

***Schistosoma japoni* induced coagulation and fibrinolysis dysfunction: A case-control study**

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Objective: *Schistosomiasis japonica* is pathologically characterized by liver inflammation and fibrosis. Although coagulation, fibrinolysis and inflammation are affected and increased D-dimer levels have been noted, the mechanisms remain unclear.

Methods: 150 patients with chronic schistosomiasis as chronic schistosomiasis group, 90 patients with advanced schistosomiasis as advanced schistosomiasis group and 69 healthy residents in this study as control group were taken. Liver function, blood coagulation, liver fibrosis and routine blood test data were gathered. ELISA technique was used to measure tissue-type plasminogen activator (t-PA) and urokinase (u-PA), plasmin/anti-plasmin complex (PAP), plasminogen (PLG), anti-thrombin (AT) and plasminogen activator inhibitor 1 (PAI1) levels. D-dimer levels were monitored using the immune turbidity method and coagulation factor VIII (FVIII) was measured using the coagulation method. Antithrombin III (AT-III), PLG, Protein S and Protein C activities were measured via the chromogenic substrate method.

Results: Although the indicators of coagulation duration (prothrombin time (PT), activated partial thromboplastin time (APTT), thrombin time (TT) and fibrinogen (Fbg) level) were not significantly different between the case and control groups, the plasma levels D-Dimer, FVIII, PAP and plasmin activators (t-PA and u-PA) were significantly increased in the cases compared to the controls. These levels were further elevated to the advanced patients compared with the chronic patients ($P < 0.05$). Anti-coagulation proteins, including AT-III, PLG, PC and PS, and anti-plasmin activators (PAI1) were decreased in the patient cases compared with the healthy controls and these level was further decreased from the advanced patients compared with the chronic patients ($P < 0.01$).

Conclusion: *Schistosoma* induced specific pathological variations on concomitant increases in coagulation and fibrinolysis that led to the inhibition of infection-induced thrombi in the vessels and an increase in D-dimers to preserve blood flow.

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Immune response induced by oral delivery of *Bacillus subtilis* spores expressing enolase of *Clonorchis sinensis* in grass carps (*Ctenopharyngodon idellus*)

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Clonorchiasis, caused by the consumption of raw or undercooked freshwater fish containing infective metacercariae of *Clonorchis sinensis*, remains a common public health problem. New effective prevention strategies are still urgent to control this food-borne infectious disease. The previous studies suggested *Bacillus subtilis* spores was an ideal vaccines delivery system and the *C. sinensis* enolase (CsENO) was a potential vaccine candidate against clonorchiasis. In the current study, we detected CsENO-specific IgM levels by ELISA in sera, intestinal mucus and skin mucus in grass carps (*Ctenopharyngodon idella*) through oral administration with *B. subtilis* spores surface expressing CsENO. In addition, immune-related genes expression was also measured by qRT-PCR. Grass carps orally treated with *B. subtilis* spores or normal forages were used as controls. The results of ELISA manifested that specific IgM level of grass carps in CsENO group in sera, intestine mucus and skin mucus almost significantly increased from week 4, post-first oral administration when compared to the two control groups. The levels of specific IgM reached its peak in intestine mucus firstly, then in sera and last in skin mucus. qRT-PCR results showed that 5 immune-related genes expression had different degree of rising trend in CsENO group when compared to the two control groups. Our study demonstrated that orally administrated with *B. subtilis* spores expressing CsENO induced innate and adaptive immunity, systemic and local mucosal immunity and humoral and cellular immunity. Our work may pave the way to clarify the exact mechanisms of protective efficacy elicited by *B. subtilis* spores expressing CsENO and provide new ideas for vaccine development against *C. sinensis* infection.

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