Do 5-HT Transporter Gene (SLC6A4) Polymorphisms Confer Risk for Situation-Specific Pain Catastrophizing?: A Pilot Study

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Introduction

Pain catastrophizing is a maladaptive coping strategy that has emerged as an important mediator of pain-related outcomes (e.g., pain report, analgesic use, length of hospital stay, disability). Despite the importance of this construct, no evidence has examined whether there is a genetic risk for pain catastrophizing. The 5-HT transporter gene (SLC6A4) is a possible candidate because prior research has established linkages between SLC6A4 polymorphisms and cognitive-affective processes. For example, relative to individuals with the SS genotype, individuals with the SS genotype (two short alleles) have a greater propensity for negative affectivity (depressive symptoms) and demonstrate enhanced fear responsivity. This study sought to observe the relationship between these SLC6A4 genotypes and pain catastrophizing, among other measures.

Objective

The aim of this study was to examine the effects of SLC6A4 genotypes on pain catastrophizing, depression, NFR magnitude, and pain tolerance.

Participants

63 Healthy Participants: Characteristics: 26 Men, 37 Women; White non-Hispanic (78%), single (43%), employed (95%), average age: 35.9 years (SD = 14.32)

Exclusion Criteria:

• 15 years of age
• Current acute illness
• Cardiovascular, neurological, or circulatory problems
• Recurrent anxiety or agitation
• Recent psychological trauma
• Specific photosensitive or seizures
• Any chronic pain, surgery

Procedure

1. Consent + Health Screening + Electrode application
2. Pain Catastrophizing Scale (PCS) Administration: Traditional
   • Center for Epidemiological Studies—Depression Scale Administration (CES-D)
   • 5 min rest: Heart Rate Variability Recording
   • Emotional modulation of startle (data not relevant to present study)
   • Pain/Neck/Shoulder Sensitivity Assessment
   • NFR Threshold Assessment: (see figure below)
   • Pain Threshold: Ascending series of stimulations presented in 65 mA steps, threshold = first stimulus (in mA) rated 20 on rating scale
   • Pain Tolerance: Ascending series continued until pain rating of 100 achieved or max intensity (40 mA) reached
   • PCS Administration: Situation-Specific (SS)

Results: Genotypes

- SS LS LL
- Genotype
- SS: 25%
- LS: 25%
- LL: 50%

Genotype

- The main effect of genotype was not significant for NFR (F [2, 56] = .825, p = .930, η² = .005), indicating there was no significant association between SLC6A4 genotypes and NFR.
- The main effect of genotype was not significant for Pain Tolerance (F [2, 56] = .826, p = .992, η² = .003).
- The main effect of genotype was not significant for Pain Threshold (F [2, 56] = .936, p = .992, η² = 0.003).

Conclusions

- Results indicated pain sensitivity was not associated with SLC6A4 polymorphisms; however, individuals with the SS genotype reported significantly higher situation-specific pain catastrophizing than persons with the LL (p = .015) or LS (p = .053) polymorphisms, an effect that explained 9.6% of the variance.
- Interestingly, there was no significant association found between traditionally-measured catastrophizing and genetic polymorphisms; however, it is possible that with a larger sample size, such an association may be obtained.
- SLC6A4 polymorphisms were not significantly associated with self-reported depressive symptoms in this study, suggesting the gene-catastrophizing association was not mediated by depression.