A aberrant insulin regulation of brain network interactions in schizophrenia

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1. INTRODUCTION

- Insula. In schizophrenia, consistent structural and functional changes have been demonstrated for the insular cortex including aberrant salience and prediction error coding, both representing critical elements of psychosis1,2.
- DMN-CEN interactions. Interactions within and between the default-mode and central-executive network (DMN, CEN) are impaired in schizophrenia3.
- Salience Network. The insula is a critical component of the salience network (SN), an intrinsic connectivity network (ICN) comprising insula, fronto-insular operculum and dorsal anterior cingulate cortex (dACC). The SN is affected by both impaired structural integrity and functional connectivity in schizophrenia3,5.
- SN’s regulatory function for DMN-CEN interactions. Critical regulatory impact of the SN on DMN-CEN interactions has been shown6. Recently, it has been proposed that the SN’s key function is its regulatory role in switching between internally oriented self-related (DMN-based) and externally oriented goal-directed (CEN-based) processes6.

2. QUESTIONS

1. Is the insular Salience Network’s regulatory function for the DMN-CEN interactions disrupted in schizophrenia?
2. Are these alterations related to the degree of impaired DMN-CEN interactions and severity of psychosis?

3. METHODS

Schematic of the analysis pipeline

4. RESULTS

1. Intra-iFC of the SN is disrupted in bilateral anterior insula in psychotic patients.

Between-group differences of both inter-network intrinsic functional connectivity and Granger causality in SA and HC.
- SA showed decreased intra-iFC in bilateral inferior parietal lobule and bilateral frontal gyrus and increased intra-iFC in the right angular gyrus and left inferior temporal gyrus.
- SA showed increased inter-iFC between the aDMN and the rvCEN and a trend to increased inter-iFC between the spDMN and the rvCEN.
- SA did not alter inter-iFC between the SN and any other ICN.

5. CONCLUSION

1. Impaired anterior insular SN activity is associated with an aberrant regulatory impact on DMN-CEN interactions in patients with schizophrenia.
2. The degree of these alterations is related to the severity of psychosis.

These findings link changes of insular Salience Network connectivity and both DMN/CEN activity and severity of symptoms via reduced insula network regulation in schizophrenia.

6. REFERENCES


7. ACKNOWLEDGEMENTS

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8. CONTACT INFORMATION

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