

# Neurobiological markers for personality, inflammation, and stress

## A naturalistic study in knee arthroplastic patients

Sara Bromander, leg. läkare

Centre for Ethics, Law and Mental Health  
Institutionen för neurovetenskap och fysiologi  
Sahlgrenska Akademin

Opponent: Docent Åsa Westrin, Avdelningen för Psykiatri  
Lunds Universitet

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UNIVERSITY OF GOTHENBURG

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### ABSTRACT

**Background:** Psychiatry has strived to identify biomarkers elucidating the underlying biological mechanisms behind different disorders, to help in diagnostics and to assess treatment effects. In forensic psychiatric populations, findings have connected levels of cerebrospinal fluid (CSF) monoamine metabolites and blood-brain barrier (BBB) integrity with impulsivity and aggression. Other biomarkers, like insulin, inflammatory mediators, and different markers for neuronal and astroglial integrity have been studied in connection with cognition and psychiatric disorders but to a lesser degree in relationship to personality traits. **Aim:** The overall aims were to establish links between CSF markers for monoamine activity, BBB integrity, hormones, inflammation and neuronal and astroglial integrity, and aggressive and impulsive personality traits in a group of persons without psychiatric disorders, and to describe the distribution and dynamics of new biomarkers. **Methods:** Serum and CSF samples were collected before, three hours after, and on the morning following arthroplastic knee surgery in 35 patients who had completed two personality questionnaires, the Temperament and Character Inventory and the Karolinska Scales of Personality. **Results:** The CSF Homovanillic acid/5-hydroxyindoleacetic acid ratio correlated negatively with Cooperativeness. Beta-trace protein, as a marker of BBB dysfunction, correlated positively with Monotony Avoidance and Impulsiveness. Positive correlations were observed between CSF interleukin-10 (IL-10) and Verbal Aggression and between Self-Directedness, serum IL-10, and interferon- $\gamma$ . CSF IL-10 correlated negatively with Inhibited Aggression, and CSF cortisol with Novelty Seeking. No correlations were detected between aggressive and impulsive personality traits and CSF levels of insulin, thyroid hormone, astroglial or neuronal integrity markers, or CSF/serum albumin ratio. Levels of CSF cytokines were markedly increased during and after the intervention compared to serum. Insulin levels in the brain seemed to be regulated differently from in the periphery, and modest increases in total-Tau were observed during surgery. **Conclusion:** Some aggressive and impulsive personality traits in non-disordered persons co-vary with various CSF biomarkers indicating lack of serotonergic control over dopamine signaling, decreased BBB integrity and inflammation.

Keywords: personality, cytokine, inflammation, insulin, impulsivity, aggression, blood-brain barrier

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