

# Immuno-Algeria 2020: Cellular components of the allergic response



IUIS-FAIS-SAI-AAA Immuno-Algeria course took place remotely between 11<sup>th</sup> May -12<sup>th</sup> June. The theme of this meeting was “Challenge of Allergy in the Molecular Era”. To ensure that all attendees had the immunological knowledge required for advanced content that was going to be discussed during the meeting, weekly immunology refresher lectures were provided during the month of May. This was followed by a 2 week long meeting focused on allergy. This week we highlight talks by Mehrnaz Mesdaghi (Associate Professor at Shahid Beheshti University of Medical Sciences, Iran), Joana Vitte (Associate Professor & Clinician at Aix-Marseille University and Marseille University Hospitals, France) and Sabelo Hadebe (Principal Investigator & Lecturer at the University of Cape Town, South Africa) which focused on cellular immunity during allergy.

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## Innate cellular immunity

A/Prof Mehrnaz Mesdaghi’s talk focused on cellular components of the allergic response, specifically on the role of innate cells. She covered different aspects of allergy starting with the mechanisms of the allergic reaction, the role of mast

cells, basophils and eosinophils during allergy, their origin, expression profiles as well as their subtypes.

Mast cells divided into two subtypes: (1) Connective Tissue and (2) Mucosal mast cells, play a huge role in innate immunity and pro-inflammatory responses and release effector molecules upon activation. Their role in allergic responses, is leveraged in the diagnosis of allergy where their fast-acting properties upon allergen exposure induces a local hypersensitivity reaction which is then used as the readout of the skin prick test.

Part of A/Prof Vitte's talk built on the mast cell introduction given by A/Prof Mesdaghi and focused on Mast Cell Activation Syndromes (MCAS). She described tryptase as an indicator of mast-cell activation in systemic anaphylaxis. Currently, there is only one *in vitro* diagnostic available on the market that measures total serum tryptase. She highlighted the symptoms and the diagnostic algorithm for MCAS and its importance, which were later simplified by European Competence Network on Mastocytosis. She stated that though histamine is one of the molecules most associated with the symptomatology of mast cell activation, it is a very delicate marker to detect *in vitro*. As a result, its use for potential diagnostics was almost completely abandoned and replaced by serum tryptase testing.

A/Prof Mesdaghi's also talked about basophils, the similarities and the differences with tissue mast cells, she highlighted their important role as initiators of chronic allergic inflammation and the fact that they are a major source of IL4. She also gave an example of the basophil activation test of a patient who is allergic to antibiotics. She then described the role of eosinophils, their cytokine and cell surface expression profile and types of granules and degranulation markers. *Did you know that eosinophils can also serve as antigen presenting cells because they present antigen on MHC class II molecules ?*

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## Adaptive cellular immunity

Dr Sabelo Hadebe's talk highlighted the importance of T cell responses in allergy and how each T helper cell phenotype contributes to asthma pathology. He began his talk discussing how the interaction between dendritic cells (DCs) and CD4 T cells leads to the development of T helper 2 (Th2) CD4 T cell responses (*instigators of allergic asthma*). One of the first cells, to be triggered by allergen are the epithelium cells and they are initiators of this allergic response. DCs present antigens to naive CD4 T cells, basophils can also present antigens to T cells and are considered a major source of IL-4. He then described the development of Th2 cells through induction a complex set of transcriptional factors, which commit CD4 T cells to the Th2 lineage. He then described the important role type 2 innate lymphoid cells (ILC2) in asthma. ILC2's in addition to producing IL-4, IL-13 and other Th2 cytokines, they also have the capacity to present allergens to CD4 T cells. He talked about the role of Th17 cells in asthma and presented studies that describe how these cells can also produce IL-4. Further, he highlighted other studies that provide evidence for the contribution of Th1 cells to severe asthma. Currently, many therapeutic antibodies used for asthma therapy target Th2 and Th17 cells.

Dr Hadebe ended his presentation by explaining the function of regulatory T cells in asthma and how they are generated. Early dysfunction of T regs, active tolerance and allergen ignorance are all mechanisms of T regs suppression in asthma.

Recording of speakers talks are available online: [Online Lectures](#)

*Summary by Khaoula Attia*