

Difference Between Macrophages and Dendritic Cells

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Key Difference – Macrophages vs Dendritic Cells

[Lymphocytes](#) and [phagocytes](#) are two main types of immune cells. A phagocyte is a type of cell which is capable of engulfing and absorbing [bacteria](#), other foreign cells, and infectious particles. There are two types of phagocytes: professional or non-professional phagocytes. The professional phagocytes are [neutrophils](#), [monocytes](#), [macrophages](#), dendritic cells, and [mast cells](#). A macrophage is a type of [white blood cell](#) that engulfs and digests foreign cells, unwanted cell materials and debris which should not be present in a healthy body. They are the big eaters in the [immune system](#). A dendritic cell is a type of [antigen](#) presenting white blood cell. They act as messengers between [innate and adaptive immune system](#). The key difference between macrophages and dendritic cells is their functions; **the main functions of the macrophages is to clean up waste and remove pathogens while the main function of dendritic cells is to process antigen material and present it on the cell surface to the [T cells](#) of the immune system.** Dendritic cells recognize pathogens and present them to other cells to kill. Macrophages kill them and then present their peptide to other cells for further help.

What are Macrophages?

Macrophage is a large phagocytic cell found in the immune system. They stay in their stationary form in the tissues or as mobile white blood cells at sites of infection. In Greek, macrophages mean “big eaters”. Macrophages engulf and digest cellular debris, foreign substances, pathogens, cancer cells, and anything which does not belong to the body. This process is called [phagocytosis](#). They eat cell debris and pathogens, behaving like an amoeba. Macrophages use phagocytosis process to get rid of foreign particles. They engulf the foreign particle by forming a pocket like structure called phagosome around them. Lysosomes release digestive enzymes to the phagosome. These enzymes digest and destroy the pathogens and cell debris. Therefore, macrophages are the main components of the immune system which recycle dead cells and other cellular debris. Macrophages are considered as the main components in the cell clean-up process.



Figure 01: Macrophage

Macrophages are formed from monocytes which are produced from the stem cells of bone marrows. They circulate through the blood stream and leave the blood after becoming mature.

What are Dendritic Cells?

Dendritic cells are a type of white blood cells which are popular as antigen presenting cells. They play an important role in the adaptive immune system. Dendritic cells are capable of inducing a [primary immune response](#) in the inactive or resting naive T lymphocytes against the pathogens. They recognize and capture antigens of the invading bodies and then process and present them on the cell surface along with the other necessary molecules. Dendritic cells also help [B cells](#) to function and maintain their immune memory.

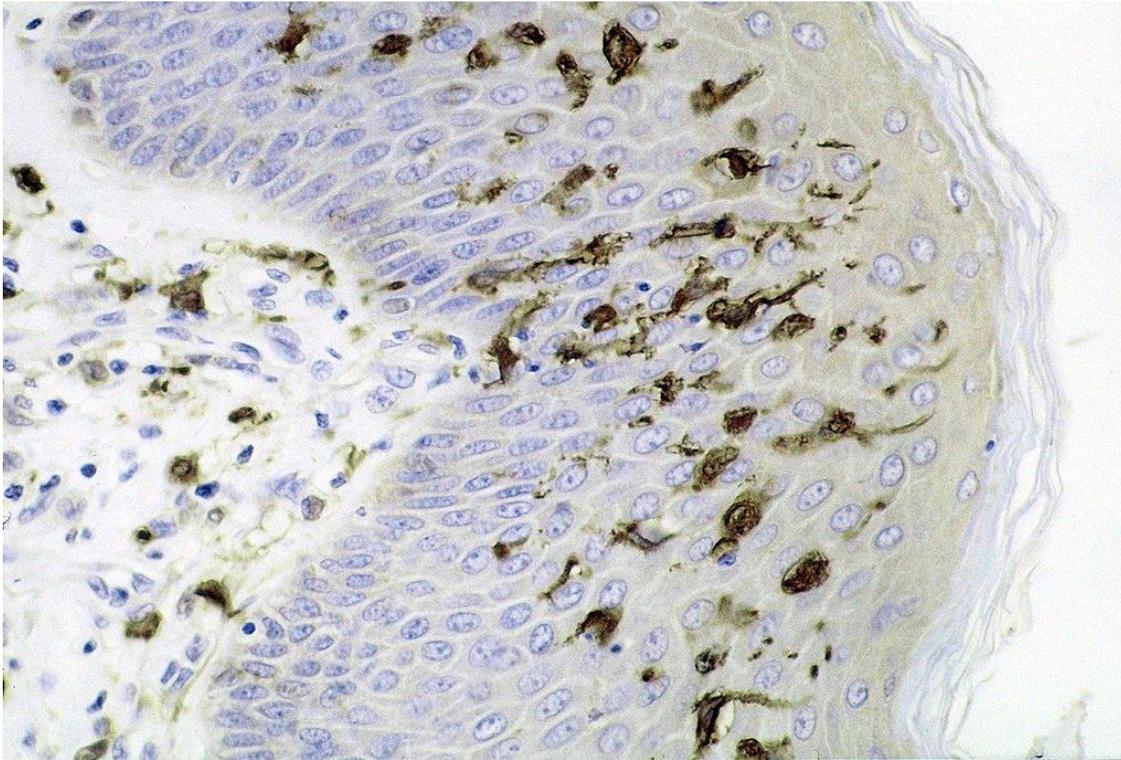


Figure 02: Dendritic cell in the skin

Dendritic cells were first discovered by Ralph Steinman in 1970. They are found in tissues which are in contact with the external environment such as skin, nose lining, lungs, stomach, intestine, etc. These cells have branched projections called [dendrites](#). Hence the name is given as dendritic cells.

What are the similarities between Macrophages and Dendritic Cells?

- Macrophages and dendritic cells are white blood cells
- Both cell types are phagocytes which engulf pathogens and cell debris.

What is the difference between Macrophages and Dendritic Cells?

Macrophages vs Dendritic Cells

Macrophages are a type of white blood cells that cleanse the body from unwanted microscopic particles such as bacteria and dead cells.

Dendritic cells are a type of antigen presenting white blood cells.

Main Function

The main function of the macrophage is to clean the body from cell debris and kill pathogens.

The main function of the dendritic cells is to process antigen material and present it on the cell surface to the T cells of the immune

system.

Size

Macrophages are bigger than dendritic cells.

Dendritic cells are smaller than macrophages.

Projections

Macrophages do not have dendrites.

Dendritic cells possess dendrites.

Summary – Macrophages vs Dendritic Cells

Macrophages and dendritic cells are two types of white blood cells as well as phagocytes. Macrophages and dendritic cells differ in morphology and function. Macrophages are known as big eaters in the immune system since they are the main immune cells which eat pathogens and cell debris and clean the body. Dendritic cells are the antigen presenting immune cells. This is the difference between macrophages and dendritic cells.

References:

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