

PLASMACYTOID DENDRITIC CELLS AS A TOOL FOR TESTING ALLERGENICITY OF CHEMICALS

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A predictive test system for assessing the allergenicity potential of chemicals will have enormous significance in industries involved in cosmetic, personal hygiene and topical medication products and in the fields of dermatology and immunology. Since dendritic cells/Langerhans cells (DC/LC) are the first cells responsible for sampling skin and mucosal surfaces for changes in the antigen microenvironment, we investigated whether phenotypic and functional changes to subset of DC, plasmacytoid dendritic cells (pDC), could be used to identify contact allergens. To achieve this goal, normal human DC were generated from CD34+ progenitor cells and were cryopreserved. Frozen DC were thawed and the pDC fraction (CD123+/CD11c-) was collected using FACS sorting. The pDC were cultured, expanded, and pulsed with chemical allergens (n=12) or irritants (n=7). Sub-toxic concentrations of each chemical was determined using FACS analysis on propidium iodide stained cells. Concentrations that resulted in >75% cell viability were used in the study. Results showed that exposure of pDC (n=6 donors) to allergens induced an increase (= 1.5 fold) in surface expression of CD86 for 11 of the 12 allergens; however, 6 of 7 irritants did not result in increased CD86 expression. Based on these findings, a prediction model was developed with a sensitivity of 92%, specificity of 86%, and an accuracy of 89%. Increased levels of released IL-6 were also detected in culture supernatants of allergen-pulsed pDC (6 of 6) but not from cultures of non-allergen-treated pDC. In conclusion, the use of CD86 expression on 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.

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