support critical p53-dependent processes and targets in the regulation of developmental ethanol effects on the brain.

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Development of thalamo-temporal connectivity during the first postnatal year

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Anatomical tracing in animal models has shown that the thalamus projects to regions in the temporal lobe around primary auditory cortex, and many regions anterior to this. During development, post mortem studies in humans have shown that myelination in the temporal lobes follows a posterior-to-anterior progression. Our aim was to investigate auditory development, and specifically the thalamo-temporal white matter connections, in living human infants during the first postnatal year. We hypothesized that the connectivity will strengthen from birth through the first year, particularly in anterior temporal areas.

We recruited 4 healthy controls with ages 1 month, 3 months, 9 months and 11 months. We assessed white matter tracts using diffusion-weighted MRI with probabilistic tractography. A highly accelerated multiband EPI sequence (monopolar acquisition, acceleration factor = 4, iPAT = 0) with 128 non-collinear diffusion weighting directions was acquired using the following parameters: TR/TE = 1980/71, voxel size $2 \times 2 \times 2\,mm^3$, $b = 1500\,s/mm^2$. Regions of interest in the thalami and the temporal cortex were drawn manually in native space and tractography between these regions performed using the FSL software.

We found an increment in the strength of connectivity from 1 to 11 months between the thalamus and cortex (irrespective of which was the seed and the target: thalamo-temporal 60% and temporo-thalamic 37%). Moreover, the pathway's fractional anisotropy increased by 26% and its mean diffusivity dropped by 90%. Furthermore, the pattern of development followed a posterior-to-anterior progression, with an extension of connections to more anterior temporal regions at 9–11 months.

In conclusion, using three measures, thalamic connections to the temporal lobe were found to strengthen in the first postnatal year, around primary auditory cortex, and especially in anterior temporal regions. These results concur with anatomical tracing and post-mortem studies of myelination. The enhanced anterior temporal connectivity may reflect the development of the posterior-to-anterior cortical processing stream that in adults processes complex sounds such as language.

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LORIS: Enhanced tools for data management in neurodevelopmental studies

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LORIS is a web-based data management system serving as the backbone for many neurodevelopmental studies, including all NeuroDevNet imaging subprojects (FASD, CP and ASD), as well as large-scale multi-centre international collaborations such as the NIH-funded Fragile X and Infant Brain Imaging Study (IBIS), and the NIH MRI study of normal brain development (Das, 2012; Wolff, 2012; Evans, 2006). LORIS manages the workflow of subject data through the full lifecycle of a multi-centre longitudinal study, providing a framework that presently handles data for more than 10,000 unique subject profiles worldwide, on over 400 behavioural and clinical measures.

Custom tools developed in LORIS for neurodevelopmental studies enhance its design and usability at every project stage. From study inception, screening and recruitment modules track subject consent, exclusion factors, family relationships and participation history. LORIS' Instrument Builder enables site staff to create forms for behavioural and clinical data entry, which can be optionally completed by subjects and families online from home via secure login. Data input error is effectively controlled and monitored by Double Data Entry and Conflict Resolver features. Statistical and Candidate-profiling tools provide at-a-glance visualization of data entry progress, while the Data Integrity Manager neatly organizes extensive Quality Control procedures for data validation. In parallel, a Feedback module is available to flag data quality problems and ensure timely resolution. LORIS' Data Querying Tool is designed for rapid extraction of data from large datasets. Queries can be filtered by any user-defined criteria, and output in a number of formats, by subject or in a longitudinal fashion. All modalities including Imaging (MRI, MEG) and Genetic datasets can be exported from LORIS to any processing pipeline for analysis.

LORIS' purpose-built tools for neurodevelopmental studies facilitate seamless management of large-scale data collection, validation and dissemination efforts, across multiple data modalities and throughout the project lifecycle.

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