Saadia Kerdine-Römer, J Immunome Res 2017, 13:1 (Suppl)
http://dx.doi.org/10.4172/1745-7580.C1.011

8th Molecular Immunology & Immunogenetics Congress

Protein kinase CK2 controls T cell polarization through dendritic cells activation in response to contact sensitizers

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Statement of the Problem: Allergic contact dermatitis (ACD) represents a severe health problem with increasing worldwide prevalence. It is a T cell-mediated inflammatory skin disease caused by chemicals present in daily or professional environment. Nickel sulfate (NiSO4) and 2, 4-dinitrochlorobenzene (DNCB) are two chemicals involved in ACD. These contact sensitizers are known to induce an up-regulation of phenotypic markers and cytokine secretion in dendritic cells (DCs), professional antigen-presenting cells, leading to the generation of $CD8^+$ Tc1/Tc17 and $CD4^+$ Th1/Th17 effector T cells.

Findings: In the present study, using a peptide array approach, we identify protein kinase CK2 as a new kinase involved in the activation of human monocytes-derived DCs (MoDCs) in response to NiSO4 and DNCB. Inhibition of CK2 activity in MoDCs leads to an altered mature phenotype with lower expression of CD54, PDL-1, CD86 and CD40 in response to NiSO4 or DNCB. We also show that CK2 activity regulates pro-inflammatory cytokine production such as TNF-α, IL-1β and IL-23 in MoDCs. Moreover, using a DC/T cell co-culture model in an allogeneic set-up, our work demonstrate that CK2 activity in MoDCs plays a major role in the Th1 polarization in response to NiSO4 and DNCB. Interestingly, we also demonstrate that CK2 inhibition in MoDCs leads to an enhanced Th2 polarization in the absence of contact sensitizer stimulation.

Conclusion & Significance: CK2 plays: (1) a role in phenotypic maturation and cytokine production in response to $NiSO_4$ and DNCB; and (2) a major role in CD4+ T lymphocytes activation and in the control of Th1 polarization without affecting Th17 polarization.

Biography

Saadia Kerdine-Römer has experience in Immunotoxicology in the field of Skin Allergy. She has been working for many years in the activation of dendritic cells by allergenic molecules. She demonstrated that haptens can be real danger signals. She has worked on the identification of new signaling pathways in immunity cells in response to haptens. Currently, she is working on the transcription factor Nrf2 and its link in the inflammatory response of skin allergic origin.

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