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Age and HIV Effects on Resting State of the Brain in Relationship to Neurocognitive Functioning

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Highlights:

- HIV reduces resting state functional connectivity (FC) within Occipital Network
- Age-HIV interaction affects FC within Motor Network (MN)
- HIV strengthens relationship between FC within-MN values and cognitive performance
- In healthy aging, FC values have decreasing power in explaining cognitive functions
- In HIV, age does not moderate relationships between RS-FC and cognitive functions

ABSTRACT

This study examined the effects of age and HIV infection on the resting state (RS) functional connectivity (FC) of the brain and cognitive functioning. The objective was to evaluate the moderating role of age and HIV on the relationship between RS-FC and cognition. To examine RS-FC we implemented the Independent Component Analysis (ICA) and Regional Homogeneity (ReHo). Neurocognition was evaluated with comprehensive battery of standardized neuropsychological tests. Age and HIV were entered as the independent variables. The independent effects of age, HIV, and interaction effects of age-HIV on RS-fMRI measures (ICA, ReHo) were tested in 108 participants (age M=42). RS-FC indices that exhibited age-HIV interactions were entered into further analysis. Bivariate correlation analysis was performed between the retained RS-FC indices and T-scores of neurocognitive domains (Attention, Executive, Memory, Psychomotor, Semantic Skills). Multivariate regression modeling determined the impact of age and HIV on these relationships. We found that in the ICA measures, HIV-seropositivity was decreasing RS-FC in the left middle occipital gyrus (p<.001). Age-HIV interaction was observed in the left superior frontal gyrus (LSupFrontG), where FC was decreasing with age in HIV+ (p<.001) and increasing in HIV- (p=.031). ReHo indices did not reveal significant effects. HIV strengthened the relationship between RS-FC in LSupFrontG, Memory and Psychomotor Factor scores. Aging weakened those relationships only in control group. In sum, age-HIV interaction effects are prominent rather in remote than local RS-FC.