Potassium Channel Allele Modulates the Prognosis of Chronic Musculoskeletal Pain

Chronic musculoskeletal pain is a complex disorder that causes physical and psychological symptoms. While acute pain promotes healing of damaged tissue, chronic pain is caused by long-term maladaptive changes that result in hyperexcitability of pain-signaling neurons. Potassium channels have recently been implicated in pain syndromes because they largely determine the characteristics for cell activation. The gene KCNS1 encodes for a potassium channel alpha subunit, and a common single nucleotide polymorphism (SNP) in this gene that was recently correlated with more severe chronic neuropathic pain. Therefore, this study examines the effects of this KCNS1 SNP on the symptomology of chronic musculoskeletal pain, as well as treatment response based on KCNS1 genotype. The sample included 193 participants with chronic musculoskeletal pain who provided saliva samples from which their DNA was extracted according to standard guanidine hydrochloride extraction protocol with DNA STAT-60™, amplified following standard polymerase chain reaction protocol, and sequenced to determine each participant’s KCNS1 genotype. Participants answered questionnaires measuring physical pain symptoms and psychological suffering at baseline and again following three months of treatment with either CBT or a control educational program (EDU). There were no significant differences between groups at baseline, although those homozygous for the KCNS1 SNP (GG) tended to have higher levels of physical and mental functioning. Additionally, all participants responded to treatment regardless of genotype, with greater improvements seen in CBT compared to EDU for all genotypes. This suggests that GG individuals had to improve less to reach the same level of functioning as their heterozygous AG and homozygous AA counterparts. Further, AA individuals tended to improve more psychologically, whereas AG individuals improved more physically. This suggests that KCNS1 genotypic variation can alter the symptomology of chronic musculoskeletal pain and that CBT is an effective chronic pain treatment regardless of KCNS1 genotype.