A relationship between cancer genes and the reprogramming gene SOX2 discovered

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A team of researchers from the Spanish National Cancer Research Centre (CNIO), led by Manuel Serrano, from the Tumour Suppression Group, together with scientists from London and Santiago de Compostela, has discovered that the cellular reprogramming gene SOX2, which is involved in several types of cancers, such as lung cancer and pituitary cancer, is directly regulated by the tumor suppressor CDKN1B(p27) gene, which is also associated with these types of cancer.

The same edition of the online version of the journal also includes a study led by Massimo Squatrito, who recently joined the CNIO to direct the Seve Ballesteros Foundation Brain Tumour Group. This study, carried out in Eric C. Holland's laboratory, at the Memorial Sloan Kettering Cancer Center (MSKCC), in Nueva York, shows the relationship between MEF, a gene regulator involved glioblastomas - the most aggressive and common brain tumours -, and SOX2.

YAMANAKA'S CELLULAR REPROGRAMMING CONTINUES TO SURPRISE

The cell reprogramming process, discovered by this year's Nobel Prize winner, Shinya Yamanaka, has become a powerful tool for researchers. Via the introduction of a cocktail of four genes into cells, among them SOX2, scientists can reprogram cells and transform them into stem cells which can be used to study a variety of processes, including cancer.

The research team led by Manuel Serrano and Manuel Collado was interested in the possible role of the tumour suppressor gene CDKN1B(p27) in reprogramming. During the course of these studies, Han Li, first author of the study, unexpectedly discovered that cells deficient in the CDKN1B(p27) gene could be reprogrammed without the need to introduce SOX2. This observation was the starting point to unravel the functional relationship between both genes.

The work led by Squatrito, in which the researcher Elena Bazzoli figures as first author, was based on earlier works that linked SOX2 with tumorigenesis. The article describes how SOX2 is regulated by MEF in cells of the nervous system. "Brain tumour cells acquire stem cell traits thanks to the participation of SOX2, and this produces an increase in tumorigenic potential" states Squatrito.

These new insights help to understand the origin of cancers linked to CDKN1B(p27) and MEF, and highlight the potential role of adult stem cells in cancer.

More information: p27Kip1 directly represses Sox2 during embryonic stem cell differentiation. Han Li, Manuel Collado, Aranzazu Villasante, Ander Matheu, Cian J. Lynch, Marta Cañamero, Karine Rizzoti, Carmen Carneiro, Gloria Martínez, Anxo Vidal, Robin Lovell-Badge, Manuel Serrano. *Cell Stem Cell* (2012). doi: 10.1016/j.stem.2012.09.014

MEF Promotes Stemness in the Pathogenesis of Gliomas. Elena Bazzoli, Teodoro Pulvirenti, Moritz C. Oberstadt, Fabiana Perna, Boyoung Wee, Nikolaus Schultz, Jason T. Huse, Elena I. Fomchenko, Francesca Voza, Viviane Tabar, Cameron W. Brennan, Lisa M. DeAngelis, Stephen D. Nimer, Eric C. Holland, Massimo Squatrito. *Cell Stem Cell* (2012). doi: 10.1016/j.stem.2012.09.012

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