Summary

The 70 KDa HspA2 testis specific chaperone protein seems to play a central role in the spermatogenesis. It is part of the synaptonemal complex supporting the meiosis; meanwhile as chaperon protein it facilitates the production and transport of proteins necessary for successful spermiogenesis. Previous studies proved that low expression of HspA2 resulted in various spermiogenetic defects like persistent histones, surplus cytoplasm, abnormal shape as well as in meiotic nondisjunction, disomies. Other studies found correlation between different attributes of spermiogenetic defects in semen samples as well as correlation among spermiogenetic abnormality and chromosomal non disjunction. This supported the theory on the central role of HspA2 in spermatogenesis, but individual cells were not evaluated. My concern in this thesis was to find intracellular correlation between different HspA2 related defects, nuclear and cellular immaturity attributes and chromosomal disomy. To test the supposed intracellular co-occurrence of HspA2 related abnormalities double probing technique of individual spermatozoa has been developed. In the first experiment by consecutive aniline blue and FISH probing we found that arrested nucleoprotein replacement and meiotic non disjunction are related within individual spermatozoa. In another study aniline blue staining was followed by CK immunostaining, in situ nick translation, and caspase-3. Data of this study proved that different attributes of arrested maturity in the nuclear and cellular compartment, persistent histones, surplus cytoplasm and DNA chain bakes are related in the same cell, moreover the degree of abnormalities were also conforming. The apoptotic activity was also related to immaturity. These facts support the theory that HspA2 has central role in the spermatogenesis. However rarely heterogenic immaturity attributes may occur, the most reasonable explanation that after the defected maturation step, the spermatozoa may follow its changes in several pathways. We have pursued in the third research a detailed morphometrical evaluation of the sperm head and tail in order to find differences between native, non decondensed spermatozoa with haploid and disomic set. Meanwhile there was significant difference in morphometric parameters between haploid and aneuploid cells, by objective morphometry, disomic sperm heads were larger, in evaluation of the distribution there was also a substantial (70%) overlapping in the of the values of these two populations, moreover disomic cells were found among the microcephalic spermatozoa also. Our data proves that the visual assessment in the selection of good chromosomal quality sperm using morphometric aspects is unreliable.