Brain growth across the life span in autism: Age-specific changes in anatomical pathology.

Autism is marked by overgrowth of the brain at the earliest ages but not at older ages when decreases in structural volumes and neuron numbers are observed instead. This has led to the theory of age-specific anatomic abnormalities in autism. Here we report age-related changes in brain size in autistic and typical subjects from 12 months to 50 years of age based on analyses of 586 longitudinal and cross-sectional MRI scans. This dataset is several times larger than the largest autism study to date.

Results demonstrate early brain overgrowth during infancy and the toddler years in autistic boys and girls, followed by an accelerated rate of decline in size and perhaps degeneration from adolescence to late middle age in this disorder. We theorize that underlying these age-specific changes in anatomic abnormalities in autism, there may also be age-specific changes in gene expression, molecular, synaptic, cellular, and circuit abnormalities. A peak age for detecting and studying the earliest fundamental biological underpinnings of autism is prenatal life and the first three postnatal years. Studies of the older autistic brain may not address original causes but are essential to discovering how best to help the older aging autistic person. Lastly, the theory of age-specific anatomic abnormalities in autism has broad implications for a wide range of work on the disorder including the design, validation, and interpretation of animal model, lymphocyte gene expression, brain gene expression, and genotype/CNV-anatomic phenotype studies.

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