Highlight: Beautiful Convolutions

Several lines of evidence suggest that the origins of mental illnesses are likely in developmental processes taking place years before symptoms emerge. Researchers are working to understand the early maturation of the brain, and how disruptions in development in early life contribute to later mental illness.

During the third trimester, the cerebral cortex – the outermost brain region and home to higher order functions, including cognition – loses its smooth appearance and folds into complex grooves and wrinkles, during a developmental process called gyrification. Although the most dramatic brain growth takes place during the first years of life, previous studies were only able to provide information on the process of gyrification in school-age children and adolescents – not infants.

A group of researchers at the University of North Carolina at Chapel Hill recently developed a magnetic resonance imaging approach that makes it possible to track gyrification in healthy infants. These researchers found marked regional differences in cortical development in infants' brains. High-growth regions were located in the association cortex, an area of the cerebral cortex that is involved in higher-order processes such as cognition, and low-growth regions were located in the sensorimotor, auditory, and visual cortices. Previous work showed that between early childhood and adulthood, the growth of the cortex is not uniform, with areas involved in higher-order function expanding very rapidly. This study provides a more comprehensive picture of how much asymmetric growth occurs very early in life. Such differences in growth rates across the brain may inform our understanding of mental illnesses, as researchers previously observed abnormal gyrification patterns in several neurodevelopmental illnesses, such as schizophrenia, autism spectrum

Source: Dinggang Shen Ph.D., University of North Carolina at Chapel Hill School of Medicine
