Journal of Andrology, Vol 15, Issue 1 71-77, Copyright © 1994 by The American Society of Andrology

JOURNAL ARTICLE

Correlation between the rate of lipid peroxidation and cellular maturity as measured by creatine kinase activity in human spermatozoa

G. Huszar and L. Vigue
Department of Obstetrics and Gynecology, Yale University School of Medicine, New Haven, Connecticut 06510-0863.

We have demonstrated previously that creatine kinase (CK) activity is a measure of cellular maturity and fertilizing potential in human spermatozoa. In the present work we have examined whether there is a relationship between sperm CK activity and the rate of lipid peroxidation (LP) as measured by malondialdehyde (MDA) formation. Both MDA production and CK activity were higher in oligospermic than in normospermic specimens ($P < 0.001$, $N = 41$ and 101, respectively), and there was a close correlation ($R = 0.43$, $P < 0.001$) between these two biochemical parameters. As demonstrated previously with the CK measurements, there was a heterogeneity among the groups: About 40% of the oligospermic men had MDA and CK activity values similar to that of the normospermic group, and 12% of the normospermic men had MDA and CK activity values similar to that of the oligospermic group. We have also examined in three experimental paradigms the question of sperm-to-sperm propagation of increased LP and the possible increase in LP following centrifugation as used in sperm preparation for assisted reproduction: The MDA differences among Percoll sperm fractions originating within the same specimens, the lack of change in MDA production after co-centrifugation and co-incubation of samples with high and low sperm LP rates, and the repeated centrifugation of the same specimens without an increase in MDA production all indicated the lack of sperm-to-sperm propagation of LP or increase in LP due to mechanical stress.(ABSTRACT TRUNCATED AT 250 WORDS)

This article has been cited by other articles:

M. Fraczek, D. Sanocka, M. Kamieniczna, and M. Kurpisz
Proinflammatory Cytokines as an Intermediate Factor Enhancing Lipid Sperm Membrane Peroxidation in In Vitro Conditions
J Androl, January 1, 2008; 29(1): 85 - 92.
[Abstract] [Full Text] [PDF]

HUMAN REPRODUCTION UPDATE HOME

W.C.L. Ford
Glycolysis and sperm motility: does a spoonful of sugar help the flagellum go round?
Hum. Reprod. Update, May 1, 2006; 12(3): 269 - 274.
[Abstract] [Full Text] [PDF]

HUMAN REPRODUCTION HOME

T.G. Cooper
Cytoplasmic droplets: the good, the bad or just confusing?
Hum. Reprod., January 1, 2005; 20(1): 9 - 11.
[Abstract] [Full Text] [PDF]

HUMAN REPRODUCTION HOME

C. Celik-Ozenci, A. Jakab, T. Kovacs, J. Catalanotti, R. Demir, P. Bray-Ward, D. Ward, and G. Huszar
Sperm selection for ICSI: shape properties do notpredict the absence or presence of numericalchromosomal aberrations
Hum. Reprod., September 1, 2004; 19(9): 2052 - 2059.
[Abstract] [Full Text] [PDF]

Journal of ANDROLOGY HOME

G. Huszar, C. Celik-Ozenci, S. Cayli, T. Kovacs, L. Vigue, and E. Kovanci
Semen Characteristics After Overnight Shipping: Preservation of Sperm Concentrations, HspA2 Ratios, CK Activity, Cytoplasmic Retention, Chromatin Maturity, DNA Integrity, and Sperm Shape
J Androl, July 1, 2004; 25(4): 593 - 604.
[Abstract] [Full Text] [PDF]

Molecular Human Reproduction HOME

S. Cayli, D. Sakkas, L. Vigue, R. Demir, and G. Huszar
Cellular maturity and apoptosis in human sperm: creatine kinase, caspase-3 and Bcl-XL levels in mature and diminished maturity sperm
Mol. Hum. Reprod., May 1, 2004; 10(5): 365 - 372.
[Abstract] [Full Text] [PDF]

HUMAN REPRODUCTION HOME

J. G. Alvarez and M. Ollero
Characterization of human sperm
Hum. Reprod., March 1, 2002; 17(3): 843 - 843.
[Full Text] [PDF]

HUMAN REPRODUCTION HOME

A. Schuffner, M. Morshedi, and S. Oehninger
Cryopreservation of fractionated, highly motile human spermatozoa: effect on membrane phosphatidylserine externalization and lipid peroxidation
Hum. Reprod., October 1, 2001; 16(10): 2148 - 2153.
[Abstract] [Full Text] [PDF]

BIOLOGY *of* REPRODUCTION HOME

P. Vernet, N. Fulton, C. Wallace, and R. J. Aitken
Analysis of Reactive Oxygen Species Generating Systems in Rat Epididymal Spermatozoa
Biol Reprod, October 1, 2001; 65(4): 1102 - 1113.
[Abstract] [Full Text] [PDF]

HUMAN REPRODUCTION HOME

M. Ollero, E. Gil-Guzman, M. C. Lopez, R. K. Sharma, A. Agarwal, K. Larson, D. Evenson, A. J. Thomas Jr, and J. G. Alvarez
Characterization of subsets of human spermatozoa at different stages of maturation: implications in the diagnosis and treatment of male infertility
Hum. Reprod., September 1, 2001; 16(9): 1912 - 1921.
[Abstract] [Full Text] [PDF]

HUMAN REPRODUCTION HOME

E. Gil-Guzman, M. Ollero, M.C. Lopez, R.K. Sharma, J.G. Alvarez, A.J. Thomas Jr, and A. Agarwal
Differential production of reactive oxygen species by subsets of human spermatozoa at different stages of maturation
Hum. Reprod., September 1, 2001; 16(9): 1922 - 1930.
[Abstract] [Full Text] [PDF]

HUMAN REPRODUCTION HOME

E. Kovanci, T. Kovacs, E. Moretti, L. Vigue, P. Bray-Ward, D. C. Ward, and G. Huszar
FISH assessment of aneuploidy frequencies in mature and immature human spermatozoa classified by the absence or presence of cytoplasmic retention
Hum. Reprod., June 1, 2001; 16(6): 1209 - 1217.
[Abstract] [Full Text] [PDF]

BIOLOGY *of* REPRODUCTION HOME

G. Huszar, K. Stone, D. Dix, and L. Vigue
Putative Creatine Kinase M-Isoform in Human Sperm Is Identifiedas the 70-Kilodalton Heat Shock Protein HspA2
Biol Reprod, September 1, 2000; 63(3): 925 - 932.
[Abstract] [Full Text]

HUMAN REPRODUCTION HOME

R. K. Sharma, F. F. Pasqualotto, D. R. Nelson, A. J. Thomas Jr, and A. Agarwal
The reactive oxygen speciestotal antioxidant capacity score is a new measure of oxidative stress to predict male infertility
Hum. Reprod., November 1, 1999; 14(11): 2801 - 2807.
[Abstract] [Full Text] [PDF]

HUMAN REPRODUCTION HOME

A. Gergely, E. Kovanci, L. Senturk, E. Cosmi, L. Vigue, and G. Huszar
Morphometric assessment of mature and diminished-maturity human spermatozoa: sperm regions that reflect differences in maturity
Hum. Reprod., August 1, 1999; 14(8): 2007 - 2014.
[Abstract] [Full Text] [PDF]

HUMAN REPRODUCTION HOME

A. Zini, M. Buckspan, M. Jamal, and K. Jarvi
Effect of varicocelectomy on the abnormal retention of residual cytoplasm by human spermatozoa
Hum. Reprod., July 1, 1999; 14(7): 1791 - 1793.
[Abstract] [Full Text] [PDF]

BIOLOGY *of* REPRODUCTION HOME

R. J. Aitken, E. Gordon, D. Harkiss, J. P. Twigg, P. Milne, Z. Jennings, and D. S. Irvine
Relative Impact of Oxidative Stress on the Functional Competence and Genomic Integrity of Human Spermatozoa
Biol Reprod, November 1, 1998; 59(5): 1037 - 1046.
[Abstract] [Full Text]