Vaccines and Therapeutics for Schistosomiasis

BACKGROUND: Schistosomiasis (also called bilharzia or snail fever) is a human disease caused by infection with one of several forms of the Schistosoma parasite. The disease is endemic to more than 70 countries, including many in Africa, South America, the Caribbean, the Middle East, and Asia (China and Japan). More than 200 million people are actively infected. Of those, 120 million are symptomatic and 20 million have severe disease. Schistosomiasis is particularly problematic for individuals co-infected with HIV, hepatitis or malaria. If left untreated, chronic Schistosomiasis kills up to 25% of individuals infected with this parasite.

There are no licensed vaccines for the prevention of Schistosoma infection, and the parasites can develop resistance to Praziquantel, the only effective drug.

What we need are new vaccines and therapeutics for the prevention and treatment of Schistosomiasis.

THE TECHNOLOGY: Discoveries at Trudeau Institute have resulted in a filed patent application that describes a new target for Schistosoma vaccines and therapeutics, SmNACE.

The most effective strategy for preventing Schistosomiasis may be to target the outer surface, or tegument, of the Schistosoma parasite. The tegument protects the parasites from destruction by the human immune system and reduces the parasites’ susceptibility to drugs targeting internal enzymes.

Trudeau Institute researchers discovered, cloned and expressed SmNACE, an enzyme present in the tegument of Schistosoma parasites. SmNACE is a homolog of mammalian CD38, an enzyme that metabolizes nucleotides. The Trudeau Institute researchers demonstrated SmNACE also metabolizes nucleotides.

Since CD38 regulates the immune system by metabolizing nucleotides, and since SmNACE also metabolizes nucleotides, SmNACE likely helps Schistosoma parasites persist in mammals by interfering with their hosts’ immune systems. The available data suggest inhibitors of SmNACE may be useful treatments for Schistosomiasis, and SmNACE itself may be a useful antigen for Schistosomiasis vaccines.

APPLICATIONS:
- Provides a new therapeutic target for the prevention and treatment of Schistosomiasis
- Provides a new candidate antigen for Schistosomiasis vaccines

BUSINESS OPPORTUNITY: Trudeau Institute is seeking partners to assist in the further development of this novel discovery. Partnership opportunities exist in the form of licensing and/or sponsored research.

PATENTS:
- Title: CD38 modulated chemotaxis. US patents: some claims allowed and awaiting issue, other claims pending. Issued patents in Japan (2002-535531) and Australia (20072213318).

PUBLISHED LITERATURE:
- Biochemistry, 2005, 44:11082-11097. Production of calcium-mobilizing metabolites by a novel member of the ADP-ribose cyclase family expressed in Schistosoma mansoni.

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HISTORY: The Trudeau Institute was founded in 1884 as a tuberculosis treatment and research facility. In 1964, the Institute was rededicated as an independent, nonprofit, biomedical research organization.

TODAY: The Trudeau Institute is a world-renowned leader in the effort to better understand the immune system for the purpose of preventing and treating human diseases. Our expertise and enthusiasm for modeling infection, immunity, vaccination, inflammation and sepsis have led to many pioneering discoveries. Mouse models currently studied at the Institute include influenza, parainfluenza, influenza-associated bacterial pneumonia, bacterial sepsis, pneumonic plague, tuberculosis, toxoplasmosis, schistosomiasis, and chronic herpesvirus infection. Our scientists are available for sponsored research, grant partnering and consulting.

MISSION: To make breakthrough discoveries that lead to improved human health.

FOCUS: Eradication of infectious and inflammatory disease through research aimed at the development of vaccines and immune-based therapeutics.

STAFF: Approximately 135 employees, including 12 Principal Investigators and 38 PhDs. The Scientist magazine consistently rates Trudeau Institute among the "Best Places to Work" for scientists and postdoctoral fellows.

FACILITIES: 42 acres in Saranac Lake, New York. 90,000 square feet of research and support space, including newly expanded BSL3 and ABSL3 facilities, and core facilities for animal breeding, imaging, and flow cytometry.

FINANCING: The Trudeau Institute is a nonprofit 501(c)(3) organization. The Institute’s $17M budget for 2009 was supported by federal grants (78%), donations from individuals and foundations (10%), and endowment funds (11%).