Premature birth linked to older 'brain age' in adult life

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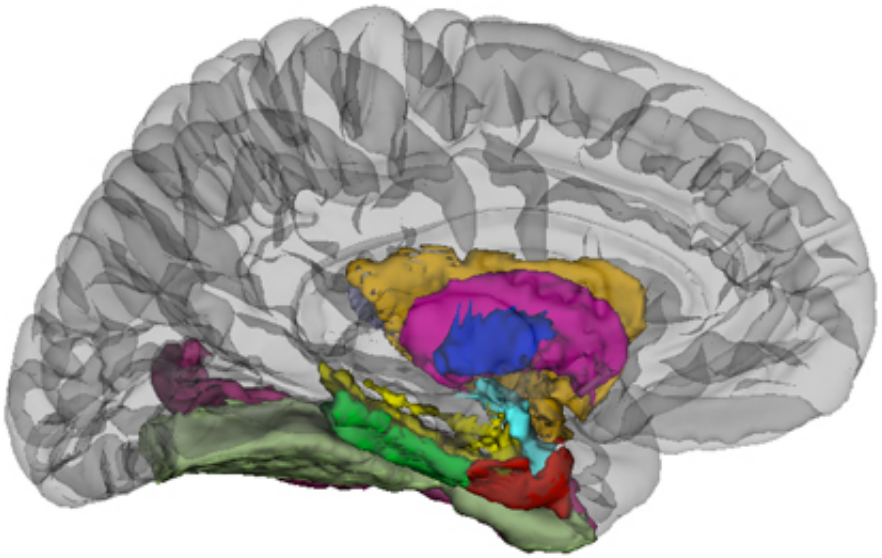

Some of the brain areas which showed older ‘brain age’ in the preterm group. Credit: King's College London

New King's College London research suggests that babies born very prematurely show accelerated brain development in adult life, as their brains look 'older' compared to non-premature babies.

The final steps of brain development that are crucial for human brain function occur in the third decade of life, and this new study is the first to map out these changes in the very preterm brain over a 15-year period, from adolescence into adulthood. Very preterm is defined as

birth 28-32 weeks before 37 weeks of pregnancy are completed.

Approximately 8 per cent of babies are born prematurely in the UK every year. Most premature babies go on to lead healthy lifestyles, although as a group they are more likely to require extra school support and experience a variety of psychiatric problems. This new study, published in the journal *NeuroImage*, sheds light on why people born prematurely experience these problems.

The researchers analysed data from 328 magnetic resonance imaging (MRI) scans of very preterm people who have been studied since birth, 232 MRI scans of control participants collected on-site and 1,210 scans obtained from open-access MRI depositories.

They found smaller global volumes of grey matter (which contains most of the brain's neuronal cell bodies) in the very preterm group, and especially in areas involved in memory and in processing emotions. The study also revealed that some structural brain changes in areas responsible for complex cognitive operations, such as spatial abilities and behavioural control, are resilient to the effects of very preterm birth, possibly indicating the presence of compensatory mechanisms.

As grey matter volume changes over the life span, with an initial growth in volume up to adolescence followed by a steady decline, it can be used as a marker of 'brain age'. The researchers found that in the premature group there was a discrepancy between participants' chronological age and 'brain age' estimated from their MRI scan, suggesting that in participants of a similar age, very preterm adults' brains looked 'older' than controls.

Dr Vjaceslavs Karolis, the study's first author from King's College London, said: 'The finding of structural signatures of accelerated brain maturation in those born very prematurely was unexpected, because

previous research suggested delayed brain maturation at earlier stages of development.'

Dr Chiara Nosarti, the study's lead author, also from King's, said: 'It remains to be investigated whether these structural brain differences have real-life implications. Our results have clinical relevance as they could inform the development of cognitive and behavioural interventions aimed at boosting brain resilience.'

More information: Vyacheslav R. Karolis et al. Volumetric grey matter alterations in adolescents and adults born very preterm suggest accelerated brain maturation, *NeuroImage* (2017). DOI: 10.1016/j.neuroimage.2017.09.039

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