

ABERRANTLY LONG TELOMERES IN EMBRYONIC STEM CELL LINES

Scientists at the Spanish National Cancer Research Centre have discovered that the telomeres of established stem cell lines are longer than those present in the inner cell mass of the blastocyst, of which the established stem cell lines derive from.

Madrid, September 2nd, 2011 – Elisa Varela and Ralph P. Schneider of the Telomeres and Telomerase Group directed by Maria A. Blasco have recently published in the North American journal *PNAS* a study, in which Sagrario Ortega, Head of the CNIO Transgenic Mice Core Unit, also participates, where they analyse the dynamics of telomere length in the stem cells and in the different stages of embryogenesis.

The group of Maria A. Blasco had previously determined that the stem cells that derive from the inner cell mass (MCI) of the blastocyst (one of the first stages in embryonic development) have longer telomeres than those of the starting embryos. Little was known until now on the mechanisms controlling telomere length during the process of derivation of embryonic stem cells. Contrary to the intuitive idea that the characteristic feature of the embryonic stem cells having hyper-long telomeres was a property inherited from the blastocyst, CNIO researchers show in this work that this feature of a big telomere length is not inherited but acquired along the *in vitro* derivation of the stem cells.

In this work, CNIO researchers have also gained further insight into the molecular mechanisms leading to this excessive telomere lengthening. These mechanisms consist of epigenetic changes that by rendering

more open the conformation of the telomeric chromatin would thus facilitate the access of the enzyme telomerase to the telomeres and their lengthening therefore.

Finally, the authors found out that the expression of a telomeric protein, termed TRF1, was greatly increased preceding telomerase-mediated telomere lengthening, suggesting that high levels of TRF1 protein are associated with the pluripotency state.

You may access the full article by visiting the following web page:

<http://www.pnas.org/content/early/2011/08/23/1105414108.long>

About the CNIO:

The Carlos III Health Institute, an institution of the Spanish Ministry of Science and Innovation, established the Spanish National Cancer Research Centre (CNIO) in 1998. The mission of the CNIO is to carry out research of excellence and to offer innovative technologies within the cancer field to the Spanish National Health System. Maria A Blasco is the CNIO Director since June 2011.

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