

Cross reactivity between *Fasciola hepatica* and several *Schistosoma* spp. including *S. bovis* has been demonstrated previously. Native, purified Fh12, a cross-reacting fatty acid binding protein from *F. hepatica*, has also been shown to be a potential vaccine against both *S. mansoni* and *F. hepatica*. A cDNA encoding nFh12 has been identified, sequenced, and the recombinant protein, denoted rFh15, has been purified. rFh15 induces in rabbits antibodies which react with *F. hepatica* adult worm antigen and are also cross-reactive with *S. mansoni*. Rabbits vaccinated with rFh15 develop up to 60 % less *F. hepatica* worms than controls. Significantly, vaccinated rabbits also develop less liver lesions, smaller parasites, and less fluke eggs than controls. Thus, this recombinant vaccine has, in addition to its anti-parasitic effect, anti-inflammatory and anti-fecundity effects. Computer modelling has identified several putative T-cell and B-cell epitopes. These were developed through molecular cloning technology, overexpressed, purified and tested for their immunoprophylactic effect against *F. hepatica* in rabbits. A 12 amino acid recombinant T cell epitope resulted in up to 75 % less flukes in vaccinated rabbits over controls. This protection was related to cellular, not humoral, responses suggesting a Th1 mechanism of immunity. C57/Bl mice immunized with nFh12 or rFh15 developed, respectively, 92 % and 72 % less *S. bovis* worms than controls. The molecular vaccines also had an anti-pathology effect reflected as smaller liver lesions. Thus the *Fasciola* polypeptide & epitopes have potential to be considered as a heterologous trematode vaccine.

- X 644 VACCINE POTENTIAL OF A GLUTATHIONE S-TRANSFERASE CLONED FROM *SCHISTOSOMA HAEMATOBIIUM* IN PRIMATES INFECTED WITH AN HOMOLOGOUS CHALLENGE. Boulanger Denis, Warter A, Lindner V, Trottein F, Pierce RJ, Chippaux JP\*, Sellin B, and Capron A. Centre de Recherche sur les Méningites et les schistosomiases, Niamey, Niger; Faculté de Médecine, Institut de Pathologie, Strasbourg, France; AND Centre d'Immunologie et de Biologie Parasitaire, Institut Pasteur, Lille, France.

Patas monkeys have been twice immunized with a *Schistosoma haematobium*-derived recombinant glutathione S-transferase (Sh28GST) then challenged with an homologous calibrated challenge. B.C.G. and Freund's Complete Adjuvant (FCA) have been used as adjuvants in two distinct protocols. Specific IgG and IgA antibody responses were intense and homogenous in the animals receiving the Sh28GST in presence of FCA, whereas B.C.G. could only induce moderate and heterogenous antibody titres. No significant effect on worm burdens was evidenced 36 weeks post-infection in either group of Sh28GST-immunized animals compared to their matched controls receiving an irrelevant protein. Although not significant, reductions by one half of eggs located in all the tissues (FCA group) and in the uro-genital system (B.C.G. group) were noted. Moreover, the total egg output has been dramatically diminished by 60% and 77% in the B.C.G. and FCA groups, respectively. These reductions reached 75% and 80% in the urines. Bladder pathology was also minored in the animals displaying the lowest urine egg excretions. There was no clear positive or negative correlate between antibody responses and individual levels of protection. Taken as a whole, the Sh28GST proved to be capable of significantly reducing *S. haematobium* worm fecundity in experimentally infected primates. Although the FCA induced higher levels of protection, the good efficacy of B.C.G. as adjuvant appeared sufficient to consider the future application of this new formulation as a vaccine against human uro-genital schistosomiasis.

- 645 INTRACELLULAR STAINING IN, AND CYTOKINE PRODUCTION OF, IL-4 BY EOSINOPHILS FROM TRANSGENIC IL-5 C3H/HEN MICE. Freeman GL\*, Dawson C, Tominaga A, Takatsu K, Secor WE, and Colley DG. DPD/NCID/CDC, Atlanta, GA; DASTLR/NCID/CDC, Atlanta, GA; Kochi Medical School, Kochi, Japan; and Institute of Medical Science, University of Tokyo, Tokyo, Japan.

Acute (8 week) infection in experimental schistosomiasis is associated with a strong shift to a Th2 cytokine profile. Spleen cells from 8 week-infected mice (45 cercariae injected s.c.) produce IL-4 when stimulated *in vitro* with either *Schistosoma mansoni* soluble egg antigen (SEA), Concanavilin A (Con A), or phorbol 12-myristate 13-acetate and ionomycin (P+I). Attempts to fully identify the spleen cell source(s) of IL-4 have not been conclusive but it appears to be largely due to a non-B, non-T cell. Immunohistochemistry studies have demonstrated that eosinophils in peritoneal exudates induced in normal mice by schistosome eggs produce IL-4. To determine whether eosinophils are a cellular source of IL-4 in spleen cells from animals with acute infections, we utilized a combination of surface phenotyping and intracellular cytokine (IL-4) staining by flow cytometry. Using both CBA/J 8 week-infected and C3H/HeN-TgN(IL-5)1 meg (Tg IL-5) uninfected mice we determined that the major cell source for IL-4 was a CD3-, B220-, CD11b+ spleen cell. Upon separating these cells using a fluorescence-activated cell sorter (FACS), and then cytocentrifugation and staining, nearly all of the IL-4+ cells were eosinophils. To examine further the IL-4 potential of eosinophils, we removed peritoneal exudates from Tg IL-5 mice injected 60 hours previously with thioglycollate broth and plated them for 1 hr on petri dishes at 37°C. The non-adherent cells were 95.5 % eosinophils plus 1.8% mast cells and 2.7% lymphocytes. Upon 24hr of culture with either nothing, Con A, P + I, or SEA, these cells made 0 pg/ml, 2.7 pg/ml, 244 pg/ml, or 0 pg/ml of IL-4, respectively, demonstrating the IL-4 producing capacity of a highly enriched population of eosinophils.



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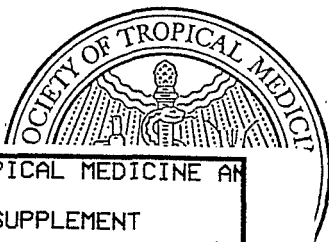
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