

SYSTEMS AND DEVICES FOR PROTEASE DETECTION BASED ON ENGINEERED POLYMERS AND BIOPOLYMERS AND METHODS OF USE

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Unregulated changes in protease activity are linked to many diseases including cancer, infectious, inflammatory and even cardiovascular diseases. The concentration and activity of proteases are precisely regulated *in vivo* and disruption of this homeostasis is linked to a number of pathological disorders, from inflammatory and cardiovascular disease to cancer and neurological abnormalities. The ability to detect changes in protease activity is thus a powerful potential means for diagnosing protease-related diseases, as well as for discovering new drugs against these maladies. We developed accurate and low cost assays for detection of these changes. This invention is a new methodology for simple detection and quantification of protease concentration and activity in different media and can be used for several areas of diagnostic and drug discovery including:

- 1- As a point of care technology, this assay is aimed to low cost, early detection of a number of diseases including infectious, inflammatory, cardiovascular and cancers which are known to involve proteases. Quantification of such proteases in early stages of the disease can be used as the first step towards preventing these diseases to progress to terminal stages.
- 2- The assay can be used to monitor the effectiveness of treatments in individuals throughout the course of therapy without burdening the patients and the healthcare system with costly of diagnostic tests. This is achievable by monitoring the changes in the target protease level in the body during the treatment.
- 3- The assay can also be used in high throughput screening of possible drug candidates in the battle against certain cancers and infectious, inflammatory, and cardiovascular diseases. The low cost of the assay and its one-step process makes it especially promising in drug discovery.