Technology offer

CIC biomaGUNE
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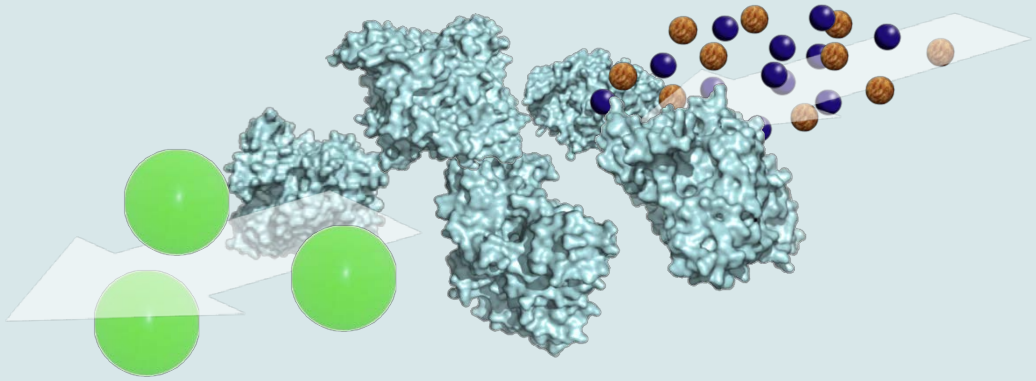
Centro de Investigación Cooperativa en Biomateriales

Hydrolase activity detection & measurement

Enzymatic growth of fluorescent quantum dots

Priority date April 20, 2010

Powerful bioanalytical tool for the detection and quatitation of enzymatic hydrolytic activity based on the formation of fluorescent CdS nanoparticles (quantum dots) from SH_2 or thiol containing organic compouds produced as a result of the enzymatic activity.



Background:

Detection and quantitation of hydrolase activity has great interest in the fields of medicine, food industry and bioassays. Traditional assays for hydrolase activity involve colorimetric detection, too slow for high-throughput applications and insufficiently sensitive in many assays. Electrocatalytic electrode alternatives are too expensive and difficult to implement as to provide a realistic advantage over existing methods. Therefore, a rapid, sensitive and accurate analytical method to determine the enzymatic activity of hydrolases such as alkaline phosphatase and acetylcholine esterase is a long-felt need.

Technology:

The present invention provides a simple and inexpensive method to detect and quatify enzymatic activity of hydrolases that catalyse a hydrolisis reaction of a substrate which yields either H_2S or a thiol-containing organic compound that further reacts with cadmium ions (Cd^{2+}) to form fluorescent CdS quantum dots readily detectable via a fluorescence assay.

Example applications:

Bioanalysis development (ELISA, Western blot, Southern blot); Quality control (Alkaline phosphatase detection in diary industry); Diagnostic and therapy (Alkaline phosphatase detection in whole blood, hepatic function studies, Alzheimer's disease treatment monitoring)

References:

•Garai-Ibabe, G. *et al.* Thiocholine Mediated Stabilization of in Situ Produced CdS Quantum Dots: Application for the Detection of Acetylcholinesterase Activity and Inhibitors. Analyst 2014, 139, 280.

•Saa, L. *et al*. Assays for Methionine Γ-Lyase and S-Adenosyl-L-Homocysteine Hydrolase Based on Enzymatic Formation of CdS Quantum Dots in Situ. Anal. Chem. 2012, 121024150243006.

•Saa, L. *et al*. Analytical Applications of Enzymatic Growth of Quantum Dots. Chem.-Eur. J. 2010, 16, 6187–6192.

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