

# The role of vitamin D deficiency in antituberculous protection

L.D. Todoriko<sup>1</sup>, Ya.I. Toderika<sup>1</sup>, O.S. Shevchenko<sup>2</sup>, O.V. Pidverbetska<sup>1</sup>, O.Ya. Pidverbetskyi<sup>1</sup>

1. Bukovinian State Medical University, Chernivtsi, Ukraine

2. Kharkiv National Medical University, Kharkiv, Ukraine

**Conflict of interest:** none

**BACKGROUND.** The main task of modern phthysiology is a comprehensive search for ways to optimize the etiotropic and the pathogenetic treatment of tuberculosis (TB). The search for improved treatment in addition to etiotropic antimicrobial therapy lies in the plane of improving pathogenetic therapy. Analysis of the available scientific sources suggests that the efficacy of TB treatment can be improved by adding vitamin D to the pathogenetic treatment, as vitamin D metabolites support the innate immune response to *Mycobacterium tuberculosis*.

**OBJECTIVE.** To determine the role of vitamin D in the immunopathogenesis of the inflammatory response in pulmonary TB and to assess the prospects of its impact on improving the effectiveness of treatment by analyzing information from available scientific sources on this topic.

**MATERIALS AND METHODS.** The study was performed for the period December 2020 – August 2021. The search was conducted by keywords: pulmonary tuberculosis, vitamin D, mechanism of action, pathogenesis, treatment. Access to various full-text and abstract databases was used as the main source of research.

**RESULTS AND DISCUSSION.** A large number of studies conducted so far prove the link between vitamin D deficiency and the occurrence of pulmonary TB. Vitamin D receptors have been found to be present on various surfaces of immune cells, including T and B cells, indicating that they need vitamin D to perform cellular functions. Vitamin D has been shown to increase the phagocytic activity of macrophages, and that monocytes incubated with cholecalciferol (vitamin D<sub>3</sub>) metabolites induce anti-TB activity. A number of studies have shown that vitamin D increases the body's production of the antimicrobial/antimycobacterial peptide LL-37, a member of the cathelicidin peptide family.

Therefore, the narrowly analyzed analysis according to the literature suggests that in the conditions of full vitamin D status of the human body the course of TB will be favorable, and in case of vitamin D deficiency – which is primarily associated with genetic polymorphisms, the course of TB may be unfavorable.

**CONCLUSIONS.** Vitamin D functionates as one of the activators of macrophages and plays a role in the immune defense of the human body against mycobacterial TB. The inclusion of vitamin D in the program of complex treatment of TB infection is promising, as it enhances the production of antimicrobial/antimycobacterial peptide LL-37. It can be used as one of the components of TB prevention in children.

**KEY WORDS:** vitamin D, tuberculosis, pathogenesis, inflammation, treatment.