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Brainstem microstructure in heavy drinking adolescents

Andre Galinowski[1,2], **Ruben Miranda**[1,2,3], **Jean Luc Martinot**[1,2,4] and **the IMAGEN Consortium**
[1]Inserm, UMR 1000, Research unit "Neuroimaging and Psychiatry" France
[2]Paris Descartes University, France
[3]Paul Brousse Hospital, France
[4]CENIR - Brain & Spine Institute, France

Introduction: The cortical-cerebellar circuit is vulnerable to heavy drinking (HD) in adults. We hypothesized HD adolescents would display early microstructural modifications of the pons/midbrain region, containing core structures of the reward system.

Methods: At age 14, 32 otherwise, symptom-free HD (HD14) and 24 sober adolescents becoming HD at age 16 (HD16), were identified in the community (IMAGEN cohort in 8 European cities) with the alcohol use disorders identification test (AUDIT) and compared with abstainers. The money incentive delay (MID) task assessed reward sensitive performance. Voxel-wise statistics of diffusion tensor imaging (DTI) values in the thalamo-ponto-mesencephalic region were obtained using tract-based spatial statistics. Projections between the ventral tegmental area (VTA) and the nucleus accumbens (NAcc) were identified by probabilistic tractography.

Results: Significantly different DTI values were detected in a cluster of the upper dorsal pons of HD14 and HD16 adolescents compared with abstainers. When expecting reward: HD14 had higher MID task success scores than abstainers. MID task success scores were linked with the number of tracts in all adolescents.

Conclusion: In symptom-free community adolescents, a region of lower white matter (WM) integrity in the pons at age 14 was associated with current heavy drinking and predicted heavy drinking at 16. Heavy drinking was related to reward sensitivity.

Biography

Andre Galinowski completed his Medical School from Paris 12 Val de Marne University and studied Psychiatry in Paris and Ottawa (Canada). He graduated in Psychology from Paris V René Descartes University and in Neurobiology from Paris VI Pierre and Marie Curie University.

andre.galinowski@gmail.com

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Page 61