

Multiplexed Specific Metalloprotease Activity Measurements

Technology #19425

Applications

This technology is a method of detecting active metalloproteases in biological samples, and has potential applications as a research tool, drug discovery technique, or diagnostic.

Problem Addressed

Matrix metalloproteases (MMPs) are enzymatic proteins that are important for many physiological roles in development and adulthood. MMPs are an attractive diagnostic and therapeutic target because MMP expression and activity is dysregulated in many diseases including cancer, cardiovascular disease, endometriosis, pre-eclampsia, and arthritis. However, detection of MMP activity remains a challenge. Current technologies often fail to differentiate between active and inactive forms, require large sample sizes, and only detect single MMPs at a time. This technology is a simple, multiplexed solution to detect MMP activity.

Technology

This technology detects active MMPs using a multifunctional probe that binds selectively to the active form of many MMPs and facilitates conjugation to a fluorescent tag through a biotin functional group. The identity of probe-bound MMPs can be detected with commercially available, color-coded beads conjugated to antibodies against specific MMPs. Quantification of the fluorescence from both the probe and beads are then compared to standards of known concentration and used to very accurately determine the concentration of the individual constituent MMPs. The inventors demonstrate that this technology works on samples from cell culture supernatant, menstrual fluid, and peritoneal fluid. Additionally, MMP detection is both sensitive and specific and can accurately detect MMP-1, -2, -3, -7, -9, -10, and -12 at concentrations as low as 100 molecules per microliter of sample. Finally, this technology is can easily be multiplexed, and is compatible with high-throughput screening techniques.

Advantages

- Accurate MMP detection with small sample input
- Multiplexed, simultaneous detection of MMPs
- Highly sensitive and specific
- Simple system using many commercially available reagents
- Compatible with high throughput screening for MMP drug discovery

Categories For This Invention:

Life Sciences

255 Main Street, room NE 18-501
Cambridge, MA 02142-1601
Phone: 617-253-6966 Fax: 617-258-6790
<http://tlo.mit.edu>
Contact the Technology Manager: tlo-inquiries@mit.edu

Diagnostics

Protein

Markers

Research Tools

Screening Assays

Intellectual Property:

Compositions and multiplex assays for characterizing active proteases and their inhibitors

PCT

2019-046288

Compositions and multiplex assays for characterizing active proteases and their inhibitors

US Patent Pending

2019-0064167

Inventors:

Steven Tannenbaum

Linda Griffith

Douglas Lauffenburger

Miles Miller

Caroline Chopko

Christi Cook

Ravindra Kodihalli

Evan Chiswick

External Links:

Tannenbaum Lab

<http://web.mit.edu/srtlab/>

Griffith Lab

<http://lgglab.mit.edu>

Lauffenburger Group

<http://web.mit.edu/dallab/>