Psychoneuroendocrinology (2015) 57, 102—110

Available online at www.sciencedirect.com

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journal homepage: www.elsevier.com/locate/psyneuen

Plasma oxytocin and personality traits in psychiatric outpatients

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Received 15 December 2014; received in revised form 3 April 2015; accepted 3 April 2015

KEYWORDS
Oxytocin;
Personality traits;
Personality disorder;
Mood disorder;
Extraversion;
Anxiety

Summary The oxytocin system is regarded as being of relevance for social interaction. In spite of this, very few studies have investigated the relationship between oxytocin and personality traits in clinical psychiatric populations. We assessed the relationship between personality traits and plasma oxytocin levels in a population of 101 medication-free psychiatric outpatients (men = 37, women = 64). We used the Karolinska Scale of Personality (KSP) and diagnostic and symptomatic testing. Plasma oxytocin levels were analysed with a specific radioimmunoassay at inclusion and after one month for testing of stability. Plasma oxytocin levels were stable over time and did not differ between patients with or without personality disorders, nor were they related to severity of depressive or anxiety symptoms. The KSP factors Impulsiveness and Negative Emotionality were significant independent predictors of plasma oxytocin. A subscale analysis of these personality factors showed significant positive correlations between baseline plasma oxytocin and the KSP subscales monotony avoidance and psychic anxiety. The significant association between the KSP factor Impulsiveness and oxytocin levels observed at baseline was observed also one month later in men. These findings suggest that personality traits such as Impulsiveness and Negative emotionality which are linked to social functioning in several

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http://dx.doi.org/10.1016/j.psyneuen.2015.04.003

psychiatric disorders seem to be associated with endogenous plasma oxytocin levels. These variations in oxytocin levels might have an impact on social sensitivity or social motivation with possible gender differences.

1. Introduction

The nonapeptide oxytocin, acting both as a hormone and as a neurotransmitter, has been associated with social cognition (e.g. social memory and emotion recognition), pro-social behaviours (e.g. approach, formation and maintenance of attachment bonds, social competence, trust, empathy, cooperation, and generosity), social emotional responses and social stress (reviewed in Meyer-Lindenberg et al., 2011). Personality dimensions relevant for social behaviour such as novelty seeking and extraversion have in some studies been positively associated with peripheral oxytocin levels in healthy populations (Andari et al., 2012; De Dreu et al., 2013). Furthermore, administration of intranasal oxytocin improved participants' self-perception of certain personality traits important for social affiliation, like extraversion and openness to experiences, in a between-subject, randomized, double-blind experiment performed on university students (Cardoso et al., 2012).

Individuals with psychiatric disorders often display social deficits, which may be transient or more trait like. In several mental disorders with pronounced trait like social deficits, especially autism spectrum disorders, but even in schizophrenia, social anxiety disorder and borderline personality disorder, a dysregulation of the oxytocin system is assumed to be linked to the social and interpersonal dysfunctions (Yamasue et al., 2009; Cochran et al., 2013). For more transient or episodic disorders such as depression, the evidence for involvement of the oxytocin system is not consistent, often pointing towards individual, developmental or categorical variability (Cochran et al., 2013). Only a few studies have focused on the relationship between plasma oxytocin levels and personality traits in psychiatric populations. In a study performed by Bell et al. (2006), plasma oxytocin levels were positively related to reward dependence and novelty seeking in patients with major depression. Accumulating evidence points towards a possible link between a dysregulated oxytocin system and childhood adversity as a risk factor for development of depression, anxiety or personality disorder (Cochran et al., 2013; MacDonald and Feifel, 2014). Social affiliative behaviour in several mental disorders might be more related to personality dimensions rather than categorical diagnoses. Since some symptoms of depression or personality disorders, like social withdrawal or interpersonal functioning, may be related to the function of the oxytocin system, assessment of the relationship between plasma oxytocin and personality traits in clinical populations need to take into account depression severity and comorbidity with personality disorders. Measures of personality traits, by contrast with the poor convergence of categorical personality disorder assessment, have strong psychometric properties and account for substantial variance in both normal-range personality and personality disorder (Newton-Howes et al., 2015).

Oxytocin is released both into the circulation and into the brain. In most studies oxytocin levels have been measured in plasma. Whether peripheral oxytocin levels reflect central oxytocin is not fully established. While recent work from Carson et al. (2014) suggests that peripheral oxytocin can approximate central oxytocin reporting significant correlation between plasma and cerebrospinal fluid (CSF) oxytocin in children, the earlier studies have found no such relationship (Altemus et al., 2004; Kagerbauer et al., 2013). It should be remembered that many factors contribute to oxytocin release and therefore experimental design together with environmental factors may influences the results.

In the present study, we assessed the relationship between plasma oxytocin levels and personality traits in a population of medication free psychiatric outpatients. Based on the literature (Andari et al., 2012; Bell et al., 2006; De Dreu et al., 2013), we hypothesized a relationship between extraversion and oxytocin levels. Whether plasma oxytocin levels and associations between plasma oxytocin and personality traits are stable over time is not known and therefore plasma oxytocin was measured both at inclusion and after one month. Furthermore, since some studies have shown gender differences regarding both oxytocin levels/function and personality traits (Tost et al., 2010; Tseng et al., 2014), we made a post hoc assessment of men and women separately.

2. Methods

2.1. Study setting

Patients attending an outpatient clinic in northern Stockholm, Sweden during 1991 to 1992 were asked to participate in the study. The outpatient clinic (catchment area about 80 000 inhabitants) offers assessment and treatment for all psychiatric disorders except schizophrenia.

The Ethics Committee of the Karolinska Institutet approved the study protocol. The patients received verbal and written information of the study and provided written informed consent. The study population has been described earlier (Svanborg et al., 1999, 2000).

2.2. Patients

Of the 120 patients, who consented to participate, 101 patients were enrolled: 64 women and 37 men, mean age 38 years (SD 12 years, range 19—76 years). About half ($n = 50$) of the patients were smokers, 15 men (42%) and 35 women (55%). The proportion between smokers and non-smokers did not differ statistically between the sexes (Chi square 1.56, $p = 0.21$). All patients included in the study were either first admissions ($n = 76$) or already in (non-pharmacological) treatment ($n = 44$). Patients receiving