

palaeoclimate'. P. P. Chakrabarty (Indian School of Mines (ISM), Dhanbad) discussed about 'Stable isotopes in Chattisgarh basin: Implications to sequence stratigraphy and Precambrian/Cambrian boundary'. Parthasarathi Ghosh (Indian Statistical Institute (ISI), Calcutta) presented a paper on 'Variations in atmospheric CO<sub>2</sub> between Permian and Cretaceous: Clues from the isotopic compositions of pedogenic carbonates'. S. Banerjee, (Indian Institute of Technology (IIT), Mumbai) presented his findings on 'Carbonate bed decoupling by using isotope data in Rohtas limestone'. D. M. Banerjee (Delhi University) discussed about 'Stable isotope studies of Proterozoic sediments from Vindhyan and Nagaur basins'. Natabar Sharma (MS University, Vadodara) presented a paper on 'Stable isotope studies on buried and surface soils'. A Sarkar (ISM) discussed about 'Carbon isotopes across the P/T boundary of continental Gondwana and climate-extinction connection'. S. Balakrishnan (Pondicherry University) discussed the possibility of working on 'Geochemical studies on Mesozoic-Cenozoic sediments of the Cauvery Basin occurring in the Pondicherry-Ariyalur areas'. Amitava Chakrabarty (IIT, Kharagpur) indicated the potential of 'Stable isotope studies of carbonates and water from Hooghly Estuary, West Bengal'. Joygopal Ghosh (Geochronology Division, Geological Survey of India (GSI), Calcutta) discussed about the 'Use of organic carbon isotope ratio

in Gondwana stratigraphy'. Prashenjit Ghosh (Physical Research Laboratory (PRL), Ahmedabad) presented his findings on 'Stable isotope studies of Siwalik palaeosols'. A. K. Mittal (KDMIPE, ONGC) discussed about the 'Application of stable carbon isotope in hydrocarbon exploration'.

Three papers were presented in the session on 'Isotope hydrology and environmental isotopes'. P. Nagabhushanam (NGRI) discussed about the 'Use of stable isotopes in elucidating palaeoclimatic signatures in Neyveli groundwater basin and source of seepage in coal mines'. K. K. Sharma (Wadia Institute of Himalayan Geology, Dehra Dun) presented new data on 'Stable isotope systematics of surface water bodies in the NW Himalaya'. S. K. Gupta (PRL) deliberated on 'Isotope hydrology research at PRL'.

Three papers were presented in the session on 'Crustal evolution and ore genesis'. Biswajit Mishra (IIT, Kharagpur) discussed about 'Quantification of water-rock ratio in relation to hydrothermal mineralization from stable isotope studies'. S. P. Venkata Dasu (AMSE Wing, GSI, Bangalore) presented 'New S-isotopic data and ore petrology of some polymetallic-Au prospects of India'. D. Asthana's (ISM) topic of discussion was 'Can stable isotope be useful in delineating slab melting process in early Proterozoic?'

The 'Palaeoceanography' session was brief. Ajai Rai (Allahabad University)

reported his findings on 'Neogene stable isotope record of foraminifers in the SE Indian ocean and its palaeoceanographic implication'. Devesh K. Sinha (BHU, Varanasi) discussed about 'Neogene ocean circulation changes in the Indo-Pacific based on planktic foraminiferal biogeography and stable isotope analyses'.

During the session on 'Instrumentation and analytical techniques', A. G. Datar (IR Technology, Mumbai) provided an overview on 'Recent developments in stable isotope ratio mass spectrometry'. S. Das Sharma (NGRI) talked on 'Stable isotopes at NGRI' and B. R. Venkatesh (AMSE Wing, GSI, Bangalore) discussed on the intricacies of the 'Extraction of SO<sub>2</sub> from sulphides/sulphates and measurements of sulphur isotopes'.

The participants at the workshop thought it fit to formulate and launch a coordinated national programme on 'Tracking the evolution of earth's crust, ocean and climate: Experimenting with stable isotope tracers'. The workshop concluded with a hope that more scientists and researchers of stable isotopes would be involved in the national programme and explore and identify a suitable place for establishing the national facility.

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## SCIENTIFIC CORRESPONDENCE

# Immediate type hypersensitivity reaction: An immunological marker for microfilariae negative individuals with hydrocele

Filarial infection caused by *Wuchereria bancrofti* brings out a spectrum of clinical and parasitological symptoms in people living in the endemic regions. Two common symptoms of the chronic disease are elephantiasis of legs and hydrocele of testicles in humans. There are usually more cases of hydrocele than elephantiasis in most endemic communities and in fact the prevalence

of hydrocele has been proposed as a diagnostic index in predicting infection prevalence or identifying communities at risk for filariasis<sup>1</sup>. The symptomatic filariae patients, especially those with elephantiasis, are in general microfilariae (MF) negatives. However, individuals with hydrocele can often be MF positives<sup>2</sup>. Filarial infection similar to other helminthiasis induces a strong

IgE response in endemic individuals<sup>3,4</sup>. IgE-mediated allergic disorders such as immediate type hypersensitive (ITH) reactions were also observed in endemic population<sup>4,5</sup>. The extent of ITH reaction measured as skin test positivity was earlier reported by us using the soluble extract of infective larvae (L3) of *W. bancrofti* or a defined filarial allergen Sd 30 (mol wt 30 kDa) exhibiting prote-

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**Table 1.** Filariae skin test with Sd 30 antigen in individuals having hydrocele

Hydrocele patient	Numbers tested	Positive cases	
		Number	%
Microfilariae positive, median age = 28 yrs (age = 14–40 yrs)	14	0	0
Microfilariae negative, median age = 24 yrs (age = 14–48 yrs)	36	35	97.2

Skin test was carried out by injecting two micrograms of antigen in saline. Reading was taken after 15 min of intradermal injection.

ase activity<sup>6</sup>. ITH reaction in hydrocele patients as a group separate from other filarial groups, has not been studied. In the present note we report skin test results in hydrocele patients.

The study was carried out in *W. bancrofti* endemic regions of Khurda district, Orissa. Individuals with hydrocele were identified with the help of a local public health physician. The presence of MF was determined by microscopic examination (Giemsa stained) or 50 µl blood taken between 20:30 and 23:30 h. A filarial antigen (Sd 30) having a mol wt of 30 kDa was isolated from saline soluble extract of adult *Setaria digitata*, as described by Beuria and Das<sup>7</sup>. Skin testing (ITH) was carried out by injecting 2 µg of antigen (0.04 ml volume) on the volar surface of an arm following a previous procedure<sup>4</sup>. An equal amount of isotonic saline was used as negative control. The original wheal due to antigen and saline was encircled (by a pen), then after 15 min the wheal and flare reaction was read. If the wheal area became double the initial encircled area, it was considered as a positive skin test.

ITH reactivity to Sd 30 was carried out in 50 hydrocele patients with ( $n = 14$ ) and without ( $n = 36$ ) MF (Table 1). All the 14 patients with MF did not exhibit ITH reaction, while 35 out of 36 amicrofilaraemic hydrocele cases (97.2%) exhibited ITH reaction. The result of ITH reaction in hydrocele pa-

tients was clear-cut and indicated positive ITH reaction in MF negative hydrocele patients. However, it should be mentioned that our earlier results<sup>4</sup> of ITH reaction in MF positive asymptomatic individuals and MF negative elephantiasis patients or endemic normals did not indicate any association of ITH with the presence (or absence) of MF as has been noted in hydrocele patients. A limited distribution of ITH positivity using Sd 30 antigen was noted earlier. The values ranged from 20% in chronic patients, 56% in asymptomatic carriers to 62% in endemic normals<sup>6</sup>. Similar result was observed using infective larval (L<sub>3</sub>) antigenic extract of *W. bancrofti* – 38% in endemic normals, 13% in asymptomatic carriers and 13% in chronic filarial patients<sup>4</sup>. None of the filariae groups exhibited extensive ITH reaction as is observed (97% positivity) in case of amicrofilaraemic hydrocele individuals. It is not fully understood why ITH reactions are not frequent in people infected with filariasis (helminth infection, in general) in contrast to the response of atopic (allergic) individuals to extrinsic allergens. In fact, the presence of ‘blocking antibodies’, especially of IgG4 subclass has been reported to be one possible explanation to control the manifestations of ITH reactions in filariasis<sup>6,8</sup>. Immunoregulatory mechanisms controlling ITH reactivity are probably different in hydrocele patients with MF from other filarial groups. The

high prevalence of skin test positivity in MF negative hydrocele group suggests that ITH reaction might be an immunological (diagnostic) marker for this group of population. MF negative hydrocele individuals pose a problem in attributing filarial etiology in contrast to MF positive hydrocele counterparts. Skin testing using filarial allergen may be useful in detecting the filarial infection associated with amicrofilaraemic hydrocele patients.

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