



## Mast cells and their importance for the immune system

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Cite this study: Canatar, C., & Ayaz, F. (2022). Mast cells and their importance for the immune system. 4<sup>th</sup> Advanced Engineering Days, 18-19

### Keywords

Mast cells  
Mediators  
Immunity

### Abstract

Mast cells, which originate from bone marrow tissue, have some important functions and can be located in areas such as respiratory epithelium, gastrointestinal tract, and skin. They play essential roles in many different events such as tissue repair, innate and adaptive immunity, and allergic reactions. Mast cells, which release various mediators as a result of exposure to different stimuli, can take part in both some pathological and some physiological processes thanks to these mediators. Among these mediators, which have some important effects and duties; histamine, some cytokines, leukotrienes, some proteoglycans, prostaglandins, platelet activating factor (PAF) and some neutral proteases. In this review study we will focus on the mast cells and their functions.

### Introduction

Mast cells, originating from bone marrow tissue; they are cells that can be located in areas such as respiratory epithelium, gastrointestinal tract, and skin [1-3]. The density and number of granules in the cytoplasm of mast cells, which can have different sizes, are an effective factor on the difference in the size of these cells [4].

Stem cell factor (SCF), which is of great importance for mast cells; It is accepted as a necessary factor in the proliferation and maturation, survival, migration and differentiation of mast cells [3,5,6].

Mast cells with many functions; They are very important cells that can play a role in some allergic reactions, some inflammation events, both innate and adaptive immunity (depending on the body's needs), healing of wounds, angiogenesis, parasitic and bacterial infections, coagulation process, pathophysiology of some diseases, and tissue repair [1,3,7,8]. These cells can recruit immune system cells to the infection site [9].

### Results

Many mediators are released as a result of exposure of mast cells to different stimuli. Some microorganisms such as allergens or parasites and bacteria can be given as examples of the stimuli mentioned. Thanks to the released mediators, mast cells are involved in both some pathological and some physiological processes [2,3]. While some neuropeptides and cytokines may play a role in the activation of mast cells, this activation may also occur as a result of binding of IgE antibody and specific receptors on mast cells. The synthesis of IgE antibody occurs as a result of exposure to certain antigens by plasma cells [2,4]. Some chemicals, anaphylatoxins (C3a and C5a), some hormones, radiation and some toxins may also play a role in stimulating mast cells. In other words, activation of mast cells can be made possible by some stimuli (chemical, physical or biological) [3].

## Discussion

Examples of mast cell mediators are histamine, some cytokines, leukotrienes, some proteoglycans, prostaglandins, platelet activating factor (PAF) and some neutral proteases. In addition, these mediators have some important effects and duties. Histamine, which is considered a very important mediator; It can play roles in neurogenic vasodilation, both innate and adaptive immunity [2,10]. Some neutral proteases, which are among the mast cell mediators, are known to be involved in tissue repair. Leukotrienes and prostaglandins (released shortly after the stimulation of the mast cells), which are considered lipid mediators, play a role in increasing vascular permeability. In addition to this, leukotrienes have a role in stimulating bronchospasm. The mast cell mediator called platelet activating factor (PAF) is involved in the aggregation of platelets [2,3]. Some proteoglycans, which are among mast cell mediators, play a role in inhibiting some chemokines, and these mediators also have anticoagulant effects [2].

Mast cells may be involved in the development of allergic inflammation. This occurs with some cytokines released by mast cells out of the cell [11]. In addition, various cytokines can take part in both host defense and regulation of the immune system, and the source of some cytokines involved in this context is known as mast cells [9].

Mast cells can also play an active role in acquired immunity through some mediators [2,3]. Mast cells can be the focus of attention in immunotherapeutic approaches, thanks to some of their powerful and important functions to modulate the immune system activities [12,13].

## Conclusion

Mast cells are functional in the innate and adaptive branches of the immune system. They are involved in reactions that primarily create the allergies. But they are also found in tumor tissues and their role as anti or pro tumor cell types depends on the mediators that they secrete to the region. Due to their immunomodulatory potential via cytokine, chemokine and other mediator secretion they have been considered as immunotherapy target agents as well. More studies should be conducted to fully decipher their activities and to take advantage of these cells for immunotherapy as well as to develop treatment methods against allergic reactions [1,12,13].

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