

Evaluating the presence of testis specific transcripts in mature human spermatozoa

Aslani F. (M.Sc.)¹, Akhondi M.A. (Ph.D.)², Modaresi M.H. (M.D., Ph.D.)³, Shabani A. (Ph.D.)¹, Arabi M. (M.D.)², Sadeghi M.R. (Ph.D.)²

1- Department of Biology, Faculty Basic Sciences, Alzahra University, Tehran, Iran.

2- Reproductive Biotechnology Research Center, Avicenna Research Institute (ACECR), Tehran, Iran.

3- Department of Genetics, Faculty of Medicine, Medical Science / Tehran University, Tehran, Iran.

Abstract

Introduction: Progress and completion of spermatogenesis is related to simultaneous expression of various genes. Recent studies show that many genes are expressed in the sperm and several RNA copies are present in the mature spermatozoa. Identification of these genes and evaluation of their functions would improve our understanding of the molecular basis of fertilization, early embryo cleavage and the causes of many types of unexplained male infertility. In this study, we investigated the expression of DAZ, PRM1, PRM2, TSGA10, SYCP3 and AKAP4 genes in ejaculated human spermatozoa.

Materials & Methods: Semen samples were collected from men referring to Avicenna Infertility Clinic. Normal semen samples (According to WHO criteria) were subjected to density-gradient centrifugation to specifically recover the pure fraction of motile spermatozoa with normal morphology. Total RNA was extracted from sperm pellets and cDNA was synthesized using RT-PCR. The presence of DAZ, TSGA10, PRM1 and PRM2 cDNAs were evaluated using appropriate primers. Expression of SYCP3 (Testis specific gene) was evaluated by nested RT-PCR. The cDNA synthesized from normal testis tissues was used as positive control.

Results: Study on cDNAs showed that DAZ, TSGA10, PRM1 and PRM2 transcripts were present in normal human testis and all of the evaluated mature spermatozoa samples but not AKAP4 or SYCP3 transcripts.

Conclusion: According to our previous study, the expression of SYCP3 and AKAP4 genes is started from spermatocyte level in human testis during spermatogenesis process. However, we did not find any transcripts of these genes in mature spermatozoa. It is estimated that mRNAs of TSGA10, PRM1, PRM2 and DAZ and other testis specific genes in spermatozoa may participate in later sperm functions such as fertilization and early embryo cleavage. Therefore, further studies are needed to understand the role of these transcripts in the process of fertilization and early embryo development.

Key Words: Gene expression, Testis-specific genes, Spermatogenesis, Spermatozoa, Transcript.

Corresponding Author: Dr. Mohammad Reza Sadeghi, Reproductive Biotechnology Research Center, Avicenna Research Institute (ACECR), P.O. Box: 19615-1177, Tehran, Iran.

E-mail: Sadeghi@avicenna.ac.ir