Conference abstract SL-17

Inside the Brain: Fragrance Effects on Human Attention

S. M. FRIEDL [1], E. LAISTLER [2], E. MOSER [2,3], E. HEUBERGER [1]

[1] Department of Clinical Pharmacy and Diagnostics, University of Vienna, Althanstraße 14, 1090, Vienna, Austria
[2] MR Center of Excellence, Medical University of Vienna, Lazarettgasse 14, 1090, Vienna, Austria
[3] Center for Biomedical Engineering and Physics, Medical University of Vienna, Währinger Gürtel 18–20, 1090 Vienna, Austria

E-mail: eva.heuberger@univie.ac.at (E. Heuberger)

Sci Pharm. 2009; 77: 184 doi:10.3797/scipharm.oephg.21.SL-17

Understanding the nature of attention seemed intractable until recent developments in neuroimaging and cognitive psychology have allowed for providing specific anatomical and cognitive details about the attention systems of the human brain.

Neuronal activity is accompanied by a change in local blood supply and can be monitored by means of functional magnetic resonance imaging (fMRI), a method which depends on the BOLD (Blood Oxygen Level Dependent) contrast [1].

In earlier studies, the two monoterpenoids 1,8-cineole and linalool showed no effects on the performance of healthy human subjects in a standard sustained attention (vigilance) task or on physiological parameters after inhalation, whereas both fragrances changed evaluation of subjective well-being. On the other hand, after percutaneous absorption without olfactory stimulation effects on both vigilance and autonomic nervous system parameters were detected, but no influence on self-evaluation was determined [2, 3].

In the present study, we investigated the effects of these odorants on the human central nervous system after transdermal and inhalative application using fMRI. The fragrances and corresponding placebo formulations were tested in 69 young healthy volunteers. To prevent any olfactory stimulation in the transdermal groups odourless air was provided via breathing masks. In the inhalation groups, the odorants were administered by means of these breathing masks. In addition, physiological parameters and self-evaluation were assessed.

Preliminary results indicate a significant effect of 1,8-cineole on the central nervous system. Furthermore, different activation patterns were observed as a function of both administration mode and sex.

[1] Moser E, Stadlbauer A, Windischberger C, Quick H H, Ladd M E. Magnetic Resonance Methodology, Eur J Nucl Med Mol Imaging. 2009; 36(Suppl 1): S30–S41. doi:10.1007/s00259-008-0938-3

[2] Heuberger E, Ilmberger J, Hartter E, Buchbauer G. Physiological and Behavioral Effects of 1,8-Cineol and (±)-Linalool: A Comparison of Inhalation and Massage Aromatherapy. Nat Prod Commun. 2008; 3: 1–8.

[3] Heuberger E, Redhammer S, Buchbauer G. Transdermal absorption of (–)-linalool induces autonomic deactivation but has no impact on ratings of well-being in humans. Neuropsychopharmacology. 2004; 29: 1925–1932. doi:10.1038/sj.npp.1300521

Presented at the 21st Scientific Congress of the Austrian Pharmaceutical Society April 16th to April 18th 2009, Vienna, Austria.