

**EVALUATION OF THE EFFECTIVENESS OF THE PEPTIDE COMPOSITION OF
THE CALIFORNIAN WORM EXTRACT ON THE IMMUNE SYSTEM**

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Annotation: Modern biotechnology is actively exploring natural biologically active compounds, such as peptides, to develop effective means of strengthening the immune system. One promising source of such compounds is the extract of the Californian worm (*Lumbricus rubellus*), which has a unique composition of peptides. This article discusses the main methods for assessing its effect on the immune system, including in vitro and in vivo studies.

Keywords: Californian worm extract, peptides, immune system, immunomodulation, cytokines. In this version, the text became more natural, but at the same time retained scientific accuracy. If you need to change something else - style, level of formality or structure - tell me, and I will help to improve it.

Introduction

The immune system plays a key role in protecting the body from pathogens, tumor cells and toxins. One of the pressing challenges of modern medicine is the search for natural immunomodulators that are highly effective and have minimal risk of side effects. Californian worm extract, which contains biologically active peptides, is a promising candidate for study due to its antioxidant, anti-inflammatory and regenerative properties.

Materials and methods

1. Preparation of the peptide composition

The Californian worm extract is obtained by water-alcohol extraction followed by purification using ultrafiltration. High-performance liquid chromatography (HPLC) is used to separate the peptide fractions.

2. In vitro studies

The following methods were used to evaluate the effect of the extract on immune cells:

Cell lines: macrophages (RAW 264.7), T and B lymphocytes, and spleen cells.

Methods of analysis:

Cell proliferation was determined using the MTT test.

Cytokine production – IL-6, IL-1 β and TNF- α levels were measured by enzyme-linked immunosorbent assay (ELISA).

Phagocytic activity was assessed by the absorption of latex microparticles or bacterial antigens.

3. In vivo studies

Experiments were conducted on laboratory mice and rats to evaluate the immunomodulatory properties of the extract.

Key indicators:

Changes in the mass of immune organs (thymus, spleen). The number of T- and B-lymphocytes in the peripheral blood (flow cytometry method). Models of immunosuppression: Cyclophosphamide was used to model immune suppression. Restoration of immune functions served as a criterion for the effectiveness of peptides.

Results and discussion

The results of the studies showed that the peptide extract of the Californian worm has a pronounced immunomodulatory activity: Stimulates the proliferation of immunocompetent cells, especially T-lymphocytes. Enhances the production of anti-inflammatory cytokines, such as IFN- γ . Activates the phagocytic activity of macrophages, which confirms its modulating effect. In animal studies, an increase in the mass of the thymus and spleen was observed, indicating an increase in the immune response. Thus, the data obtained indicate the prospects of using the Californian worm extract as a natural immunomodulator.

Conclusion

The peptide composition of the Californian worm extract has significant potential as an immunomodulatory agent. Further studies, including clinical trials, are needed to clarify the optimal dosage and assess the safety of its use in humans.

Sources used:

1. Levinskaya, A. A., Kuznetsov, I. V. "Peptides as Promising Biologically Active Substances." *Biotechnology*, 2020, No. 5, pp. 23-31.
2. Li, X., Liu, S., Fang, Q., et al. "Immunomodulatory effects of peptides derived from earthworm extract on macrophages." *Journal of Ethnopharmacology*, 2019, Vol. 236, pp. 205-212.
3. Kuzmin, N. S., Ivanova, E. P. "Immunomodulatory properties of natural compounds." *Medical Immunology*, 2021, Vol. 23, No. 2, pp. 103-112.