What's Eating You? *Schistosoma japonicum*

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The ova of *Schistosoma japonicum* have a thick refractile wall (Figure 1). They are small and round, in contrast to the elongated ova of *Schistosoma mansoni and Schistosoma haematobium*. *S japonicum* usually has no visible spine, though some specimens will demonstrate an inconspicuous apical spine. Ova of *S mansoni* also have a thick refractile wall, but they are easily differentiated from *S japonicum* ova by their elongated shape and the presence of a thick lateral spine. *S haematobium* ova are elongated and have a thin wall and a delicate apical spine.

Schistosome cercariae are released by fresh water snails and must find a vertebrate host to complete their life cycle. They use movement and proteolytic enzymes to penetrate the skin of the vertebrate host.[1] After penetrating the skin, Schistosome cercariae enter cutaneous blood vessels and travel to the lungs. Within days, the organisms travel to the portal vascular system where they mature into adult worms. Adult schistosomes (flukes) live in the portal and intestinal vascular system of the vertebrate host, often coupled together. Occasionally, adult worms will migrate, resulting in ectopic cutaneous lesions. Common signs and symptoms of schistosomiasis include bloody diarrhea in the acute phase and hepatomegaly and ascites in the chronic phase.[2] In China's Hunan Province, the human prevalence of schistosomiasis is about 8%,[3] and occupational exposure to water is a major risk factor.[4] Travelers to endemic areas are at risk if they are exposed to fresh water containing the cercariae.

The diagnosis of cutaneous schistosomiasis usually is not considered clinically prior to examining skin biopsy results. The diagnosis is generally based on histopathologic findings in the skin biopsy specimen. All schistosome ova are characterized by a refractile chitinous wall and central basophilic stippling (Figure 2).

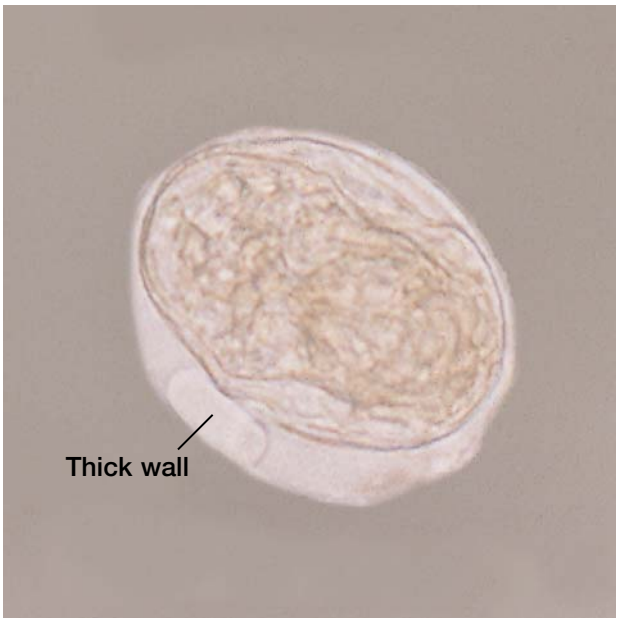

Figure 1. *Schistosoma japonicum* is characterized by round ova with a thick refractile wall and an inconspicuous or absent spine.

Schistosome antigens are highly chemotactic for neutrophils and eosinophils.[5] Eosinophils appear to play a major role in natural immunity to the organism. A lung recovery assay can be used to determine resistance of mice to secondary infection with *S japonicum*. Prior infection imparts a considerable level of resistance. The inflammatory cells that accumulate around schistosomes embedded in the skin following penetration are mainly neutrophils, with a few eosinophils appearing 24 hours after penetration.[6]

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Vaccines for schistosomiasis, based on irradiated cercariae, show activity in animal models. After challenge, the skin of immunized mice showed degranulated mast cells in the dermis and epidermis. Margination and emigration of granulocytes, predominantly eosinophils, occurred in dermal vessels. Eosinophils migrated into the epidermis and formed intraepidermal microabscesses.[7] Deteriorated schistosomula were present amid the eosinophilic microabscesses in the epidermis and in eosinophilic infiltrates in the dermis. Contrary to expectations, the major site of immune protection does not appear to be the skin. In one study, immunized mice infected with *S japonicum* larvae showed skin penetration equivalent to nonimmunized mice. Attrition of schistosomes occurred during migration to the lungs and continued after migration to the liver.[8]

Schistosome cercariae secrete a serine protease in response to skin lipids. The serine protease facilitates penetration of human skin. Topical preparations of both peptide-based irreversible serine protease inhibitors and nonpeptide reversible inhibitors have demonstrated potential as topical schistosome antipenetrants.[9] Other antipenetrant agents, especially topical insect repellents and niclosamide have been studied. These agents offer great promise for the protection of military personnel and travelers to endemic areas but are not cost-effective for protection of the indigenous population. Immunization and control of intermediate hosts (fresh water snails) offer the most cost-effective alternatives as public health measures.[10]

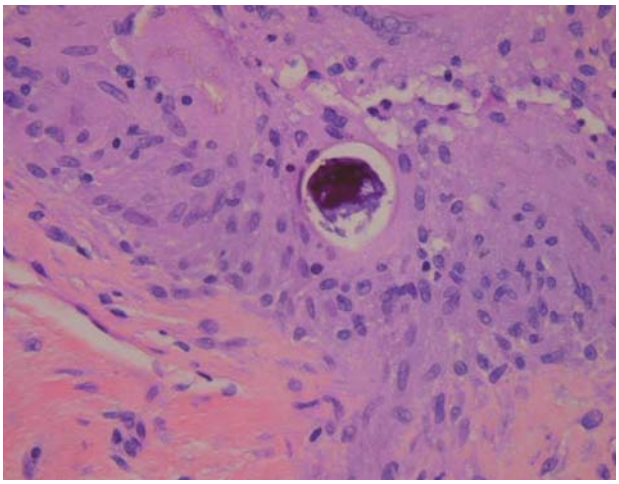

Figure 2. Characteristic histologic appearance of schistosome ova in tissue (H&E, original magnification ×400).

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