hippocampus as Seed Region

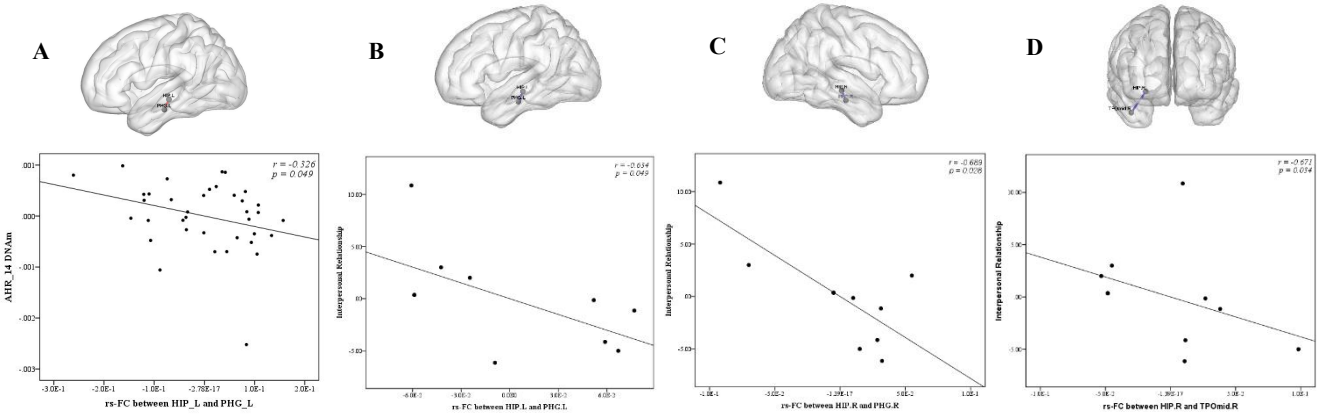

Fig. 3A Relationship Between Adverse Experiences and rs-FC in Adolescents with Depression; 3B-D Healthy Group

Conclusion

Our findings suggest that adverse experiences during adolescence may lead to alterations in hippocampal connectivity and epigenetic modifications, potentially contributing to the pathophysiology of depression.

Contact Information: Xiaodi Xia (xiaodixia97@gmail.com), Yixiao Fu (fuyixiaoresearch@126.com)
Poster Presented at The 12th MindBrainBody Symposium, Berlin, Germany, March 10-12, 2025.