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(54) **METHODS, MICROFLUIDIC DEVICES, AND SYSTEMS FOR DETECTION OF AN ACTIVE ENZYMATIC AGENT**

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(58) **Field of Classification Search**
USPC 435/288.7, 23, 287.3, 287.2; 422/68.1, 422/81, 82; 436/4, 43, 63, 518
See application file for complete search history.

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(57) **ABSTRACT**

Embodiments of the present invention provide methods, microfluidic devices, and systems for the detection of an active target agent in a fluid sample. A substrate molecule is used that contains a sequence which may cleave in the presence of an active target agent. A SNAP25 sequence is described, for example, that may be cleaved in the presence of Botulinum Neurotoxin. The substrate molecule includes a reporter moiety. The substrate molecule is exposed to the sample, and resulting reaction products separated using electrophoretic separation. The elution time of the reporter moiety may be utilized to identify the presence or absence of the active target agent.

15 Claims, 10 Drawing Sheets