Additive effects of serotonin transporter and the tryptophan hydroxylase-2 gene variation on emotional processing.

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ABSTRACT

Prior studies reported that functional variants of both the serotonin transporter (*5-HTT*) and tryptophan hydroxylase-2 gene (*TPH2*), two key regulators of the serotonergic signalling pathway, modulate amygdala activation during emotional processing. We addressed the question whether these two gene variants modulate each other, using an emotional picture processing task. Specifically, we measured event-related potentials (ERPs) during a passive emotional picture perception task, focusing on ERPs for the early posterior negativity (EPN) around 240 ms and for the slow wave starting at 315 ms. We found evidence for increased neural activity at 240 ms in individuals who carried one or two copies of the low-expression short variant of the *5-HTT*. Carriers of T variant of the *TPH2* also showed a tendency towards increased neural activity at 240 ms.. Moreover, we observed an additive effect of both genotypes for EPN, with highest neural activity to emotional stimuli in individuals carrying combination of both short variant of *5-HTT* and T variant of *TPH2*. Our results indicate that both the *5-HTT* and the *TPH2* genotype modulate the sensory encoding of affective stimuli during early steps of visual processing, and reveal additive effects of two genes in the serotonergic control of emotion regulation.