

Silica Particle based nanocomposites for Specific IgE Determination to Betalactams

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Current immunoassays for diagnosing betalactam (BL) allergy have limited sensitivity and poor specificity. These include ImmunoCAP, the commercial immunoassay, and the radioallergosorbent test (RAST), a handmade test performed only in specialized laboratories. Both are based on cellulose polymers modified with covalently attached betalactam-poly-L-lysine conjugates, which are able to interact with specific IgE (sIgE). In RAST, dendrimers have been used instead of poly-L-lysine in the formation of penicilloyl- conjugates, showing specific recognition by penicillin-sIgE.¹

In this work, we propose the use of nanomaterials consisting on silica particles highly functionalized with drug-dendrimer conjugates (including mono- and bi-epitopic structures), as precise and controlled solid phases able to improve the tests' reliability. The homogeneous composition of the nano-composites provides high reproducibility and quality, which is critical for hospital applications, while silica particles possess promising properties as biocompatibility, tuneable size, and functionalisation, and their preparation is affordable and reproducible.²

The use of nano-scaled silica particles improved the results of available immunoassays techniques in terms of sensitivity and specificity, providing the possibility of testing different betalactams, simultaneously.

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