

# Abstract

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## Increase of oxidative stress in human sperm with lower motility.

Kao SH, Chao HT, Chen HW, Hwang TI, Liao TL, Wei YH.

School of Medical Laboratory Science and Biotechnology, Taipei Medical University, Taipei, Taiwan.

**OBJECTIVE:** To investigate the causal role of oxidative-stress status on human sperm motility.

**DESIGN:** To demonstrate that sperm with higher oxidative damage have a lower antioxidant capacity.

**SETTING:** University hospital infertility center.

**PATIENTS:** Seventy-eight semen samples were obtained from 35 healthy donors who had normal semen characteristics and from 43 infertile or subfertile males.

**INTERVENTIONS:** The levels of oxidative damage (8-hydroxy-2'-deoxyguanosine [8-OHdG] and lipid peroxides) and antioxidants (retinol, alpha-tocopherol, ascorbate, and protein thiols) in the spermatozoa and/or seminal plasma were measured.

**MAIN OUTCOME MEASURES:** We analyzed the specific content of 8-OHdG and lipid peroxides by using high-performance liquid chromatography (HPLC)-electrochemical detection and HPLC-fluorescence analysis, respectively. Retinol and alpha-tocopherol were analyzed by using an HPLC system, whereas ascorbate and protein thiols were determined by using spectrophotometry. 8-Hydroxy-2'-deoxyguanosine was visualized by immunofluorescent staining with an anti-8-OHdG antibody that was conjugated with fluorescein isothiocyanate conjugate. Lipid peroxides in spermatozoa were stained with a fluorescent dye, C11-BODIPY(581/591).

**RESULTS:** Statistically significant negative correlations were revealed between sperm motility and 8-OHdG and between motility and lipid peroxides. Statistically significant positive correlations were found between sperm motility and the levels of retinol, alpha-tocopherol, ascorbate, and protein thiols of seminal plasma. 8-Hydroxy-2'-deoxyguanosine and lipid peroxides in spermatozoa were found to be present mostly in mitochondria.

**CONCLUSIONS:** Oxidative stress and oxidative damage were increased significantly in spermatozoa with declined motility, and the antioxidant capacities in the spermatozoa and seminal plasma were lower in males who had infertility or subfertility.

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