Abstract Submitted for the MAR13 Meeting of The American Physical Society

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 cellderived 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.

Huilin Shao Harvard University, Center for Systems Biology

Date submitted: 19 Nov 2012 Electronic form version 1.4