

Una manera de hacer Europa



BUENAS PRÁCTICAS
Actuaciones Cofinanciadas

"STUDY OF THE DEVELOPMENT OF ACUTE LYMPHOPLASTIC LEUKAEMIA IN CHILDREN IN ORDER TO ESTABLISH NEW THERAPEUTIC AND PROPHYLACTIC BASES"

Directorate General for Universities and Research

**Programa Operativo
de Castilla y León**

Año 2019

Fondo Europeo de Desarrollo Regional

Good Practise presented by the Directorate General for Universities and Research, within the framework of the Call for subsidies for research projects specified in the project developed by the Higher Scientific Research Centre (Centro Superior de Investigaciones Científicas) "STUDY OF THE DEVELOPMENT OF ACUTE LYMPHOPLASTIC LEUKAEMIA IN CHILDREN IN ORDER TO ESTABLISH NEW THERAPEUTIC AND PROPHYLACTIC BASES".

The Regional Ministry of Education, through the Directorate General for Universities and Research, launched a call for aid to support research projects and to develop research, development and innovation projects, carried out by consolidated research groups with recognised excellence.

The Consejo Superior de Investigaciones Científicas (CSIC) (Spanish National Research Council) was the beneficiary of one of these subsidies, in this case, to investigate on measures to prevent children from developing leukaemia, through the work of a research group working in the laboratories of the Salamanca Cancer Research Centre.

There are 21 projects in the area of Biomedicine among the 61 granted. Biomedicine as a line of research has great media impact due to the social interest it generates. Out of these 21 projects, this one has been selected as good practise because of the need for progress in research for cures for cancer in general and leukaemia in particular. The project entitled "Study of the development of acute lymphoblastic leukaemia in children in order to establish new therapeutic and prophylactic bases", has been developed at the Institute of Molecular and Cell Biology for Cancer in Salamanca, which belongs to the CSIC.

The amount granted for these subsidies in the selected area for this good practise amounts to 1,559,338 euros, of which 779,669 euros (50%) are co-financed by the ERDF.

The impact achieved by this operation is clear since it has been found that even if a child is a genetically predisposed to suffer from leukaemia, developing this cancer can be prevented by controlling the living micro-organisms that reside in the intestine from childhood. Therefore, and since some 350 new cases of childhood leukaemia are detected each year in Spain out of a population of 47 million inhabitants, if extrapolated to Europe, we could estimate a possible impact of some 5,562 cases out of a population of 747 million inhabitants.

This operation is considered a Good Practise because it meets the following criteria:

1. The action has been adequately disseminated to beneficiaries and the general public through the different media.

The Directorate General for Universities and Research complies with all its regulatory obligations and includes information on these aids in a specific section of the website.

<https://www.educa.jcyl.es/universidad/es/fondos-europeos/fondo-europeo-desarrollo-regional-feder>

<http://www.educa.jcyl.es/universidad/es/investigacion-innovacion/ayudas-subvenciones>



In addition, they have been publicised in the press, for which the following poster was produced:



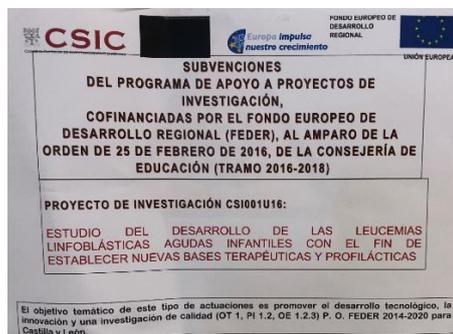
The University of Salamanca, which houses the CSIC's Institute of Molecular and Cell Biology of Cancer, publicises these aids through its website.

<https://transferencia.usal.es/publicada-la-convocatoria-de-proyectos-de-investigacion-2016/>

Meanwhile, the CSIC designed a poster.



In addition, it has also placed another poster in which makes reference to the project presented as good practise at its facilities in the Unamuno University Campus in Salamanca.



The principal investigator himself hosts his results in open access repositories which are included in the final Scientific Report, which highlights this article, selected as the best of July 2017 by the Spanish Society of Biochemistry and Molecular Biology <http://www.sebbm.es>

Grant Support

I. Hauer has been supported by the German Children's Cancer Foundation, FICLS 028/2016, KKS A2016/07 and from the "Forschungskommission" of the medical faculty of the Heinrich Heine University. M. Mischon is an HHMI Faculty Scholar (111643-551065-17) and supported by NIH/NCI through an Outstanding Investigator Award (R35CA197628) to M. Mischon, a Wellcome Trust Senior Investigator Award, the Leukemia and Lymphoma Society, the California Institute for Regenerative Medicine, the William Lawrence and Blanche Hughes Foundation. A. Borkhardt has been supported by the German Children's Cancer Foundation and the Federal Ministry of Education and Research, Bonn, Germany. Research in I. Sánchez-García's group is partially supported by FEDER and by MINECO (SAF2012-32810, SAF2015-64420-R and Red de Investigación Biomédica en Enfermedades Raras 2014-2017-RED16), Instituto de Salud Carlos III (PE14/00066), ISCIII Plan de Ayudas IBSAL 2015 Proyectos Integrados (IBY13/00005), by Junta de Castilla y León (BIO/SAS1/15, CSI001U14, UNC-017, and CSI001U16), Fundación Innocente Innocente and by the ALIMMORA project (European Union's Seventh Framework Programme (FP7/2007-2013) under grant agreement no. 282891). I. Sánchez-García's lab is a member of the EuroSysTm and the DECIDE Network funded by the European Union under the FP7 program. A. Borkhardt and I. Sánchez-García have been supported by the German Children's Cancer Foundation (DICLS R13/26). Research in C. Vicente-Dueñas' group is partially supported by a "Miguel Servet" grant (CP14/00062-RES 2013-2016-FEDER) from the Instituto de Salud Carlos III (Ministerio de Economía y Competitividad) and by the Lady Tata International Award for Research in Leukaemia 2016-2017. A. Martín-Lorenzo and G. Rodríguez-Hernández were supported by IEP-Consejería de Educación de la Junta de Castilla y León (CSI001-13 and CSI001-15, respectively).

The costs of publication of this article were defrayed in part by the payment of page charges. This article must therefore be hereby marked advertisement in accordance with 18 U.S.C. Section 1734 solely to indicate this fact.

Received March 9, 2017; revised June 2, 2017; accepted June 4, 2017; published OnlineFirst June 19, 2017.

2. The actions incorporate innovative elements:

The number of cases of childhood leukaemia is increasing. There are certain genetic alterations that predispose one to this disease. However, the fact that you have the genetic alteration does not necessarily mean that you will have the disease. The research group has discovered the connection between exposure to infection from environmental causes and developing acute leukaemia. The great challenge is to find a way to establish preventive measures to avoid developing leukaemia in children with a predisposition. The results obtained in this project have provided the first step towards establishing prevention measures for a disease with such a high incidence and prevalence.

Modifying the microbiome (as a community of living micro-organisms residing in the intestine) would be an inhibitory mechanism against exposure to environmental causes developing leukaemia.

The aim is to find a way to establish preventive measures to avoid exposure to environmental causes. Mouse models are used in the study; they are unique tools for addressing this challenge and will be used by the research team as the basis for developing these new approaches to prevent exposure to the factors triggering the disease's development.

3. Adaptation of the results obtained to the established objectives.

Precursor B-cell lymphoblastic leukaemia is the most common cancer in childhood. Although the cure rate is excellent, leukaemia is still the leading cause of death from disease in children. Patients die from causes arising from the disease (relapse or progression) or from the treatment (infections). In addition, the treatment is associated with severe toxic side effects and long-term sequelae. The intensity of conventional treatments (chemotherapy, surgery, radiotherapy, parent transplants) has reached its limit, so new therapies need to be promoted to develop preventive strategies, which is very difficult because the disease's mechanisms are still unknown.

However, the proposed objectives have been achieved through this project, according to the work plan presented. Thus, the project aims to study whether the application of inhibitor treatments prevents developing leukaemia in individuals who are carriers of the genetic mutation.

These results have provided the first step in developing preventive strategies against childhood leukaemia.

4. Contribution to the resolution of a problem or weakness detected in the territorial scope of implementation.

The results obtained until now have provided the first step towards establishing prevention measures for a disease with such a high incidence and prevalence.

The project contributes decisively to specialisation in research and innovation in Castilla y León to make progress in scientific leadership in two sectors: health and quality of life sector in relation to the companies involved in developing new treatments against cancer, and the energy and environment sector, in relation to the companies concerned with everything related to radio frequency emissions generated by mobile telephone infrastructures and equipment, on all aspects concerning the impact on human beings, health and the environment.

5. High coverage of the target population.

In Castilla y León 10% of children are born with a genetic predisposition to develop the disease. Therefore, the success of this research will be directly aimed at the population that is prone to developing leukaemia, without prejudice to the positive impact it may have on the rest of the population, not only the people of Castilla y León, but the world population.

6. Consideration of the cross-cutting equal opportunities and non-discrimination criteria, in addition to social responsibility and environmental sustainability.

Promoting gender equality is a commitment undertaken by the research group in developing this project presented as a good practise, with particular attention to ensuring gender balance, as permitted by the situation in the field of research and innovation. Thus over 50% of the research staff are women.

The project also complies with international principles and current regulations on bioethics, animal experimentation, biosafety, biosecurity, environmental protection, and gender equality and data protection. The project thus complies with the basic standards applicable to the protection of animals used for experimental and other scientific purposes.

The facilities of the Salamanca Cancer Investigation Centre have been acknowledged for the quality of their laboratories for the following research support services: washing and sterilisation, microscopic analysis and studies with damaged cell samples.

7. Synergies with other policies or public intervention instruments

Firstly, the project has fulfilled the thematic priorities of the Regional Strategy for Research and Innovation for the Smart Specialisation of Castilla y León 2014-2020, particularly by applying knowledge and technology in Health technology and in Social Care, Demographic Change and Welfare, to improve the quality of life of the citizens.

In addition, the German government has selected the principal investigator for this project, as an advisor and as an "ad hoc" member of the committees of the German Federal Office for Radiation Protection and the French Institute for Radiation Protection and Nuclear Safety, which are responsible for defining future research programmes on the possible role of environmental factors in the pathogenesis of childhood leukaemia.

The results arising from the study will provide the first step in developing preventive strategies against childhood leukaemia. This way, the goals of the project are absolutely linked to the lines of research set by the European Union for the period 2014-2020.

Una manera de hacer Europa



BUENAS PRÁCTICAS

Actuaciones Cofinanciadas

Fondo Europeo de Desarrollo Regional