IMG-09. CHARACTERISATION OF A PANEL OF IN VIVO MODELS OF PAEDIATRIC-TYPE DIFFUSE HIGH-GRADIE GLIOMA (PDHGG) USING MAGNETIC RESONANCE IMAGING

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Novel therapies for paediatric-type diffuse high-grade glioma (PDHGG) are urgently required. Orthotropic models using patient-derived material are invaluable tools in preclinical drug development as they retain genetic/epigenetic features, eg. histone H3G4 and H3K27 alterations. Their evaluation in situ is vital and requires sensitive imaging techniques such as MRI.

12 diffuse hemispheric gliomas (DHG; 2 DHG-G34) and 21 diffuse midline gliomas (DMG; 17 DMG-K27N) tumours have been characterised using MRI following site-specific orthotopic implantation of patient-derived cells directly from tumour material or after minimal expansion as stem cell cultures. Of the 62 models implanted; 3 DHG and 10 DMG samples were not tumourgenic and 13 DHG/3 DMG models are currently under MRI surveillance. Tumours identified on T1,-weighted(T1)-images varied from a diffuse hyperintense signal to well-defined high contrast masses. Tumour growth in 5 DMG models was too diffuse for longitudinal monitoring with T2-w-MRI. Once established, diffusion-weighted, T1/T2, mapping and contrast-enhanced MRI were used to further assess the models. 15 DMG models demonstrated higher water diffusivity and T1 than 10 DHG tumours, which suggests less tightly packed tumour cells but may also reflect the closer proximity of tumours growing in the thalamus/pons/cerebellum to the intracranial contrast-agent enhancement in 17/19 DMG and 5/10 DHG models. 14/15 DHG and 2/10 DHG models demonstrated significant differences in T1/T1w, T2/T2w, FLAIR and diffusion tensor imaging between the original tumour and the xenograft. 6/10 DHG models did not show new contrast- and diffusion-weighted enhancement and 1/19 DHG models showed new contrast-enhancement in the same area as the original tumour.

CONCLUSIONS: Novel models of paediatric-type diffuse high-grade glioma (PDHGG) have been established, using patient-derived cells from the same primary tumour. MRI can accurately characterize these models and demonstrate significant differences compared to the primary tumour, facilitating preclinical drug development.

IMG-08. RESPONSE ASSESSMENT FOR PEDIATRIC CRANIOPHARYNGIOMA: RECOMMENDATIONS FROM THE RESPONSE ASSESSMENT IN PEDIATRIC NEURO-ONCOLOGY (RAPNO) WORKING GROUP

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INTRODUCTION: Craniopharyngioma (CP) is a histologically benign tumor of the pituitary stalk that accounts for 4% of pediatric central nervous system (CNS) tumors. Given its location, CP often causes neuro-endocrine, hypothalamic, and vision dysfunction. Standard therapy is surgical resection with or without radiotherapy. The response assessment of CP is complex due to the presence of both solid and cystic tumor components. Three-dimensional measurements of critical brain structures can be challenging in a clinical environment, introducing variability.

METHODS: The Response Assessment in Pediatric Neuro-Oncology (RAPNO) committee, formed of international experts in relevant subspecialties, devised consensus guidelines from published literature and expert opinion to assess CP response in prospective clinical trials.

RESULTS: Magnetic resonance imaging (MRI) is the recommended radiologic modality for baseline and follow-up CP assessment. Computed tomography may be useful for identification of calcification in the initial diagnostic work-up. The committee defined specific standard MRI-based sequences focused on comprehensive evaluation of the suprasellar space. Radiologic CP response is defined by two-dimensional measurements of both solid and cystic tumor components. Three-dimensional measurements are also encouraged in prospective trials. In certain clinical contexts, response of solid and cystic disease may be differentially considered based on their unique natural histories and responses to treatment (including transient cyst growth during or after RT). Importantly, the committee incorporated functional endpoints related to neuro-endocrine and visual assessments into CP response definitions. In most circumstances, cystic disease should be considered progressive only if growth is associated with acute, new-onset or progressive functional impairment. CONCLUSION: CP is a common pediatric CNS tumor for which standardized response predictors have been controversial. A set of validated guidelines for baseline and longitudinal assessments of CP to uniformly define response in future prospective trials.