Docket #: S05-306

Magnetic Sifter for Biomedical Detection

Stanford engineers have developed a patented device and sample preparation technique for high throughput purification, concentration, and sample preparation of a wide variety of biomolecules. This technology employs magnetic nanobead probes to tag molecules or cells of interest from raw samples. Then those tags are used to sift the molecules for purification with high capture efficiency. Recent developments in the sifter design allow for ultra-high capture and release efficiencies, high-throughput, simple interfacing with standard flow equipment, and the ability to perform cell separation in addition to biomolecule separations (such as DNA, RNA and proteins).

Ongoing Research
The inventors have ongoing studies directed at developing protocols for biomolecule and cell separation.

Applications

- **Sample preparation/purification** for:
  - biological research
  - diagnostics
  - biowarfare detection
  - genomics and proteomics
  - collection and isolation of rare cells
- **Types of molecules that can be purified include:**
  - DNA
  - RNA
  - proteins
  - pathogens
  - cells

Advantages

- **High throughput** - greater than 1 ml/hr
- **Ultra-high capture and release efficiencies** - greater than 95%
- **Multi-functional probes** - the same probes can potentially be used for both capture and detection
- **Low cost, easy to use, simple design**

Publications

- Christopher M. Earhart, Robert J. Wilson, Robert L. White, Nader Pourmand, Shan X. Wang, "Microfabricated magnetic sifter for high-throughput and high-gradient magnetic separation," Journal of Magnetism and Magnetic Materials, Volume 321, Issue 10, May 2009, Pages 1436-1439

Patents

- Published Application: 20070181466
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