

Highly Efficient Colorimetric Allergy Detection Based on Hierarchically-structured Nanozymes

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Nanozymes, nanomaterials with enzyme-like characteristics, have recently attracted a significant attention due to their potentials to overcome the intrinsic limitations of natural enzymes, such as low stability in harsh conditions (temperature and pH) and relatively high costs for preparation, purification, and storage. In this study, we report a highly efficient colorimetric allergy detection system by employing hierarchically-structured platinum nanoparticles (H-Pt NPs) as peroxidase mimetics. H-Pt NPs were conjugated to an antibody for detecting immunoglobulin E (IgE) analytes, which are the representative markers to diagnose allergy, and successfully integrated into the conventionally used allergy diagnostics, ImmunoCAP diagnostic test (Phadia, Uppsala, Sweden). Using this strategy, total and specific IgE were detected in a 10 min time period at room temperature with high specificity and sensitivity. The high catalytic activity and stability could allow the H-Pt NPs to replace conventional peroxidase-based immunoassay systems as part of new, rapid, robust, and convenient assay systems which can be widely utilized for the identification of clinically important target molecules.

Clinical utility of fractional exhaled nitric oxide measurement for chronic cough: A meta-analysis

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Background: Chronic cough is a common clinical syndrome affecting 10% of general populations. Cough variant asthma (CVA) and eosinophilic bronchitis (EB) are major conditions for chronic cough hypersensitivity. However, methacholine challenge or induced sputum tests are technically demanding, and not widely available. Fractional exhaled nitric oxide (FeNO) measurement has strengths for simplicity, rapidity and non-invasiveness. **Methods:** We conducted a systematic literature search to identify studies published until January 2016, with following three research questions; “What is the diagnostic accuracy of FeNO 1) for CVA in chronic cough, 2) for ‘CVA and/or EB’ in chronic cough, or 3) for EB in non-asthmatic chronic cough?”. The hierarchical summary ROC (HSROC) model was used to examine the overall diagnostic property of FeNO in each research question. **Results:** A total of 17 studies (2,358 adult patients) were finally selected. First, the HSROC analyses showed a moderated diagnostic accuracy of FeNO in detecting CVA (summary area under the curve [AUC] 0.87 [95% CI 0.84-0.90]). FeNO also had a moderate accuracy (summary AUC 0.89 [95% CI 0.86-0.92]) in detecting ‘CVA and/or EB’. However, FeNO had a relatively lower accuracy (summary AUC 0.81 [95% CI 0.77-0.84]) in detecting EB among non-asthmatic chronic cough. In the HSROC curves, high and consistent specificity of FeNO for CVA was observed. Publication bias was not significant in each analysis. **Conclusions:** FeNO test has overall moderate diagnostic utility for CVA and/or EB in adult patients with chronic cough. However, FeNO has a diagnostic potential to be utilized as a ‘rule in’ test for CVA.