

Human hookworm vaccine, a vaccine to prevent intestinal blood loss and transmission caused by the hookworm *Necator americanus*

Coreen M. Beaumier, Jeffrey Bethony, Alex Loukas, Marva Loblack, David Diemert, Maria Elena Bottazzi and Peter J. Hotez
Sabin Vaccine Institute and Texas Children's Center for Vaccine Development, USA

Hookworm is one of the more important parasitic infections and is estimated to infect approximately 576-740 million individuals, primarily in Southeast Asia, Latin America, and sub-Saharan Africa. The intestinal blood loss due to hookworm infection can lead to iron deficiency anemia and is estimated to result in the loss of 22 million DALYs per year. Chemotherapy is insufficient to control hookworm infection, therefore the need for a hookworm vaccine. The target product profile of Sabin Vaccine Institute PDP's Human Hookworm Vaccine is a bivalent recombinant protein vaccine for the prevention of moderate to heavy hookworm infection. Currently two vaccine candidate antigens are in clinical development: the *Necator americanus* glutathione S-transferase (Na-GST-1) and *Necator americanus* aspartic protease (Na-APR-1). The former has been expressed in *Pichia pastoris* and the latter in a tobacco plant expression system, *Nicotiana benthamiana*. Both are formulated with Alhydrogel® and will be tested with the immunostimulant Gluco-Pyranosylphospho-Lipid A Aqueous Formulation (GLA-AF). Na-GST-1 and Na-APR-1 have shown promising efficacy in animal models of hookworm infection. The Na-GST-1 vaccine is currently in Phase I trials in adults in Brazil and the USA. The Na-APR-1 vaccine will enter Phase I trials later this year. Both vaccines will then undergo age de-escalation studies into pediatric populations resident in hookworm endemic areas of Brazil. Our goal is to co-formulate these two antigens into a bivalent vaccine co-administered with the immunostimulant GLA in Phase II trials in hookworm endemic areas of Brazil to determine the biological effect of the vaccine on infection.

Biography

Dr. Coreen Beaumier completed her Ph.D. in Immunology/Virology at the University of Massachusetts Medical School with postdoctoral studies following at the National Institutes of Health (NIH). Following her time at NIH, she went to the Walter Reed Army Institute of Research as a scientist and subsequently became the Chief of Immunology in the Division of Viral Diseases. Currently, she is the project manager of the Human Hookworm Vaccine Initiative for the Sabin Vaccine Institute PDP.

beaumier@bcm.edu