

Michele Bellone
Department of Animal Biology
Nuclear position and transcriptomic changes in the acquisition of meiotic and developmental competence in mouse oocytes
Prof.ssa Silvia Garagna

In order to investigate the changes in mRNA transcripts profile during the first steps of mouse embryo development I analyzed, by RT-PCR, metaphase II (MII) oocytes divided in two classes according to their different chromatin organization – “surrounded nucleolus” (SN) oocytes, in which chromatin forms a ring around the nucleolus, and “non surrounded nucleolus” (NSN) oocytes, in which chromatin has a more widespread pattern¹ – and previously analyzed by microarrays, focalizing my attention on two specific sets of genes: a) genes detected only in SN- (*Crebbp*, *Fnip1*) and in NSN-derived (*Jam2*, *Ogfr*) MII oocytes; b) maternal effect genes (*Dppa3*, *Npm2*, *Prei3*, *Smarca4*, *Zar1*) involved in the first steps of the embryo development.

The single cell analysis confirmed the microarrays results for the SN- and NSN-specific genes and found a significant higher expression of *Dppa3* in the SN-oocytes, refining in this way the microarrays results which had shown no significant difference for the maternal effects genes.

The next step of my research will be the collection of 1-cell and 2-cell embryos obtained from *in vitro* fertilization of SN- and NSN-derived MII oocytes for microarrays and RT-PCR analysis, in order to fulfill our understanding of the beginning of embryo development.

Another relevant feature for oocyte maturation, other than chromatin organization, is the nucleus, also called germinal vesicle (GV), position since it defines the starting point for meiotic spindle migration². I analyzed, in antral oocytes, the relationships between GV position and a) chromatin organization; b) presence or absence of cumulus cells surrounding the oocytes. I found a significant correlation between the peripheral GV position and the degree of oocyte maturation. To fulfill this set of data I will analyze the maturation and developmental competence of antral oocytes in relation with the position of their GV.

References

1. Zuccotti M., Piccinelli A., Giorgi Rossi P., Garagna S. & Redi C.A, Chromatin organization during mouse oocyte growth, *Molecular Reproduction and Development* 41 (1995) 479-85.
2. Brunet S., & Maro B, Germinal vesicle position and meiotic maturation in mouse oocyte, *Reproduction* 133 (2007) 1069-72.