

## *Review Articles*

### Karyosphere, the Enigmatic “Surrounded Nucleolus” of Maturing Oocytes: Review

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In mammals and other animals, the late prophase I oocyte undergoes large-scale chromatin remodeling. Condensing chromosomes associate with the inactive nucleolus and surround it with a rim of heterochromatin called karyosphere. This rim has been shown to contain centromeric and pericentromeric regions of chromosomes. Karyosphere formation coincides in time with global transcriptional silencing of oocyte genes, but this seems to reflect regulation by common upstream factors rather than causal relationship between the two processes. The function of karyosphere is not yet known, but is likely related to the positioning of bivalents in metaphase I by clustering chromosomes together in a limited volume before the nuclear envelope breakdown. Studies show that karyosphere formation, (“non-surrounded to surrounded nucleolus transition”) indicates acquisition of meiotic and developmental competence by the oocyte. Methodological approaches are discussed to use this important morphological marker to select oocytes with better potential for assisted reproduction.

*Key words:* oocytes, meiosis, chromatin rearrangement, heterochromatin