# Mini nano imaging agent

Maximal safe resection of glioma remains the single most effective treatment. Tools to guide the resection while avoiding removal of normal brain tissues can aid neurosurgeons in achieving optimal results. One strategy to achieve this goal is to rely upon interoperative fluorescence staining of tumor cells in vivo, that can be visualized by the surgeon during resection.

Towards this goal Patiel et al., designed a biodegradable fluorescent mini nano imaging agent (NIA) with high specificity for U87MG glioma cells and previously unmet high light emission. The NIA is the conjugate of polymalic acid (PMLA) with chlorotoxin for tumor targeting, indocyanine green (ICG) for NIR fluorescence and the tri-leucine peptide as fluorescence enhancer. PMLA as a multivalent platform carries several molecules of ICG and the other ligands. The NIA recognizes multiple sites on glioma cell surface, demonstrated by the effects of single and combined competitors. Systemic IV injection into xenogeneic mouse model carrying human U87MG glioblastoma indicated vivid tumor cell binding and internalization of NIA resulting in intensive and long-lasting tumor fluorescence. The NIA is shown to greatly improve tumor removal supporting its utility in clinical applications [1].

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Patil R, Galstyan A, Sun T, Shatalova ES, Butte P, Mamelak AN, Carico C, Kittle DS, Grodzinski ZB, Chiechi A, Ding H, Black KL, Ljubimova JY, Holler E. Polymalic acid chlorotoxin nanoconjugate for near-infrared fluorescence guided resection of glioblastoma multiforme. Biomaterials. 2019 Mar 23;206:146-159. doi: 10.1016/j.biomaterials.2019.03.029. [Epub ahead of print] PubMed PMID: 30933776.