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Biomarkers in psychiatry

Irina Singh and Nikolas Rose

The use of biomarkers to predict human behaviour and psychiatric disorders raises social and ethical issues, which must be resolved by collaborative efforts.



Psychiatry has long been a second-class citizen in science and medicine. Despite much effort, the causes of many psychiatric disorders remain unclear, and it has been difficult even to categorize such disorders precisely. In the past decade,

however, there has been a large shift towards incorporating biomarkers into psychiatry (Fig. 1), and there is hope that such biological indicators will improve psychiatric diagnoses by underpinning them with physiological evidence (Boxes 1 and 2). But biomarkers promise far more than a basis for better diagnoses. They could assist in predicting the course of an illness in an individual and in tailoring treatment. And they could be used to predict the development of not only psychiatric disorders but also certain behaviours, personality traits and mental or emotional capacity.

Scientific innovations that will ultimately improve psychiatric outcomes and general well-being are to be welcomed. But they must be scrutinized to assess their value to the general

public. Despite the wealth of research into biomarkers and the considerable interest in their use in clinical and non-clinical situations, there has been little discussion of the social, ethical and legal problems posed by their use in psychiatry. Here we set out the key challenges in this area. We focus on interventions in children and adolescents, particularly those aimed at preventing behavioural problems. The identification of biomarkers in these age groups forms an important research agenda and the initial pathways through which this research is being translated from the laboratory to the clinic, as well as the classroom and other locations, can already be observed.

The promise of biomarkers

At present, psychiatric disorders are diagnosed on the basis of signs, symptoms and course of illness, according to the classifications in the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV). Finding a biological or physiological marker, rather than relying on behavioural symptoms and signs, might provide a more precise means of diagnosis, thereby aligning psychiatric classification with classification systems used in other

areas of medicine¹. Such methods might also go further and help to re-organize the DSM system of classification, offering a counter to the swelling catalogue of categories, each with its lengthening lists of behavioural symptoms and subclassifications that have no differentiated aetiology.

Moreover, biomarkers might be used to predict the potential for developing a particular disorder. This is of particular significance in child and adolescent psychiatry. Genetic screening and neuroimaging — the main techniques for identifying biomarkers — could be used to assess children before symptoms appear. And existing childhood disorders are now themselves being viewed as 'biomarkers' for the risk of developing more severe disorders.

In this sense, biomarkers promise to be the most powerful psychiatric tool since the discovery of antipsychotic drugs — a biological means of predicting not only the development of a disorder but also its course and outcome. Biomarkers could therefore inform the type, timing and course of interventions, and they could allow disorders to be subtyped based on physiological criteria, creating a more personalized approach to psychiatric treatments.