

The influence of vigabatrin on the relationship between hippocampal EEG theta activity and locomotor behaviour in rats

Van Lier H, Bouwman BM, Nitert HEJ, Drinkenburg WHIM*, Coenen AML, Van Rijn CM NICI, Dept Biological Psychology, University of Nijmegen, Nijmegen, *Johnson & Johnson Pharmaceutical Research and Development, a division of Janssen Pharmaceutica NV, Beerse, Belgium

A positive relationship between speed of locomotion and hippocampal EEG theta frequency has been described in literature. Vigabatrin, an irreversible GABA transaminase inhibitor, was reported to induce sudden short high-speed running episodes. However, vigabatrin decreases theta peak frequency, which seems contradictory to a positive relationship between speed of locomotion and theta frequency as found in drug-free conditions. Thus, the combination of decreased theta peak frequency and high speed running movements suggest that vigabatrin might influence the relationship between theta peak frequency and locomotor speed. Therefore, the relationship between hippocampal EEG theta activity and locomotor speed in both spontaneous and forced walking conditions was studied in Long-Evans rats after vigabatrin administration. Vigabatrin increased the percentage of time that rats spent passively, while decreasing active behaviours. During spontaneous walking in the open field, the speed of locomotion was increased by vigabatrin, while hippocampal EEG theta peak frequency was decreased. Vigabatrin also reduced the theta peak frequency during forced (speed controlled) walking. Furthermore, there was a weak positive correlation ($r=0.35$) between theta peak frequency and locomotor speed for both the saline and vigabatrin condition. Vigabatrin and saline did not differ in the slope of the regression line, but showed different offset points at the theta peak frequency axis i.e. vigabatrin lowers the overall theta peak frequency. Thus, vigabatrin does not affect the weak relationship between speed of locomotion and theta peak frequency. However, speed of movement only has a small contribution to the factors that control theta peak frequency after vigabatrin administration and in controls. Consequently, other factors than speed of locomotion seem to be involved in determination of the theta peak frequency.

H. van Lier, NICI, Dept. Biological Psychology, University of Nijmegen, PO Box 9104, 6500 HE Nijmegen, The Netherlands, t +31 24 3615611, e-mail h.vanlier@nici.kun.nl

Poster presenter in session Neuroscience 2 on Thursday 3 June