

## THYMOSINE, A T CELL MODULATOR IN COVID-19

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Received: 07 Oct 2025, Revised and Accepted: 26 Nov 2025

### ABSTRACT

The pandemic of Coronavirus Disease (COVID-19) has resulted in millions of deaths worldwide, and many big cities worldwide were under lockdown to contain the infection. Though the effectiveness of vaccines varies, people were getting infected with the Virus; however, the severity of clinical manifestations was variable. Many drugs used in the treatment of COVID-19 were being redirected from their original use and were used in COVID-19. Thymosine is involved in amplifying T cell maturation and enhances the specificity. Thymosine could potentiate the T cell response and naturally resist infections, and could help to contain infections

**Keywords:** COVID-19, Thymosine, T Cell, Lymphopenia, T cell polymorphism

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### INTRODUCTION

The pandemic of Coronavirus Disease (COVID-19) has resulted in millions of deaths worldwide, and many big cities worldwide were under lockdown to contain the infection. It's been more than 5 years since the first case was reported in Wuhan Province of the Republic of China [1]. Recently, there has been an upsurge in COVID-19 cases worldwide. Though the effectiveness of vaccines varies, people were getting infected with the Virus; however, the severity of clinical manifestations was variable. Many drugs were used in the treatment of COVID-19, including antibiotics like azithromycin and doxycycline, antivirals such as Remdesivir, along with corticosteroids [2]. These drugs were being redirected from their original use and were used in COVID-19.

Remdesivir, primarily used for treating RNA viruses, did show promising results during the earlier SARS and MERS pandemics caused by the same coronavirus [3]. Benefits were limited to cases with early presentation, where the drug is assumed to inhibit viral replication, integration into cells, and utilisation of the host machinery. The problem with the immune system in COVID-19 is that innate immunity fails to remove the virus due to faulty interferons and dysregulation of T cells [4, 5].

The inability of T cells to act, due to invasion of the cellular machinery, which leads to T cells being unable to detect the cells as foreign antigens, similar to what happens in cancerous cells in the organism. After evading immune surveillance, the tumour cells grow and metastasize, just as the COVID-19 virus [6]. Spontaneous resolution has been documented in some cancers, including renal cell carcinoma, Hodgkin's lymphoma, and multiple myeloma [7]. Their spontaneous resolution is attributed to T cell modulation and their regained ability to recognise tumour cells as foreign, leading to the subsequent destruction of these cells [8].

Thymosine is a hormone derived from the thymus gland, which undergoes a size reduction and is only present in rudimentary form in adults. The development of T cells and B cells occurs in haematopoietic cells, and further maturation requires the thymus and bone marrow, respectively, for them to reach maturity and effectively combat infections. Thymosine is a 38 kDa peptide hormone that is regularly synthesized by the thymus. Its concentration diminishes with age in the blood. It is involved in amplifying T cell maturation and enhances the specificity [9]. Therefore, the use of these agents could potentiate the T cell response and naturally resist infections. Moreover, it will increase

the lymphocyte count and contribute to immune strength, as lymphopenia is a common finding in COVID-19 and is associated with severe infection [10, 11].

Many COVID-19 patients experience mild symptoms or no symptoms at all, while a few develop moderate to severe illness. In a family, one person may suffer from severe disease, whereas others are asymptomatic but still test positive for COVID-19 via RT-PCR. The variability in disease expression is attributed to T cell function. Numerous T cell polymorphisms are known and may contribute to the differing immune responses. Therefore, enhancing T cell activity through Thymosine might help develop a sufficient immune response to the invading pathogen and contain the infection [12].

The safety concern regarding the use of Thymosine may arise; however, these hormones do not cause any significant side effects. The serum Thymosine level correlates with the size of the Thymus, and a high level of Thymosine induces negative feedback inhibition on the Thymus gland, further reducing its size. Therefore, it can be safely used as an immune modulator to combat COVID-19 infection naturally.

### CONCLUSION

Thymosine can be used as an immune booster to fight COVID-19 infection

### ETHICAL CONSIDERATION

Research was carried out according to the Declaration of Helsinki

### FUNDING

Nil

### AUTHORS CONTRIBUTIONS

All authors have contributed equally

### CONFLICT OF INTERESTS

Declared none

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