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MEETING ABSTRACT

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Neurobiological correlates of learning and decision-making in alcohol dependence: the LeAD study
Miriam SEBOLD1,*, Maria GARBUSOW1, Daniel J. SCHAD2, Stephan NEBE3, Christian SOMMER3, Ulrich S. ZIMMERMANN3, Michael N. SMOLKA3, Michael A. RAPP2, Quentin J. M. HUYS4 and Andreas HEINZ4
1Department of Psychiatry and Psychotherapy, Charité Universitätmedizin Berlin, Germany; 2Cognitive Sciences, Department of Sports and Health Sciences, University of Potsdam, Germany; 3Department of Psychiatry and Psychotherapy, University Hospital Carl Gustav Carus, Technische Universität Dresden, Germany; 4Institute for Biomedical Engineering, ETH Zürich and University of Zürich, Switzerland

The mesolimbic dopaminergic system has long been associated with two functions in reward processing, one in reinforcement learning (e.g. prediction error) and another in incentive motivation (e.g. cue-elicited reward-seeking). Both functions have been implicated in alcohol dependence with the former contributing to the persistence of chronic alcohol intake despite unfavorable life experiences and the latter playing a crucial role in craving and relapse, which are often triggered by alcohol-associated cues.

The bicentric study “Learning in alcohol dependence (LeAD)” aims to bridge a gap between these processes by investigating reinforcement learning mechanisms and cue-induced automatic approach behavior such as Pavlovian-to-instrumental transfer (PIT) in 120 alcohol-dependent subjects and approximately 300 healthy control subjects. We here demonstrate that alcohol-dependent subjects show alterations in goal-directed, model-based reinforcement learning [1] and demonstrate that healthy young adults show increased model-free neural signatures in the striatum when they start drinking alcohol at a younger age (Nebe et al., in preparation). Moreover, we show that in alcohol-dependent patients compared to healthy controls non-alcohol-associated cues exert pronounced control over behavior (PIT; [2]). Crucially, these cue-associated responses were significantly related with nucleus accumbens activity in subsequent relapsers, but neither in subsequent abstainers nor healthy controls, and were predictive of critical clinical outcomes such as alcohol intake during a 3-months follow-up period in patients. These findings point to resilience of dopamine function as a predictor of good treatment outcome.

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References

*Submitting author e-mail: miriam.sebold@charite.de