

Study shows macrophages are actually white blood cells

New Delhi, Dec 09: An Indo-French collaborative work of CNRS (National Centre for Scientific Research) at the Institut de Génétique et de Biologie Moléculaire in Strasbourg (France) and Institute for Stem Cell Science and Regenerative Medicine (DBT-inStem) that was supported by the Indo French Centre for the Promotion of Advanced Research (CEFIPRA) has found that macrophages, the immune system's first line of defence, are actually white blood cells (WBCs), subdivided in distinct populations diverse functions. This research work was covered in Times of India dated Nov 23, 2020.



An analysis of the *Drosophila* hemocytes by single cell RNA sequencing for the first time by a group of Angela Giangrande, Directeur de Recherche CNRS at the Institut de Génétique et de Biologie Moléculaire in Strasbourg (France) had revealed the presence of 13 subpopulations of plasmacytes and one of crystal cells in steady state conditions. The molecular signatures identified subpopulations specialized in the production of antimicrobial molecules, in the immune response to bacterial or viral attacks, or in the production of energy stores. Two populations of lamellocytes appear during inflammatory response too.

The analysis conducted in collaboration with Metabolism and Development (MAD) Lab group led by Tina Mukherjee, Assistant Investigator at inStem, further showed that the hemocytes undergo a metabolic switch during development – from high production of glucose and fatty acid in the embryo to high release of energy in the larva.

This change in the transcriptional landscape likely reflects the change in the environment. The embryo prepares for tissue and organ growth and is a closed system, protected from the

external environment by a rigid membrane, the chorion membrane, so that nothing gets in and nothing goes out.

The larva, on the other hand, feeds and is an open system, thus constantly responds to immune challenges and lives on fermenting fruits that are rich in microorganisms. This is also the stage at which the animals can be attacked by parasitoid wasp that lay eggs which use the *Drosophila* larva as nourishment.

Thus, the novel high throughput technologies allow the analysis of the macrophages at unprecedented resolution and identify new genes, new cell subpopulations, and new developmental states. This Indo-French collaborative work supported by the CEFIPRA grant sets the foundation to study macrophage heterogeneity. In the long term, these data will foster new studies on the role of the environment on macrophage biology, on the intrinsic factors that drive their heterogeneity and on the impact of specific macrophage populations in homeostasis as well as in pathology.

The researchers have shared the news on our social media platforms as well.

Link to the news coverage is [here](#).

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