A meta-analysis of pharmacodynamic testing with the NeuroCart used in the early phase drug development of antidepressants, stimulants, and CNS depressant agents.

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INTRODUCTION

The Centre of Human Drug Research (CHDR) has performed many studies during the past 25 years to assess the influence of different drugs and treatments on the central nervous system (CNS).

The aim of this study was to perform a common analysis, to compare the pharmacodynamic (PD) profiles of different treatments including antidepressants, stimulants and CNS depressant agents.

METHODS

The results from 38 studies with different CNS active drugs were analyzed. All studies used the NeuroCart, a test battery consisting of saccadic eye movement, smooth pursuit, adaptive tracking, body sway, visual analogue scales and electroencephalography. A mixed model with average baseline value taken as covariate was used. Furthermore, the least square mean (LSM) was calculated. Estimate of differences (EOD) were calculated by comparing the LSMs of the treatment and the placebo.

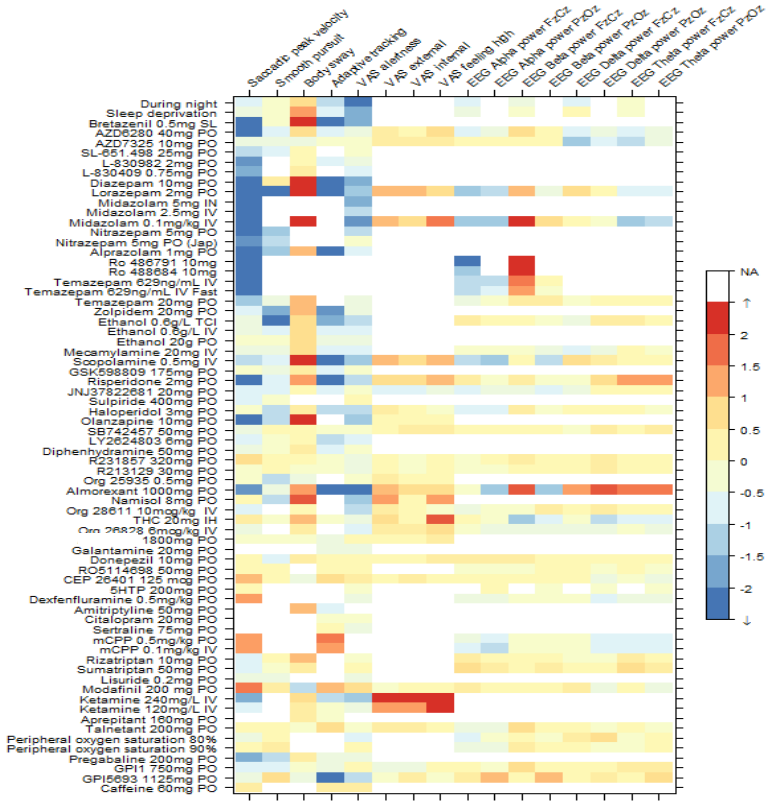

Figure 2: Heat plot of the ratios of EOD to MDES. Increases (Warm) and decreases (Cold) in effects shown. Data Not Available (NA) shown as white.

RESULTS

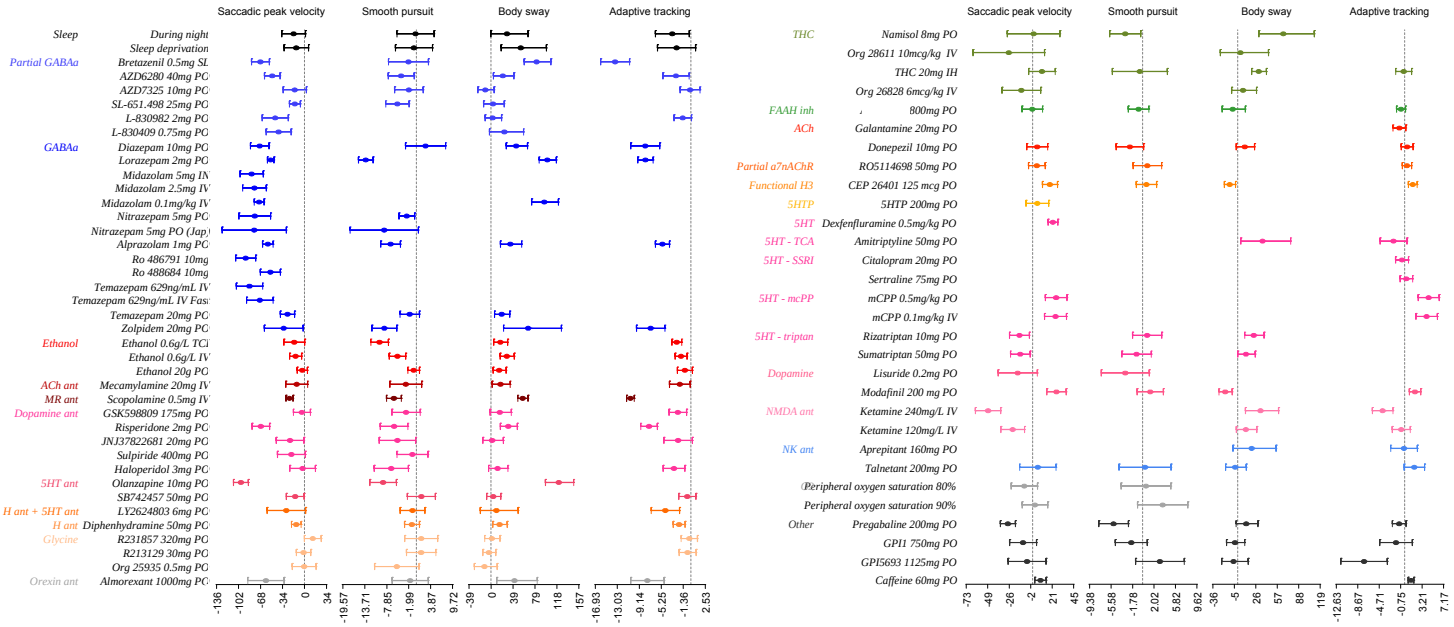

Figure 1: Forest plots of the depressant (LEFT), antidepressant and stimulant treatments (RIGHT). Least Square Mean Estimate of Difference from placebo (±95% CI), for saccadic peak velocity, smooth pursuit, body sway and adaptive tracking. Drugs are color-coded by drug class. A reference line is included to assess significance and size of the effects.

CONCLUSION

Results showed that by using a broad range of CNS tests, drugs can be profiled with unique CNS 'fingerprints'. More drugs need to be compared to determine the relationships between PD effects and mechanism of action.

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The authors report no conflicts of interest for this work