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Astrocytes promote medulloblastoma progression through hedgehog secretion.

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Astrocytes, the most abundant type of glial cells in the brain, play critical roles in supporting neuronal development and brain function. While astrocytes have been frequently detected in brain tumors, including medulloblastoma (MB), their functions in tumorigenesis are not clear. Here we demonstrate that astrocytes are essential components of the MB tumor microenvironment. Tumor-associated astrocytes (TAA) secreted the ligand sonic hedgehog (Shh), which is required for maintaining MB cell proliferation despite the absence of its primary receptor Patched-1 (Ptch1). Shh drove expression of Nestin in MB cells through a Smoothed-muscle-dependent, Gli1-independent mechanism. Ablation of TAA dramatically suppressed Nestin expression and blocked tumor growth. These findings demonstrate an indispensable role for astrocytes in MB tumorigenesis and reveal a novel Ptch1-independent Shh pathway involved in MB progression.

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