

# Vitamin A: Why is it Integral to Immune Function?



## Immunomodulatory effects of vitamin A<sup>1</sup>

### Role of vitamin A

#### Innate immunity



- Increases the mechanistic defense
- Enhances mucin secretion to support antigen non-specific immune functions
- Regulates differentiation and function of macrophages, neutrophils, dendritic cells, and NK cells

#### Adaptive immunity



- Induces T-cell migration toward the area of inflammation
- Regulates T-cell function
- Promotes T<sub>reg</sub> cell differentiation
- Plays a role in immunoglobulin production
- Regulates B-Cell activity

## Burden of vitamin A deficiency (VAD)

### VAD in children:<sup>2</sup>



A severe health problem in 122 countries



190 million children under five years of age have VAD.



Common in low- and middle-income countries

### Adverse health outcomes of VAD:<sup>1,2</sup>



Impairs body functions



Xerophthalmia (dry eyes)



Susceptibility to infection: Diarrhea, RTI, measles, malaria



Stunting



Anemia



May cause death

## Clinical evidence on the efficacy of vitamin A in children<sup>3</sup>

### Disease

### Therapeutic effect of vitamin A



Measles

- Reduces morbidity and mortality



Acute pneumonia

- Relieves clinical symptoms and signs
- Promotes the production of antibodies



Diarrhea

- Reduces morbidity and mortality
- Promotes the production of IgA in the intestinal tract
- Enhances the mucosal immune function



Enteric infection

- Reduces morbidity and mortality



Malaria

- Reduces morbidity



Hand, foot, and mouth disease

- Promotes immunoglobulin production
- Enhances antiviral function

## Key takeaways

- Vitamin A plays a key role in regulating several functions of innate and adaptive immunity.
- Vitamin A deficiency is a major health problem in many countries and may result in adverse health outcomes.
- Clinical evidence suggests that vitamin A can help prevent morbidity and mortality in children.

**Abbreviations:** IgA: Immunoglobulin A; NK cells: Natural killer cells; RTI: Respiratory tract infection; VAD: Vitamin A deficiency

### References

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- Imdad A et al., Cochrane Database Syst Rev. 2022 Mar 16;3(3):CD008524.
- Huang Z et al., J Clin Med. 2018 Sep 6;7(9):258.