

Macrophages in the spotlight

Alireza Heidari*

Department of Chemistry, American International Standards Institute, United States

*Corresponding author: Alireza Heidari, Department of Chemistry, American International Standards Institute, United States; E- alireza.heidari@calu.edu

Received: May 7, 2020; Accepted: May 21, 2020; Published: May 28, 2020

Copyright: © 2021 Heidari A. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Editorial Note

Macrophages are immune system cells that play an important role in the protection of the host. Infection-related killing processes and the accumulation of weakened or dead cells are examples of killing processes. Macrophages are large, specialised cells that recognise, engulf, and destroy target cells. The term macrophage is derived from the Greek terms "makro" which means "big" and "phagein" which means to feed. In addition to enhancing inflammation and stimulating the immune system, macrophages also have an antiinflammatory role and may reduce immune reactions through cytokine release. M1 macrophages are those that promote inflammation, while M2 macrophages reduce inflammation and promote tissue repair.

Macrophages are formed by the division of monocytes, one of the main classes of white blood cells in the immune system. When tissue damage or infection occurs, monocytes leave the bloodstream and reach the infected tissue or organ, where they undergo a series of changes to become macrophages. These macrophages can alter their structures in order to combat various microbes and invaders. In this way, macrophages function as the first line of defence against infection in the host. Macrophages have been shown to populate organs by multiplying in specific areas, such as the testis. Each macrophage has its own protein markers on the cell surface.

The phagocytosis of bacteria, viruses, and other foreign particles is the most important characteristic of macrophages. Fc receptors on the cell surfaces of macrophages interact with the Fc component of IgG, allowing opsonized species to be absorbed more easily. Fixed macrophages that remain in strategic locations such as the lungs, liver, neural tissue, bone, spleen, and connective tissue, ingesting foreign

materials such as bacteria and, if possible, recruiting additional macrophages, eliminate dying cells to a greater extent. Antigen presented on the surface of infected macrophages in the lymph node promotes TH1 proliferation mainly due to IL-12 secretion from the macrophage.

If a B- cell in the lymph node recognises the same unprocessed surface antigen on the bacterium with its surface attached antibody, the antigen is endocytosed and processed. Macrophages function as Antigen-Presenting Cells (APCs) that activate T lymphocytes. This role is critical in the effector phase of T cell-mediated immune responses. After ingestion and degradation of foreign materials, antigen fragments are expressed on the macrophage cell surface in combination with class II MHC proteins for interaction with the TCR of CD4+ helper T cells. Macrophages aid tissue repair by inducing the formation of new blood vessels and the synthesis of collagen-rich extracellular matrix. These functions are regulated by macrophage-secreted cytokines, which act on various tissue cells.

Fixed macrophages, which will remain in strategic locations such as the lungs, liver, neural tissue, bone, spleen, and connective tissue, ingesting foreign materials such as pathogens and recruiting additional macrophages if required, handle the removal of dying cells to a greater extent. Macrophages are another line of protection against tumour cells and somatic cells that have been infected with infection or parasites. Once a T cell recognises its antigen on an aberrant cell's surface, it becomes an activated effector cell, releasing chemical mediators called lymphokines that induce macrophages to become more violent.