Faster biological ageing could increase risk for depression in childhood

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Genetic factors which predispose people to accelerated 'biological ageing' also increase their risk of developing depression in childhood, according to a new study from King's College London.

The findings, published today in the *Journal of Affective Disorders*, suggest that the causes of childhood-onset depression may be different from those of adult-onset depression, and could lead to new treatments targeting the mechanisms which govern biological ageing.

According to figures from the Office of National Statistics, 10 per cent of children in Great Britain aged between 5 and 16 have a mental health problem, with 4 per cent of children suffering from an emotional disorder such as depression.

Previous research has suggested that negative environmental factors associated with depression, such as childhood maltreatment or smoking, could make people with depression age faster than people who do not have depression. This may subsequently explain the increased vulnerability to ageing-related diseases amongst people with depression, including obesity, diabetes and cardiovascular disorder.

However, in this study the researchers tested whether it could also work the other way round: i.e. could genetic factors that promote faster biological ageing predict an increased risk for depression?

To measure biological ageing, the researchers studied a feature of chromosomes called telomeres. Telomeres sit on the end of our chromosomes and act like 'caps', protecting the strands of DNA stored inside each of our cells as we age. Telomeres shorten each time a cell divides to make new cells, until they are so short that they are totally degraded and cells are no longer able to replicate. Telomere length therefore acts as a marker of biological age, with shortened telomeres representing older cells, and commonly older individuals.

The rate at which telomeres shorten across our lifespan can vary, based on a range of environmental and genetic factors. This means that two unrelated people of the same chronological age may not be the same age biologically.

In their study, the researchers first confirmed that a gene previously associated with telomere length also affected telomeres in a subset of their UK sample of more than 2,700 people. They then tested whether genetic variants associated with shorter telomeres (faster ageing) had a higher frequency amongst people with adult-onset or child-onset depression. They found that a genetic variant which primes an individual for advanced biological ageing (i.e. shorter telomeres) increased the risk for childhood-onset depression, relative to both non-depressed

individuals and people with adult-onset depression. The effect was small but suggests that, at least for some children, ageing may play a role in the development of depression.

Dr Timothy Powell from the Institute of Psychiatry, Psychology & Neuroscience (IoPPN) at King's College London, said: 'For the first time, our findings suggest that a genetic predisposition to faster biological ageing may shorten the time it takes for depression to present itself.

'Although these results need to be replicated in larger studies, it may be recommended that children with a copy of the ageing risk gene (or a combination of risk genes), and a family history of depression, be given a specialised diet, exercise and stress management regime in order to slow down rates of biological ageing and therefore the onset of depression.'

Dr Powell added: 'We also need to explore whether drugs aimed at reversing some of the cellular effects of biological ageing could represent a new treatment option for children at risk for depression.'

More information: Julia E. Michalek et al. Genetic predisposition to advanced biological ageing increases risk for childhood-onset recurrent major depressive disorder in a large UK sample, *Journal of Affective Disorders* (2017). DOI: 10.1016/j.jad.2017.01.017

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