

Young people's 'neural fingerprints' might permit a precision-medicine approach to depression

By Dr. Jessica Edwards

Precision medicine has been discussed in medical research since the late 1990's. Only recently, however, has this concept aroused interest and inspired relevant research in psychiatry, particularly in adolescents. Earlier this month, the *Journal of Child Psychology and Psychiatry* published a Research Review compiled by researchers at Stanford University and the University of California Davis, highlighting how and why a precision-medicine approach using measures of brain connectivity might be relevant in treating adolescents with depression.

"The brain changes profoundly during adolescence, including in its networks, or collections of regions that activate together and are involved in similar functions", explains the study's lead author, Rajpreet Chahal. "Interestingly, findings from both adults and adolescents demonstrate that differences in the levels of coordinated activity within or between these networks simply while at rest are unique to each adolescent, like a neural fingerprint. We reviewed studies that tested the hypothesis that these resting-state functional connectivity brain networks are related to the severity and types of depression symptoms individuals exhibit prior to treatment, as well as to changes in their symptoms following intervention".

The available data reviewed by Chahal and colleagues indicate that these brain-based network fingerprints might indeed provide important clues about which adolescents will benefit from specific types of treatment, such as psychotherapy, antidepressants, or combinations of different treatments. For example, they propose that cognitive behavioural therapy might benefit depressed adolescents with a certain pattern of connectivity in the cognitive control network more than it does adolescents with alterations in the reward network.

"More research is now needed to test whether these emerging patterns of findings can be replicated in larger samples, with different types of interventions, and for different developmental stages", says Chahal. "For now, we believe that measuring individual differences in brain networks is important for identifying sub-categories of adolescent depression, developing targeted treatments, and even classifying biomarkers of risk for the development of depression in adolescence".

Given that adolescence is the period of development with the highest incidence of depression, Chahal *et al.* hope that a person-centred approach to identifying, preventing, and treating this psychopathology will ultimately improve the efficacy of interventions. Advances in this area are particularly urgent given that traditional 'one-size-fits-all' treatment approaches do not sufficiently alleviate depression symptoms for some affected adolescents.

Referring to:

Chahal, R., Gotlib, I.H. & Guyer, A.E. (2020), *Research Review: Brain network connectivity and the heterogeneity of depression in adolescence – a precision mental health perspective*. *J. Child Psychol. Psychiatr.* doi: 10.1111/jcpp.13250.

Glossary:

Precision medicine: the concept of customized healthcare based on an individual's characteristics, such as specific symptoms or underlying biology.

