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USING PARASITES FOR TREATMENT OF HUMAN DISEASES. HELMINTHIC THERAPY

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Relevance. Helminths are highly successful pathogens, chronically infecting world's larger population which cause significant diseases. Conditions such as Crohn's disease, ulcerative colitis, multiple sclerosis, allergic asthma, rheumatoid arthritis and diabetes once considered rare, now affect tens of millions of individuals globally. Epidemiological studies in humans have shown that infection with helminth parasites is associated with a low incidence of allergy, asthma and autoimmunity in developing countries. Therapeutic strategies for these chronic inflammatory conditions stay largely insufficient. Standard treatments, including corticosteroids, immunomodulators, and biologic agents such as anti-tumor necrosis factor antibodies, rely on broad immunosuppression. But they are associated with significant limitations: increased risk of serious infections and malignancies, prohibitively high costs, primary non-response in a substantial subset of patients, and eventual loss of efficacy over time.Helminthic therapy, an experimental type of immunotherapy, has been suggested as a possible treatment method for autoimmune and other inflammatory disorders in humans. This could provide a new treatment pathway for patients who have not been helped by existing treatments, provide long-term disease control with a limited number of doses, and potentially prove more cost-effective than biological therapy.

Aim: study helminthic parasites and estimate the potential of helminthic therapy as a safe and effective treatment for autoimmune diseases.

Results and their discussion. Research has shown that helminthic parasites have the ability to cure certain disorders through the use of the parasite itself, its molecules, or even its eggs. Inflammatory bowel disease (IBD) is a chronic, globally-occurring gastrointestinal disorder and a major cause of illness.Several studies in animals have demonstrate that intestinal helminth infections are able to inhibit the development of intestinal inflammation. For clinical studies of helminth therapy in humans used the pig whipworm *Trichuris suis* and the human hookworm *Necator americanus*. Treatment consists of drinking a solution of embryonated *T.suis* eggs and applying to the skin larvae of *Necator americanus*. The eggs hatch in the intestine, but they cannot complete their life cycle. They reside in the large intestine. Larvae of the *N.americanus* are applied to the skin, enter the bloodstream. They migrate to the lungs, finally they mature into adult worms in the small intestine. *T.suis* infection promotes the expansion of regulatory T cells in the intestinal tissues. Regulatory T cells in the intestinal tissues produce anti-inflammatory molecules, which suppress the activity of inflammatory immune cells that drive IBD. Another autoimmune disease is Type Idiabetes in which the immune system mistakenly attacks and destroys the insulin-producing beta cells in the pancreas. Treatment consist of *Schistosoma mansoni and Trichuris suis* infection, significantly reduces the incidence of diabetes. They increase production of anti-inflammatory cytokines and infiltration of inflammatory cells into the pancreas. Another disease of young adults is multiple sclerosis - common neurological inflammation. Possibility of treating multiple sclerosis with live helminths or helminth products has been explored in animals. Helminth therapy appears safe and preliminary clinical, magnetic resonance imaging and immunological outcomes have generally been favorable.

Conclusions. Helminthic therapy uses harmless parasitic worms to treat autoimmune diseases such as inflammatory bowel disease, multiple sclerosis, and diabetes. Helminths create regulator cells, change the balance and release helpful molecules to stop harmful inflammation.