SHORT COMMUNICATION

Elevated levels of urinary hyaluronidase in humans infected with intestinal parasites

In humans, intestinal parasitic infections can lead to a broad spectrum of clinical severity that often includes diarrhoea and iron deficiency (Aimi et al., 2007; Assefa et al., 2009). Such infections are a serious public-health problem, causing suffering to thousands of millions of people, especially in the tropics (www.who.int/vaccine_research/diseases/oa_parasitic/en/index.html). In Malaysia, for example, intestinal infections with several helminths (Trichuris trichiura, Ascaris lumbricoides and hookworm) and protozoa (Blastocystis hominis, Giardia lamblia, Entamoeba coli and E. histolytica) are common (Hanjek et al., 1993; Noor Azian et al., 2007).

Hyaluronidase (HAase), a glycoprotein, is broadly expressed in various human tissues and body fluids (Fiszer-Szafarz et al., 2000). It depolymerises the glycosaminoglycan hyaluronic acid (HA), which is a main component of extracellular matrix (Laurent and Fraser, 1992). In infection with Cryptosporidium parvum, the parasite's invasion of the surface epithelial cells of its host's intestinal tract (Laurent et al., 1999) probably involves the degradation of extracellular matrix, perhaps via HAase released by the parasite. Entamoeba histolytica is known to express HAase (Teisal, 1983), and the invasive stages of two intestinal nematodes, Ankylostoma caninum and Ancylostoma simplex, have also been shown to release HAase, which, in their case, probably facilitates tissue histolysis and mucosal invasion (Hotez et al., 1994).

Biomarkers in urine can be used to measure oxidative stress non-invasively, for example in cancer patients (Chandramathi et al., 2009a) and those infected with intestinal parasites (Chandramathi et al., 2009b). Markers of oxidative stress can also be found in urine samples from Sprague-Dawley rats that have been infected with B. hominis (Chandramathi et al., 2010b), and, compared with their uninfected counterparts, such rats also show more HAase activity in their urine (Chandramathi et al., 2010a). If most or all of the intestinal parasites of humans release HAase as they invade their hosts, elevated levels of the enzyme in the urine of a human may be a useful indicator of infection with such parasites. The main aim of the present study was to explore whether the intestinal parasites commonly found in Malaysia were associated with elevations in urinary HAase.

SUBJECTS AND METHODS

In the present study, samples of fresh urine (each the first morning specimen excreted by a subject) and stools were collected from 35 adults with intestinal parasitic infection [with a mean (S.D.) age of 50 (10) years] and, as controls, 95 apparently healthy and uninfected adults [with a mean (S.D.) age of 57 (12) years]. All of the subjects lived in the Klang Valley, in southern Malaysia. The 95 controls (37 males and 58 females) were volunteers (mostly mature students) whereas the 35 subjects (17 males and 18 females) with intestinal parasitic infection were identified in routine medical camps. Informed consent was obtained from each subject prior to any sample collection, and the study protocol was approved by the Medical Ethics Committee of the University Malaya Medical Centre (UMMC) in Kuala Lumpur.
experimentally infected with B. hominis (Chandramathi et al., 2010a) and the invasive potential of some forms of B. hominis has been demonstrated (Al-Tawil et al., 1994).

The present study appears to be the first to measure urinary HAsA levels as an indicator of the presence of invasion activity in humans infected with intestinal parasites. The collection of urine samples may be a useful, non-invasive method of detecting elevated HAsA in humans who harbour intestinal parasites.

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