Abstract Submitted
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Protein typing of circulating microvesicles allows real-time monitoring of glioblastoma therapy HUILIN SHAO, JAEHOON CHUNG, Harvard University, Center for Systems Biology, LEONORA BALAJ, Harvard Medical School, RALPH WEISSLEDER, HAKHO LEE, Harvard University, Center for Systems Biology — Glioblastomas shed large quantities of small, membrane-bound microvesicles (MVs) into the circulation. While these hold promise as potential biomarkers of therapeutic response, there remain hurdles to their identification and quantitation. Here, we describe a highly sensitive and rapid analytical technique for profiling circulating MVs directly from blood samples of glioblastoma patients. MVs, introduced onto a dedicated microfluidic chip, are labeled with target-specific magnetic nanoparticles and detected by a miniaturized nuclear magnetic resonance system. Compared with current standard assays (e.g., Western blotting, ELISA and flow cytometry), this integrated system has a much higher detection sensitivity, and can differentiate glioblastoma multiforme (GBM) MVs from non-tumor host cell-derived MVs. The system further showed that circulating GBM MVs could serve as a surrogate for primary tumor by reflecting its molecular signature and a predictor of treatment-induced changes. We expect that this converging nanotechnology platform would have a wide range of applications, providing both an earlier indicator of drug efficacy and a potential molecular stratifier for human clinical trials.

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