

## *Insular volume reductions in patients with major depressive disorder*

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### *Abstract*

**B**ackground: Major Depressive Disorder (MDD) is one of the most common mental disorders. Converging evidence suggests that the insula plays an important role in the pathophysiology of MDD. Little is known regarding in which insula subregion volume alterations occur in patients with MDD.

**Methods:** We analyzed voxel-based morphometry in T1-weighted MRI scans of unmedicated DSM-IV MDD patients (n=26) and in age, education, and sex matched healthy controls (HC, n=26). Furthermore, we performed a quantitative meta-analysis across 14 structural MRI MDD studies by applying the anatomical likelihood estimation technique to identify concordant volume reductions in MDD in the insula cortex.

**Results:** We found significantly reduced grey matter volumes (GMV) in patients with MDD compared to HCs in the left mid-insula and in the right and left caudate nucleus. The left mid-insular volume reduction in our sample was consistent with the coordinate-based meta-analysis results.

**Limitations:** The small number of MRI studies investigating heterogeneous MDD samples included in the meta-analysis may have resulted in low statistical power.

**Conclusions:** The findings highlight the role of the mid-insula in the psychopathology of MDD. The mid-insula sub-region might be associated with reduced interoceptive abilities in patients with MDD that is the ability to process information of “how the body feels”. In addition, the caudate nucleus has been described as being part of a network that mediates emotional and motivational processes which seems to be affected in MDD.

**Keywords:** Major Depressive Disorder, Insula, Voxel-based Morphometry, Meta-analysis, Interoception, Grey Matter Volume



### *Biography:*

Isabella Mutschler is from University of Basel, Institute of Psychology and faculty Member University of California, San Diego, Autism Center of Excellence & Healthy Infant Development Lab, she is a Post-Doc in Teaching of Psychology.

### *Recent publications:*

1. “Insular volume reductions in patients with major depressive disorder”, *Neurology, Psychiatry and Brain Research*, 2019
2. “Does laughing have a stress-buffering effect in daily life? An intensive longitudinal study”, July 2020, *PLoS ONE* 15(7):e0235851, DOI: 10.1371/journal.pone.0235851
3. “Insular volume reductions in patients with major depressive disorder”, July 2019, *Neurology Psychiatry and Brain Research* 33:39-47, DOI: 10.1016/j.npbr.2019.06.002
4. Who gets afraid in the MRI-scanner? Neurogenetics of state-anxiety changes during an fMRI experiment, September 2014, *Neuroscience Letters* 583, DOI: 10.1016/j.neulet.2014.09.021
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