



Article

Assessment of frontal hemispherical lateralization in plaque psoriasis and atopic dermatitis

Szabolcs Bozsányi ^{1,2*}, Natália Czurkó ¹⁺, Melinda Becske ³, Roland Kasek ³, Keve Botond Lázár ¹, Mehdi Boostani ¹, Fanni Adél Meznerics ¹, Klára Farkas ¹, Noémi Nóra Varga ¹, Lili Gulyás ¹, András Bánvölgyi ¹, Bence Ágoston Fehér ³, Emese Fejes ³, Kende Lőrincz ¹, Anikó Kovács ¹, Hunor Gergely ¹, Szabolcs Takács ⁴, Péter Holló ¹, Norbert Kiss ¹, Norbert M Wikonkál ^{1#} and Imre Lázár ^{3,4#}

¹ Department of Dermatology, Venereology and Dermatoooncology, Semmelweis University, 1085 Budapest, Hungary: czurkonatalia@gmail.com (N.C.); lazar.keve.botond@gmail.com (K.B.L.); mehdi_parsii@yahoo.com (M.B.); meznerics.fanni@stud.semmelweis.hu (F.A.M.); farkas.klara@phd.semmelweis.hu (K.F.); varga.noemi@stud.semmelweis.hu (N.N.V.); gulyaslili1998@gmail.com (L.G.); banvolgyi.andras@med.semmelweis-univ.hu (A.B.); lorincz.kende@med.semmelweis-univ.hu (K.L.); kovacs.aniko@med.semmelweis-univ.hu (A.K.); gergely.hunor@med.semmelweis-univ.hu (H.G.); hollo.peter@med.semmelweis-univ.hu (P.H.); kiss.norbert@med.semmelweis-univ.hu (N.K.); wikonkal.norbert@med.semmelweis-univ.hu (N.M.W.)

² Department of Dermatology, Roswell Park Comprehensive Cancer Center, Buffalo, NY, United States: szabolcs.bozsanyi@roswellpark.org (Sz.B.);

³ Semmelweis University, Institute of Behavioral Sciences; becske.melinda@gmail.com (M.B.); roland@kasek.com (R.K.); agostonclub@gmail.com (B.A.F.); mesifejes@gmail.com (E.F.); imre.lazar@kre.hu (I.L.)

⁴ Institute of Psychology, Faculty of Humanities, Károli Gáspár University of the Reformed Church in Hungary takacs.szabolcs@kre.hu (Sz.T.)

* Correspondence: szabolcs.bozsanyi@roswellpark.org

+ Authors share first authorship

Authors share last authorship

Abstract: Background: Each brain hemisphere plays a specialized role in cognitive and behavioral processes, known as hemispheric lateralization. In chronic skin diseases such as plaque psoriasis (Pso) and atopic dermatitis (AD), the degree of lateralization between the frontal hemispheres may reveal insight into specific connections between skin diseases and the psyche. This study aims to analyze the hemispherical lateralization, neurovegetative responses, and psychometric characteristics of patients with Pso and AD. **Methods:** The study included 46 patients with Pso, 56 patients with AD, and 29 healthy control (Ctrl) subjects, who underwent frontal EEG (electroencephalogram) measurement, heart rate variability (HRV), and psychological tests. Statistical analyses were performed using ANOVA and Bonferroni correction. **Results:** The study shows significant right-lateralized prefrontal activity in AD patients ($p < 0.001$) and Pso patients (0.045) compared to Ctrl with no significant difference between AD and Pso groups ($p = 0.633$). Patients with AD with right-hemispheric dominant prefrontal activation in the right hemispheric region exhibit increased inhibition and avoidance markers, while Pso shows elevated sympathetic nervous system activity. **Conclusion:** Psychophysiological and psychometric data suggest a shared prevalence of the right tendency in both groups of patients. However, the findings indicate distinct psychodermatological mechanisms in AD and Pso.

Keywords: psychodermatology, atopic dermatitis, plaque psoriasis, hemispherical lateralization, electroencephalography, heart rate variability, psychometry, metacognition