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An easy-to-use, urine-based dipstick to test for kala-azar

CSIR-IICB

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Diagnosing Visceral leishmaniasis, or kala-azar, has been problematic as routine tests require tissue aspirations that are invasive, painful and risky. Researchers at the Indian Institute of Chemical Biology, Kolkata, have now developed a simpler test that seeks to overcome such problems. Half the world's kala-azar cases occur in India.

Dr Nahid Ali, a Raja Ramanna fellow and emeritus scientist at IICB, has developed a urine-based dipstick that is non-invasive which he describes as safe for collection, storage and handling. Her work has been published in the PLOS Neglected Tropical Diseases journal. She told The Indian Express that non-invasive diagnosis of VL has been a challenge for long, and to date no accepted urine-based rapid test is available.

The vector-borne disease occurs in 88 countries, particularly in remote areas of India, Bangladesh, Sudan, Brazil, Ethiopia and South Sudan, which together account for 90 per cent of all cases. WHO figures show countries with a high burden of VL reported 30,758 cases in 2014 and 21,909 in 2015.

In India, kala-azar cases are mainly found in West Bengal, Bihar, Jharkhand and eastern Uttar Pradesh. The disease, which in its most serious form is fatal in more than 95 per cent of cases if left untreated, is characterised by irregular bouts of fever, weight loss, enlargement of the spleen and the liver, and anaemia. The parasites are transmitted through the bites of infected sandflies.

Prof Samit Chattopadhyay, director of IICB, Kolkata spoke of a serious, associated condition, post-kala-azar dermal leishmanisis, or PKDL. In its third report on neglected tropical disease in 2015, WHO recommended the need of improved diagnostic tests for kala-azar as well as PKDL. The fourth report published recently lists elimination deadlines for kala-azar in various countries.

A urine test strip or dipstick test is a basic diagnostic tool used to determine pathological changes in a patient's urine in standard analysis. Diagnosis of kala-azar is complex because the symptoms are the same for many fever-associated ailments. It remains based on finding Leishmania amastigotes in spleen and/or bone marrow aspirates. Sophisticated laboratory methods, although sensitive, are costly. Besides, PKDL is often confused with other skin diseases, researchers say.

Ali said a serum-based antibody-detecting dipstick kit, which can be used in field settings with results visible to the naked eye, was developed and reported in Emerging Infectious Diseases, 2011. The dipstick has been evaluated in India, Nepal, Sri Lanka, Brazil and Spain, and she said it shows better performance than the commercially available strip test used in Latin America and East Africa.

However, since antibodies remain in the blood for long after treatment, serum-based tests cannot be used as a test of cure. “Our urine-based dipsticks have shown effective treatment response and thus have prognostic value. Urine as diagnostic tool is a thrust in Visceral leishmanisis research. Collection, storage and handling of urine samples are safe, non-invasive. The advantage is particularly to infants with infection, from whom the collection of blood is difficult,” Ali said.

The ready-to-use device can be stored at room temperature and used for at least one year. It does not involve much expertise or sophisticated instruments, experts at IICB said. This dipstick can effectively detect PKDL cases, she said.

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V S N Murty is NIO acting director

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Dr V S N Murty, took charge as the acting director of Dona Paula-based CSIR-National Institute of Oceanography (NIO) on Monday. He joined NIO in April 1980 as a junior scientific assistant, and as a scientist in July 1982. He has been actively involved with his research in the field of physical oceanography specializing in large scale ocean processes, circulation and air-sea interaction.

Holding a PhD from Andhra University, Murty has been involved in several research projects at NIO and published several research papers of international repute. He has also been the scientist-in-charge of the NIO Regional Centre at Vishakhapatnam since 2008.

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