Elisenda Eixarch

MULTI-FACT

Multi-centric study of Fetal Abnormal Cortical Trajectory with standardised and privacy-preserving method on fetal MRI

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We increasingly understand the impact that dissimilar development of the brain before birth may have on people. Around 10% of children do not follow the usual path of brain development when they are in the womb, which can cause disabilities and make their lives more difficult. It could be possible to identify two out of three of these children using scans before they are born, but currently their issues are usually only discerned later in life. This means that they cannot receive the extra help they need when they are very young, making it harder to improve their lives when they are older. This project wants to change that by increasing the understanding of brain development in unborn babies and finding features, called biomarkers, which can alert us to future problems they might have.

Looking at babies' brains during pregnancy helps doctors decide how to treat their patients, both the mothers and unborn children. We already know that using magnetic resonance imaging (MRI) to check the brains of fetuses is safe and lets us see the brain better than ultrasound images. However, MRI, which uses magnetic fields and radio waves to create images of the body, has been improved over the years for adults, but the same improvements are still yet to be made for fetuses. This is exactly what this project hopes to do for the first time, by bringing together many experts in different fields and from different hospitals to work together in a new and collaborative way.

We will examine two conditions that can affect unborn children to develop our tools.

The first is intrauterine growth restriction, which affects one in ten pregnancies. This is where the unborn baby does not get what it needs to grow well. The second is corpus callosum agenesis, which is rare. In this condition the part of the brain that links its two halves does not grow properly. We will create new technologies to follow more than 950 unborn babies with these conditions and utilise our new understanding to make tools that can be used around the world to find many more babies whose brains are not developing normally before they are born, and help them to have a better future.