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IPN Develops Innovative Rapid Test to Diagnose Childhood Leukemia

- **A small blood sample will allow the disease to be identified within minutes, reducing the need for invasive procedures such as bone marrow biopsies**
- **In the medium term, the portable device—similar to a pregnancy test—could be used in remote communities to enable timely diagnosis in children.**

Researchers at the Instituto Politécnico Nacional (IPN) are developing a rapid test to detect childhood acute lymphoblastic leukemia, wto minimizethe use of invasive methods such as bone marrow biopsies and promote early diagnosis so that treatment can begin promptly.

The project, initiated by Dr. Juan Ernesto López Ramos at the Centro de Estudios Científicos y Tecnológicos (CECyT) No. 18 in Zacatecas and now being advanced at the Unidad Profesional Interdisciplinaria de Ingeniería (UPIIZ), Zacatecas Campus, seeks to transform current diagnostic practices by using just a small blood sample to identify the disease.

According to Dr. López Ramos, the aim is to deliver, in the medium term, a point-of-care prototype—a low-cost, portable device similar to a pregnancy test—that can provide results in just 10 to 15 minutes. The device relies on gold and copper nanoparticles that bind to antibodies to detect the disease.

Beyond innovation, this effort is intended to provide new diagnostic alternatives to underserved populations in Mexico and other regions, where access to specialized medical services is limited. Childhood leukemia, a multifactorial disease, often presents with warning signs such as excessive fatigue, anemia, loss of appetite, and weight loss.

The advancement of this rapid test aligns with the priorities outlined by President Claudia Sheinbaum Pardo and the Secretary of Public Education (SEP), Mario Delgado Carrillo.

A member of Mexico's National System of Researchers (SNII), Level I, López Ramos emphasized that having such a test would make it possible to monitor children's health promptly—an especially significant advantage in remote areas with limited access to laboratory facilities.

To conduct in vitro trials and obtain patient samples of acute lymphoblastic leukemia, the team will establish agreements with the Biomedical Research Unit of the Mexican Social Security Institute (IMSS) in Zacatecas. "In many cases, the success of treatment depends on early diagnosis. Unlike other cancers, leukemia does not usually present with obvious clinical signs such as tumor growth, which makes detection particularly challenging," he explained.

The researcher also noted that once developed as a portable device, the test could be incorporated into routine medical checkups or even administered during vaccination campaigns.

When the project began in 2024, there was no record of a similar development worldwide. The team's objective is to reach a reliability level comparable to that of current diagnostic methods.

The project is being carried out under IPN's Networked Research Projects Program, with the collaboration of Dr. Blanca Lorena Martínez Vargas, Dr. Luis Mario González Rodríguez, and Dr. Sergio Domínguez Sánchez from UPIIZ; Dr. Juan Carlos Medina Llamas from CECyT 18 Zacatecas; and Dr. Edgar Eduardo Lara Ramírez from the Centro de Biotecnología Genómica (CBG).

For more information, visit www.ipn.mx

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