MB-34. MOLECULAR SUBGROUPS OF MEDULLOBLASTOMA IDENTIFICATION USING NON-INVASIVE MAGNETIC RESONANCE SPECTROSCOPY
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BACKGROUND: Medulloblastomas in children can be categorized into four molecular subgroups with differing clinical characteristics such that subgroup determination aids in prognostication and risk-adaptive treatment strategies. Magnetic resonance spectroscopy (MRS) is a widely available, non-invasive tool used to determine metabolic characteristics of tumors providing diagnostic information without the need for tumor tissue. In this study we investigated the hypothesis that metabolite concentrations measured by MRS would differ between molecular subgroups of medulloblastoma allowing for accurate subgroup determination. METHODS: Magnetic resonance spectroscopy was used to measure metabolites in medulloblastomas across molecular subgroups (SHH = 12, Groups 3/4 = 17, WNT = 1). Levels of fourteen metabolites were analyzed to determine those which were most discriminant for medulloblastoma subgroups in order to construct a multivariate classifier to distinguish between combined Group 3/4 and SHH tumors. RESULTS: Medulloblastomas across molecular subgroups revealed distinct spectral features. A five metabolite subgroup classifier inclusive of creatine, myo-inositol, taurine, aspartate and lipid 13a was developed that could discriminate between Group 3/4 and SHH medulloblastomas with excellent accuracy (cross-validated Area Under the Curve AUC = 0.88). Group 3 and Group 4 tumors demonstrated metabolic profiles with readily detectable taurine, lower levels of lipids and high levels of creatine. SHH tumors showed prominent choline and lipid with low levels of creatine and little or no evidence of taurine. CONCLUSIONS: The data show that medulloblastomas of different molecular subgroups differ metabolically as measured using MRS. MRS is a potentially useful and accurate tool to determine medulloblastoma molecular subgroups.