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GENETIC EFFECTS ON EMOTIONAL NETWORK CONNECTIVITY: FMRI STUDY OF HEALTHY INDIVIDUALS

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Introduction: It has been previously shown that genes implicated in psychiatric disorders modulated Blood oxygenation level dependent (BOLD) effect in brain regions. These studies add to the knowledge of vulnerability to disorders.

Objectives: This study has investigated genetic modulation of brain networks associated with emotion processing.

Aim of this study was to examine the effect of two genetic markers (5HTTLPR and COMT) on BOLD effect connectivity in healthy individuals.

Methods: Ninety-one participants participated in four fMRI experiments (at 3T), with dynamic facial expressions of fear, anger, sadness or happiness. We explored the effect of genetic polymorphisms on empirically defined brain network commonly associated with the responses to any emotional expressions. Connectivity was examined by means of Granger analysis allowing to estimate the directionality of information flow between the defined brain regions.

Results: Perception of dynamic emotional facial expressions was commonly associated with activation of the bilateral fusiform gyrus, right superior temporal sulcus, bilateral dorso-lateral prefrontal cortex and right amygdala. The genetic modulation of this network was observed only in experiments with fearful facial expressions. There was an interaction between the effects of genetic polymorphisms and the measures of connectivity: ( $p = 0.0002$ , adjusted  $R^2 = 18\%$ ). This was accounted for by lower connectivity in individuals lacking both copies of COMT Val polymorphism who at the same time lacked both copies of L polymorphism of 5HTTLPR gene.

Conclusions: Our results clarify the mechanism of brain network reactivity to emotional signals that is associated with genetic polymorphisms.