

New genes involved in acute lymphoblastic leukemia play fundamental role in prognosis of the disease

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This is the researcher group from Clinica de la Universidad de Navarra. Credit: Clinica de la Universidad de Navarra

The inactivity or "silence" of certain genes plays a fundamental role in the prognosis of acute lymphoblastic leukemia as well as in response to treatment, according to the results of research involving a team made up of specialists from the University Hospital of Navarra and the Center for Applied Medical Research at the same University of Navarra, as well as the Reina Sofía Hospital in Cordoba, Andalusia.

In concrete, the work confirmed that the inactivation of 13 microRNAs (a type of gene) by an epigenetic mechanism (capable of modulating the functions of the genetic code), is associated with higher mortality

amongst patients with ALL. In total, the study involved 353 patients - 179 children and 174 adults - with acute lymphoblastic leukaemia). The results open up new therapeutic options on demonstrating the possibility of using these microRNAs as new targets in the treatment of this cancer illness. The conclusions of the research were recently published in the scientific journal with the greatest international impact in its speciality, the *Journal of Clinical Oncology*.

Involved in the research work was a team made up of specialists from the University Hospital of Navarra and the Centre for Applied Medical Research (CIMA) of the University of Navarra. Specialists from the Reina Sofía Hospital in Córdoba and the Institute of Human Genetics at the Schleswig-Holstein University Hospital, Kiel Campus in Germany also participated in the study and the publication of results.

It is notable that acute lymphoblastic leukaemia is the most common oncological illness amongst children. It makes up 25% of all cancers amongst paediatric patients and approximately 75% of cases of leukemia in infancy, although current survival rates in developed countries stand at about 75% of diagnosed patients.

Subgroup with worst prognosis

With this research a set of 13 microRNAs was identified which showed up as epigenetically regulated in 65% of the patients studied with acute lymphoblastic leukaemia, according to Doctor Prósper. Epigenetic regulation is the modulation of the genes expression that does not depend on changes in the sequence of the genetic code and the influence of which in cancer is increasingly being demonstrated. They are, thus, reversible changes in the DNA that manage to get the genes to be expressed or not (to be activated or silent) depending on external conditions.

In the subgroup of patients amongst which this set of genes appears as regulated, it was shown that, although these patients initially responded to treatment, they were the ones who with greater frequency subsequently suffered relapse, disimprove and present the worst prognosis and survival rates. These are the patients amongst whom the disease is much more resistant to treatment and amongst whom a silencing of the expression of the microRNAs is produced, according to the specialist.

Most efficacious pharmaceutical drugs

Given these result, Doctor Prósper concludes that epigenetic regulation plays a fundamental role in the development of this disease. Moreover, he points out, it would seem that the most recent pharmaceutical drugs, capable of producing epigenetic alterations, can be effective in 65% of patients who respond worst to conventional therapies for acute lymphoblastic leukaemia.

Source: Elhuyar Fundazioa

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