

Conserved candidate antigens and nanoparticles to develop vaccine against giardia intestinalis

ABSTRACT

Giardia intestinalis (*Giardia lamblia*, *Giardia duodenalis*) infections in humans may be asymptomatic or symptomatic and associated with diarrhea (without blood), abdominal cramps, bloating, flatulence, and weight loss. The protozoan *Giardia* is the third most common cause of diarrhea and death in children under five, preceded only by rotavirus and by *Cryptosporidium parvum* and *C. hominis* infections. Antimicrobial drugs, particularly 5-nitroimidazole (5-NIs), are used to treat giardiasis in humans. Immunologically naive or immunocompromised host are more vulnerable to *Giardia* infection, whereas a degree of resistance to this protozoan is present in humans living in endemic areas. This suggests that vaccination may be a potential and appropriate means to control this parasitic disease outbreak and protect the human population. This review discusses *Giardia* antigens related to vaccine development. Additionally, based on the latest development of nanoparticle technology, a combination of methods for future research and development is proposed for the design of the next generation of powerful immunogens and an effective vaccine against *Giardia*.