The proliferation potential of gliomas is an indicator of their aggressiveness with significant implications in patient management and prognosis, but its assessment requires tissue sampling. We evaluated the relationship between glioma proliferation (as expressed by the Ki-67 index) and the uptake of the tumor-seeking radiotracer technetium-99m Tetrofosmin (99mTc-TF). Fourteen patients with a space-occupying lesion suspicious for glioma on structural brain imaging were prospectively enrolled. Scintitomographic (SPECT) imaging was performed and within a week the lesion was removed surgically; Ki-67 was assessed in the excised specimens by MIB-1 immunostaining. Three patients were excluded from the study because their lesions were proven metastatic. In the 11 patients eligible for analysis (7 males, 4 females; mean age 49.5 ± 7.5 years), the diagnosis was glioblastoma multiforme (6 cases), anaplastic astrocytoma (1), anaplastic oligodendroglioma (2), low-grade oligodendroglioma (1), and low-grade astrocytoma (1). We found a significant positive linear correlation between 99mTc-TF uptake and Ki-67 expression ($r = 0.95, p = 0.001$ [Spearman rank analysis]; Fig. 1–3). No significant correlation was observed between tracer uptake and tumor grade ($r = 0.27, p = 0.420$). The preliminary results of this pilot study, although deriving from a limited patient sample, propose that this tracer may hold a potential role as a noninvasive marker of glioma proliferative activity.

**References**


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Figure 1. T1-weighted, gadolinium-enhanced MRI (A) in a low-grade oligodendroglioma of the left frontal lobe. Faint $^{99m}$Tc-Tetrofosmin uptake (B, arrow) correlated with Ki-67 approx. 2% (C; MIB-1 ×100).

Figure 2. T1-weighted, gadolinium-enhanced MRI (A) in an anaplastic oligodendroglioma of the left temporal lobe. Profound tracer uptake (B) correlated with intense proliferation (C; Ki-67 approx. 40%, MIB-1 ×100).

Figure 3. Correlation between $^{99m}$Tc-Tetrofosmin uptake (expressed as lesion-to-normal [L/N] uptake ratio) and cellular proliferation rate (MIB-1) in the studied gliomas.

\[
y = 4.4282x - 4.5601 \\
r = 0.95
\]