SENSITIVITY OF SPERM TELOMERES TO CRYODAMAGE AND THEIR EFFECTS ON THE PROGENY: AN STUDY IN FISH

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Fish, very prolific, facilitates designing of experimental approaches to correlate gamete quality and reproductive outcome. We have cryopreserved rainbow trout semen using a procedure which promotes DNA fragmentation compatible with fertilization. In a previous report we referred that the obtained larvae over-expressed 5 from 8 genes related to growth and development, suggesting changes in the control of gene expression when DNA damaged cells fertilized the oocytes. This report focuses on the sensitivity of telomeres to the same procedure and their consequences for the progeny telomeres and the telomerase reverse transcriptase (Tert) expression. Telomeres lengths and Tert transcription in the offspring were analyzed using RT-PCR. Results showed a significant shortening in sperm telomere (0.36 ± 0.058 for cryopreserved sperm related to fresh). Telomeric losses were also reported in mouse but little is known about the potential transmission to the offspring. Our results showed for the first time that larvae obtained with short telomeres sperm, had, in turn, longer telomeres (2.15 ± 0.08 respect to the control), suggesting the activation or hyperactivity of some of the mechanisms involved in their elongation. Tert transcription, active in fish somatic cells for longer than in mammals, was certainly detected, being double in larvae from frozen than from fresh sperm. Results demonstrate that fertilization with DNA-damaged spermatozoa affects the offspring telomere length and point newly to some effects on the control of embryo gene expression. Studies in fish could provide important clues for understanding the genetic mechanisms underlying the effects of sperm DNA integrity beyond fertilization.