



Allergenicity Testing using Plasmacytoid Dendritic Cells

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An in vitro predictive test system for assessing the allergenicity potential of substances will have utility throughout industry to monitor products for contact allergenicity. Development of such non-animal alternative assay systems for skin sensitization hazard assessment is within the provisions of the European Union chemicals policy known as REACH (Registration, Evaluation, and Authorization of Chemicals). We investigated whether phenotypic and functional changes to subset of dendritic cells (DC), plasmacytoid DC (pDC), could be used to identify allergens. To achieve this goal, normal human DC were generated from CD34+ progenitor cells and cryopreserved. Frozen DC were thawed and the pDC fraction (CD123+/CD11c-) was harvested using FACS sorting. The pDC were cultured, expanded, and pulsed with chemical allergens (n=13) or irritants (n=7). Sub-toxic concentrations of each chemical were determined using FACS analysis of propidium iodide stained cells. Results showed that exposure of pDC (n=2-5 donors) to allergens induced an increased (? 1.5 fold) expression of CD86 for 12 of 13 allergens tested. On the other hand, 7 of 7 non-allergens did not result in increased CD86 expression. Based on these results, a preliminary prediction model was developed to identify chemical allergens (sensitivity = 91-93% and specificity = 93-100%). In conclusion, CD86 expression in pDC appears to be a sensitive and specific predictor of allergenicity of chemicals. When compared with existing animal models, the assay is advantageous because high throughput screening of chemicals using cells of human origin is possible at low cost.

Keywords: Plasmacytoid Dendritic Cells, skin sensitization and allergy, CD86 expression, REACH

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