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# Cell reprogramming to cure leukaemia and lymphoma

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Researchers from the Centre for Genomic Regulation (CRG) in Barcelona reprogramme lymphoma and leukaemia cells to halt their malignancy. Resulting cells remain benign even when no longer subjected to treatment and reduce likelihood of developing new tumours.

Results are published in this week's edition of the prestigious scientific journal *Cell Reports*.

Leukaemia and lymphoma are two types of cancer affecting blood cells. Both illnesses are widely studied and are currently treated mainly with chemotherapy, radiotherapy and antibodies in order to destroy the cancer cells. Unfortunately, there are still a considerable number of patients that do not respond to existing therapies. For this reason, the new discoveries published this week in *Cell Reports* journal could be very important for the future.

"Our experiments demonstrate that cancer cells in humans can be transdifferentiated (transformed) into similar normal cells. This discovery tests a new therapeutic strategy which allows blood diseases, like leukaemia and lymphoma, to be treated", explains Thomas Graf, principal investigator on the project, group leader at the Centre for Genomic Regulation (CRG) and ICREA research professor.

Thomas Graf and his team had already shown that, thanks to the C/EBPα transcription factor, it is possible to reprogramme one type of

blood cell to become another. Specifically, his work focused on changing lymphocytes into macrophages. Now this lab has been investigating the possibility of transforming cancerous blood cells into macrophages. The results have been very positive. The researchers have not only transdifferentiated malignant cells, but the reprogrammed cells also maintain their new state as macrophages over time and definitively. In addition, the scientists have been able to prove that the tumour generating capacity of immunosuppressed mice reduces drastically, which makes these new findings a very effective new treatment. In converting malignant cells into macrophages –a type of cell that does not divide- the work presented by Graf and his collaborators offers the possibility of a new type of treatment to combat blood cancer in the future. Even though the treatments used currently allow cancerous cells to be eliminated, they still do not reduce the capacity to generate new tumours.

"We must continue looking for ways to use what we have just discovered to benefit patients. Most importantly, we now know that human cancer cells can be successfully reprogrammed and also that the reprogramming decreases the possibility of the cancer reproducing. Now we are trying to find chemical compounds (or pharmaceuticals) with the same treatment capacity, not only in culture but also in patients", insists Thomas Graf.

**More information:** Rapino, F. et al. C/EBPαinduces highly efficient macrophage transdifferentiation of selected B-lymphoma / leukemia cell lines and impairs their tumorigenicity, *Cell Reports*. March 28, 2013

Provided by Centre for Genomic Regulation

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