

Ex Post Analysis of the Epigenetics and Cancer Programme (2013-2015)

The Epigenetics and Cancer programme was part of Cancer Plans 2 and 3. Its main objective was to gain a better understanding of the epigenetic mechanisms associated with cancer, through multidisciplinary and multi-scale research, using pre-existing data where possible. This document presents the main findings of the ex-post analysis of the programme carried out in March 2022.

Main Figures of the Epigenetics and Cancer programme

- 114 projects evaluated
- 34 projects funded (success rate: 30%)
- 34 laureates (30% women)
- 83 partners
- 13.65 million (average €400k per project)
- Median age of laureates: 46.5 years old

THE MAIN EPIGENETIC MECHANISMS COVERED

Outcomes* of the Epigenetics and Cancer Programme

- 107 new recruitments
- 20 international collaborations
- 1 new epigenetics research team and 3 new areas of epigenetics research
- 1 functional screening platform
- 5 patents
- Leverage effect for almost half of the projects
- 49 publications (37 original articles, 11 literature reviews, 1 editorial) and 3 pre-publication articles

The vast majority of projects were led by biologists and covered most of the factors known at the time to be involved in epigenetic mechanisms (histone or DNA modifications), but also other mechanisms for regulating gene expression such as non-coding RNAs or chromatin remodelling. Just over 20% of the projects exploited previously produced data. Haematological cancers, and to a lesser extent central nervous system cancers, were by far the most studied.

CONCRETE PROGRESS MADE

The projects led to the development of several tools and models, as well as scientific advances that went beyond the field of oncology in some cases. Most of the discoveries were published in biology or biochemistry/biotechnology

journals. The follow-up to the projects supported concerned the functional impact of the epigenetic modifications observed, the study of the mechanisms of action of identified epigenetic modulators, the development of new inhibitors and the characterisation of identified inhibitors.

With the creation of a new team and new research areas in epigenetics, the programme has had a certain structuring effect in a context where this theme was still emerging in the field of oncology. According to the project leaders gathered at the end of the programme, the main current challenges in the field are the development of single-cell approaches, the development of chemical inhibitors of specific epigenetic modulators that are effective and have few side-effects, and the determination of the functional impact of epigenetic marks.

Tools developed and scientific advances* in the Epigenetics and Cancer Programme

- Animal models (conditional KO for genes of interest, genetic models of cancer);
- Bioinformatics analysis pipelines;
- In vivo chromatin mapping;
- New epigenetic modifications or new epigenetic modulators associated with cancer;
- Functional characterisation of epigenetic modulators or identification of their role in cancer;
- Links between epigenetic modifications and cancer phenotype/prognosis;
- Identification of potential therapeutic targets;
- Proof of concept of anticancer activity for several molecules.

* as mentioned in the final reports