Immunology of Environmental Pollution & Chemical Victims

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The investigation on the effect of environmentally relevant level of inorganic arsenic onantigen presenting and T-cell proliferation-inducing capacities of porcine dendritic cells

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Introduction: Arsenic is a chemical element with symbol As. This study aimed to determine the molecular aspects of immuno-toxic impacts of inorganic As on animals' pivotal antigen presenting cells, dendritic cells (DC).Materials and Methods The in vitro effects of environmentally relevant level of NaAsO2 (20ng/ml for 12-24 hr) on porcine monocyte-derived DC (MoDC) functions were evaluated using flow cytometry-based phagocytosis, markers CD80/86 and MHCII and co-stimulatory molecules CD40 and CD25 expression and 3H methylthymidine pulse-labelled MoDCs- CD6+ T-cells co-cultured T-cell polarization, and ELISA-based cytokine secretion profile. Results: A low dose of iAs eventually reduced the phagocytic capacity of MoDC. Furthermore, though the protein expression of MoDC activation markers CD80/86 and MHCII and co-stimulatory molecules CD40 and CD25 only slightly changed, the T-cell polarization-inducing capacity of MoDC was remarkably diminished upon As treatment. Additionally, As induced a significantly higher IL-6 secretion by MoDC upon 12 h and 24 h incubation, while the IL-1 β secretion was only significantly upregulated upon 12 h incubation. Secretion pattern of IL-8, TNFα and IL-10 in As-treated MoDC was almost similar to non-treated MoDC. Conclusion: Data of this study indicated that As can be immunosuppressive. Considering the broad roles of DC in immuno-biology, this finding also opens a new insight to understanding the molecular mechanisms and functional consequences of As in inducing immuno-dysregulation, immuno-toxicity, and thus infectious and non-infectious diseases in animals and humans. Further fundamental studies on the effect of low level of As on immune cells and molecules in animals and humans are in progress. Key words: Environmental arsenic, Cell markers, co-stimulatory molecules, Dendritic cells, Porcine, Immunotoxicity, T-cells