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Title	Pathology of NF2-Associated Meningiomas
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Aim	Neurofibromatosis II (NF2) is an inherited tumor syndrome which predisposes patients to schwannomas, ependymal tumors, and meningiomas. Schwannomas and meningiomas tend to be multiple in patients with NF2, while sporadic tumors tend to be solitary. Prior studies have suggested that, compared to sporadic tumors, NF2-associated meningiomas may have a higher frequency of atypical morphologic features, including higher proliferative activity and prominent nuclear atypia.
Materials & Methods	In this study, we examined 16 meningiomas from nine NF2 patients and compared them with 18 sporadic meningiomas from 18 age-matched patients. Tumors were categorized according to established 2007 WHO criteria for classification of brain tumors and were examined for various histologic parameters including atypical features, “neural” appearance, and intratumoral inflammatory infiltrates. Tissue microarrays were constructed, and immunohistochemical stains for neurofibromin, merlin, IMP-3, progesterone receptor (PR), S-100 protein, and Ki-67 were performed. A standard t-test was used to analyze continuous data. Chi-square tests were utilized to compare categorical morphologic and immunohistochemical parameters. Each stain was scored for extent of immunohistochemical expression (percentage of cells staining) and staining intensity, except for Ki-67, which was reported in percentages only.
Result	There were no statistically significant differences in age or gender, indicating appropriate matching of NF2 and sporadic meningiomas. Meningiomas from NF2 patients were more likely to have a “neural” or “onion-bulbing” appearance ( $p<0.01$ ), had significantly greater merlin expression ( $p=0.04$ ), and showed significantly higher neurofibromin staining intensity ( $p< 0.01$ ). There were no significant differences between NF2 and sporadic meningiomas with regard to histologic grade (11 were WHO grade I and 5 were grade II) or other morphologic parameters, expression pattern for PR and IMP3, or Ki-67 proliferative index.
Conclusion	Parameters which may aid in distinguishing NF2-associated meningiomas from sporadic ones include immunohistochemical staining for merlin and neurofibromin as well as “onion-bulbing” morphology.