Retrovirology

BioMed Central

Poster presentation

Differential regulation of LTR retrotransposons during the transition from totipotency to pluripotency in mammalian embryos

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from Frontiers of Retrovirology: Complex retroviruses, retroelements and their hosts
Montpellier, France. 21-23 September 2009

Published: 24 September 2009

Retrovirology 2009, **6**(Suppl 2):P34 doi:10.1186/1742-4690-6-S2-P34

This abstract is available from: http://www.retrovirology.com/content/6/S2/P34

Background

Preimplantation mammalian embryo development is characterized by fundamental changes in nuclear function as genomes of gametes, egg and sperm unite to give rise to a totipotent embryonic genome. This totipotency is however a transient property since the first events of differentiation occur after few cell cycles, giving rise to the trophectoderm cells that co-exist with the pluripotent and no more totipotent cells of the inner cell mass at the blastocyst stage. Concomitantly to these cellular events, the newly formed embryonic genome becomes progressively transcriptionally active. We analyzed embryonic gene expression over this period in both the rabbit [1] and the bovine species. We have chosen these species as embryonic models in preference to the mouse since contrarily to this later species, embryonic genome activation (EGA) spans over several cell cycles and is preceded by progressive epigenetic modifications.

Results

In both of the former species we evidenced a huge transcriptional activation of LTR retrotransposons at EGA. This transcriptional activation is faithfully reprogrammed following the transfer of a somatic cell nucleus into the oocyte cytoplasm (somatic cloning) [2]. Very interestingly the expression of some of these retrotransposons is then restricted to the pluripotent inner cell mass cells of the blastocyst, and further progressively lost concomitantly with their differentiation.

Conclusion

Our results not only extend to other mammalian species data previously established in the mouse both at EGA [3,4] and at the pluripotent stage [5] but the expression pattern of LTR retrotransposons we have evidenced suggest a functional involvement of these sequences in the control of the transition between toti and pluripotency.

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