

Pronuclear Formation and DNA Synthesis in Pig Oocytes following Intracytoplasmic Injection of Pig or Mouse Spermatozoon

Xiang Sun Cui¹, Bong-Ki Kim¹, Sun Hong Jun¹, Dong Il Jin²,
Chang Sik Park³ and Nam-Hyung Kim¹

¹Department of Animal Science, Chungbuk National University,

² Sun Moon University, ³ ChungNam Univerisity

During fertilization, morphological and molecular events in male and female chromatin are precisely controlled in time. However, little information is available on onset of pronuclear formation and first S-phase entry in the pig following intracytoplasmic sperm injection. To assess species specific paternal effect on the pronuclear formation and initiation of first S-phase in the pig, we examined time of onset of male and female pronuclear formation and onset of DNA synthesis in the oocytes following pig or mouse sperm injection. We also observed ultra structure of pig zygote in relation to chronology of the S-phase following mouse sperm injection. Female pronucleus was formed about 5 h after either pig or mouse sperm injection into pig oocytes. In contrast, male pronucleus was seen in mean time 7.6 h following mouse sperm injection, and in mean time 8.5 h following pig sperm injection. Following pig or mouse sperm injection, DNA synthesis was seen after 11 h following ICSI. Transmission electron microscopy showed that at 10 h after mouse sperm injection, both paternal and maternal pronuclei were surrounded by a more and less complete nuclear envelope. At 15 h the spherical pronuclei were surrounded by an almost or fully complete nuclear envelope. One or more large spherical nucleolus precursor bodies composed of dense fibrillar material were found in each pronucleus. Most of the chromatin was dispersed, but small portions of condensed chromatin were evenly distributed throughout the nucleoplasm, without spatial relationship to the nucleolus precursor bodies. At 18 h after injection, nuclear pores were more frequently seen, predominantly in the apposed regions of both pronuclei. Nucleolus precursor bodies and condensed chromatin in contact with both cluster of small and large granules and nuclear envelope were found in the apposed regions of the pronuclei. In conclusion, paternal effect play key role in the oocyte cytoplasm during the very beginning of the first cell cycle. In addition, normal chronological microstructures of male and female pronuclei were seen in porcine oocytes following mouse injection.

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