

## REFERENCES

Agha-Rahimi, A., et al. (2014) Vitrification is not superior to rapid freezing of normozoospermic spermatozoa: effects on sperm parameters, DNA fragmentation and hyaluronan binding. *Reproductive biomedicine online*, 28(3), pp. 352-8.

Aitken, R.J., Clarkson, J.S., Hargreave, T.B., Irvine, D.S., Wu, F.S. (1989) Analysis of the relationship between defects in sperm function and the generation of reactive oxygen species in cases of oligospermia. *J Androl*, 10, pp. 214-220.

Aitken, R.J., Fisher, H.M., Fulton, N., et al. (1997) Reactive oxygen species generation by human spermatozoa is induced by exogenous NADPH and inhibited by the flavoprotein inhibitors diphenylene iodonium and quinacrine. *Mol Reprod Dev.*, 47, pp. 468-82.

Aitken, R.J., Gordon, E., Harkiss, D., Twigg, J.P., Milne, P., Jennings, Z., Irvine, D.S. (1998) Relative impact of oxidative stress on the functional competence and genomic integrity of human spermatozoa. *Biol Reprod*, 59, pp. 1037-46.

Alvarez, J.G. and Storey, B.T. (1984a) Assessment of cell damage caused by spontaneous lipid peroxidation in rabbit spermatozoa. *Biol reprod*, 30, pp. 323-331.

Alvarez, J.G., Touchstone, J.C., Blasco, L., Storey, B.T. (1987a) Spontaneous lipid peroxidation and production of hydrogen peroxide and superoxide in human spermatozoa. Superoxide dismutase as major enzyme protectant against oxygen toxicity. *J Androl*, 8, pp. 338-348.

Alvarez, J.G. and Storey, B.T. (1989) Role of glutathione peroxidase in protecting mammalian spermatozoa from loss of motility caused by spontaneous lipid peroxidation. *Gamete Res*, 23, pp. 77-90.

Alvarez, J.G. and Storey, B.T. (1992) Evidence for increased lipid peroxidative damage and loss of superoxide dismutase activity as a mode of sublethal

cryodamage to human sperm during cryopreservation. *J Androl*, 13, pp. 232-241.

Alvarez, J.G. (2003) DNA fragmentation in human spermatozoa: significance in the diagnosis and treatment of infertility. *Minerva Ginecol*, 55, pp. 233-239.

Andrabi, S.M.H. (2007) Mammalian sperm chromatin structure and assessment of DNA fragmentation. *J Assist Reprod Genet*, 24, pp. 561-9.

Barak, Y., Amit, A., Lessing, J.B., Paz, G., Homonnai, Z.T., Yogev, L. (1992) Improved fertilization rate in an in vitro fertilization program by egg yolk-treated sperm. *Fertil Steril*, 58, pp. 197-198.

Bell, M., Wang, R., Hellstrom, W.G.J., Sikka, S.C. (1993) Effect of cryopreservative additives and cryopreservation protocol on sperm membrane lipid peroxidation and recovery of motile human sperm. *J Androl*, 14, pp. 472-8.

Bernstein, A.D. and Petropavlovski, V.V. (1937) Influence of nonelectrolytes on viability of spermatozoa. *Buletin Experimentalnoi Biologii i Medicini*, III, pp. 212-25.

Brahem, S., Mehdi, M., Elghezal, H., Saad, A. (2011) Semen processing by density gradient centrifugation is useful in selecting sperm with higher double-strand DNA integrity. *Andrologia*, 43(3), pp. 196-202.

Brahem, S., Jellad, S., Ibala, S., Saad, A., Mehdi, M. (2012) DNA fragmentation status in patients with necrozoospermia. *Syst Biol Reprod Med*, 58(6), pp. 319-23.

Bunge, R.G., Keettel, W. C. and Sherman, J.K. (1954) Clinical use of frozen semen: report of four cases. *Fertil Steril*, 5, pp. 520-29.

Bungum, M., Humaidan, P., Spano, M., Jepson, K., Bungum, L., Giwercman, A. (2004) The predictive value of sperm chromatin structure assay (SCSA) parameters for the outcome of intrauterine

insemination, IVF and ICSI. *Hum Reprod*, 19(6), pp. 1401-8.

Cayli S, Jakab A, Ovari L, Delpiano E, Celik-Ozenci C, Sakkas D, et al. (2003) Biochemical markers of sperm function: male fertility and sperm selection for ICSI. *Reprod Biomed Online*, 7, pp. 462-8.

Correa, F., Soto, V. and Zazueta, C. (2007) Mitochondrial permeability transition relevance for apoptotic triggering in the post-ischemic heart. *Int J Biochem Cell Biol*, 39, pp. 787-798.

Cui, J., Holmes, E.H., Greene, T.G., Liu, P.K. (2000) Oxidative DNA damage precedes DNA fragmentation after experimental stroke in rat brain. *FASEB J*, 14, pp. 955-67.

Curry, M.R. (2000) Cryopreservation of sperm from domestic livestock. *Review of Reproduction*, 5, pp. 46-52.

De Iuliis, G.N., Wingate, J.K., Koppers, A.J., McLaughlin, E.A., Aitken, R.J. (2006) Definitive evidence for the nonmitochondrial production of superoxide anion by human spermatozoa. *J Clin Endocrinol Metab*, 91, pp. 1968-1975.

De Lamirande, E., Jiang, H., Zini, A., Kodama, H., Gagnon, C. (1997) Reactive oxygen species and sperm physiology. *Rev Reprod*, 2, pp. 48-54.

Donnelly, E.T., Lewis, S.E.M., McNally, J., Thompson, W. (1998) In vitro fertilization and pregnancy rates: the influence of sperm motility and morphology on IVF outcome. *Fertil Steril*, 70, pp. 305-314.

Erenpreiss, J., Spano, M., Erenpreisa, J., Bungum, M., Giwercman, A. (2006) Sperm chromatin structure and male fertility: biological and clinical aspects. *Asian J Androl*, 8, pp. 11-29.

Evenson, D.P. and Jost, L.K. (2002) Sperm Chromatin Structure Assay: Its Clinical Use for Detecting Sperm DNA Fragmentation in Male Infertility and Comparisons With Other Techniques. *Andrology Lab Corner*, 23(1).

Ford, C.L. and Rees, J.M. (1990) The bioenergetics of mammalian sperm motility. In Gagnon, C. (ed.) *Controls of Sperm Motility: Biological and Clinical Aspects*. CRC Press, Boca Raton, FL, pp. 175-202.

Foulkes, J.A. (1977) The separation of lipoprotein from egg-yolk and their effect on the motility and the integrity of bovine spermatozoa. *J Reprod Fertil*, 49, pp. 277-284.

Gamzu, R., Yogev, L., Botchan, A., Amit, A., Lessing, J.B., Lichtenberg, D., et al. (1997) Effect of sperm preparation with TEST yolk buffer on sperm-binding capacity under hemizona assay conditions. *Andrologia*, 29, pp. 17-21.

Gao, D.Y., Liu, C., McGann, L.E., Watson, P.F., Kleinhans, F.W., Mazur, P., Critser, E.S., Critser, J.K. (1995) Prevention of osmotic injury to human spermatozoa during addition and removal of glycerol. *Hum Reprod*, 10, pp. 1109-1122.

Gilmore, J.A., Liu, J., Gao, D.Y., Critser, J.K. (1997) Determination of optimal cryoprotectants and procedures for their addition and removal from human spermatozoa. *Hum Reprod*, 12, pp.112-118.

Gosalvez, J., Cortes-Gutierrez, E.I., Nunez, R., Fernandez, J.L., Caballero, P., Lopez-Fernandez, C., et al. (2009) A dynamic assessment of sperm DNA fragmentation versus sperm viability in proven fertile human donors. *Fertil Steril*, 92(6), pp. 1915-9.

Hammerstedt, R.H., Graham, J.K. and Nolan, J.P. (1990) Cryopreservation of mammalian sperm: what we ask them to survive. *J Androl*, 11, pp. 73-88.

Hoagland, H. and Pincus, G. (1942) Revival of mammalian sperm after immersion in liquid nitrogen. *J Gen Physiol*, 25, pp. 337-344.

Hughes, C.M., Lewis, S.E.M., McKelvey-Martin, V.J., Thompson, W. (1996) A comparison of baseline and induced DNA damage in human spermatozoa from fertile and infertile men using a modified comet assay. *Mol Hum Reprod*, 2, pp. 613-620.

Huszar, G., Celik-Ozenci, C., Cayli, S., Zavaczki, Z., Hansch, E., Vigue, L. (2003) Hyaluronic acid binding by human sperm indicates cellular maturity, viability, and unreacted acrosomal status. *Fertil Steril*, 79(Suppl 3), pp. 1616-24.

Huszar, G., Jakab, A., Sakkas, D., Celik-Ozenci, C., Cayli, S., Delpiano, E., et al. (2007) Fertility testing and ICSI sperm selection by hyaluronic acid binding: clinical and genetic aspects. *Reprod Biomed Online*, 14, pp. 650-63.

Ijaz, A., Hunter, A.G. and Graham, E.F. (1989) Identification of the capacitating agent for bovine sperm in egg yolk-TEST semen extender. *J Dairy Sci*, 72, pp. 2700-2706.

Irvine, D.S., Twigg, J.P., Gordon, E.L., Fulton, N., Milne, P.A., Aitken, R.J. (2000) DNA integrity in human spermatozoa: relationships with semen quality. *J Androl*, 21(1), pp. 33-44.

Isachenko, V., Isachenko, E., Katkov, I.I., Montag, M., Dessole, S., Nawroth, F., Van Der Ven, H. (2004b) Cryoprotectant-free cryopreservation of human spermatozoa by vitrification and freezing in vapor: effect on motility, DNA integrity, and fertilization ability. *Biol. Reprod*, 71, pp. 1167-1173.

Jacobs, B.R., Caulfield, J. and Boldt, J. (1995) Analysis of TEST (TES and Tris) yolk buffer effects on human sperm. *Fertil Steril*, 63, pp. 1064-1070.

Jeyendran, R.S., Gunawardana, V.K., Barisic, D., Wentz, A.C. (1995) TEST-yolk media and sperm quality. *Hum Reprod Update*, 1, pp. 73-9.

Keel, B.A., Webster, B.W. and Roberts, D.K. (1987) Effects of cryopreservation on the motility characteristics of human spermatozoa. *J Reprod Fertil*, 81, pp. 213-220.

Keel, B.A., Webster, B.W. and Roberts, D.K. (1993), Semen cryopreservation methodology and results. In: Barratt, C.L.R., Cooke, I.D., eds. Donor insemination. Cambridge University Press, pp. 71-96.

Lanzendorf, S.E., Holmgren, W.J. and Jeyendran, R.S. (1992) The effect of egg yolk medium on human sperm binding in the hemizona assay. *Fertil Steril*, 58, pp. 547-550.

Lovelock, J.E. (1957) The denaturation of lipid-protein complexes as a cause of damage by freezing. *Proceedings of the Royal Society of London. Series B, Biological Sciences*, 147(929), pp.427-433.

Mahadevan, M.M., Miller, M.M. and Moutos, D.M. (1997) Absence of glucose decreases human fertilization and sperm movement characteristic in vitro. *Hum. Reprod.*, 12, pp. 119-123.

Morris, I.D., Ilott, S., Dixon, L., Brison, D.R. (2002) The spectrum of DNA damage in human sperm assessed by single cell gel electrophoresis (Comet assay) and its relationship to fertilization and embryo development. *Hum Reprod*, 17(4), pp. 990-8.

Moustafa, M.H., Sharma, R.K., Thornton, J., Mascha, E., Abdel-Hafez, M.A., Thomas, A.J. Jr, et al. (2004) Relationship between ROS production, apoptosis and DNA denaturation in spermatozoa from patients examined for infertility. *Hum Reprod*, 19, pp. 129-38.

Muratori, M., Maggi, M., Spinelli, S., Filimberti, E., Forti, G., Baldi, E. (2003) Spontaneous DNA fragmentation in swim-up selected human spermatozoa during long term incubation. *J Androl*, 24(2), pp. 253-62.

Nallella, K.P., et al. (2004) Cryopreservation of human spermatozoa: comparison of two cryopreservation methods and three cryoprotectants. *Fertility and sterility*, 82(4), pp.913-8.

Overstreet, J.W. and Drobnis, E.Z. (1993) Sperm transport in the female tract. In: Barratt CLR, Cooke ID, eds. *Advances in Donor Insemination*. Cambridge: Cambridge University Press: in press.

Parmegiani, L., Cognigni, G.E., Bernardi, S., Troilo, E., Ciampaglia, W., Filicori, M. (2010) "Physiologic ICSI": Hyaluronic acid (HA) favors selection of spermatozoa without DNA fragmentation and with normal nucleus, resulting in improvement of

embryo quality. *American Society for Reproductive Medicine*, 93(2), pp. 598-603.

Ragni, G., De Laurentis, L., Ambrogio, G.D., Pellegrini, S., Maggioni, P., Vegetti, W., Perotti, L., Dalla Serra, A., Parazzini, F., Crosignani, P.G. (1998) Semen preparation by standard swim-up versus swim-up with test yolk buffer incubation in intrauterine insemination: A randomized study. *Hum Reprod*, 13, pp. 1859- 1863.

Sakkas, D., Seli, E., Bizzaro, D., Tarozzi, N., Manicardi, G.C. (2003) Abnormal spermatozoa in the ejaculate: abortive apoptosis and faulty nuclear remodelling during spermatogenesis. *Reprod Biomed Online*, 7, pp. 428-432.

Sakkas, D. and Alvarez, J.G. (2010) Sperm DNA fragmentation: mechanisms of origin, impact on reproductive outcome, and analysis. *Fertility and Sterility*, 93(4), pp. 1027-1036.

Samplaski, M.K., Dimitomanolakis, A., Lo, K.C., Grober, E.D., Mullen, B., Garbens, A., Jarvi, K.A. (2015) The relationship between sperm viability and DNA fragmentation rates. *Reproductive Biology and Endocrinology*, 13, pp. 42.

Smirnov, I.V. (1949) Preservation of domestic animal semen by deep cooling. *Sovetskaja Zootechnia*, 4, pp. 63-65.

Spano, M., Bonde, J.P., Hjollund, H.I., Kolstad, H.A., Cordelli, E., Leter, G. (2000) Sperm chromatin damage impairs human fertility. The Danish First Pregnancy Planner Study Team. *Fertil Steril*, 73(1), pp. 43-50.

Storey, B.T. (1997) Biochemistry of the induction and prevention of lipoperoxidative damage in human spermatozoa. *Mol Hum Reprod*, 3, pp. 203-214.

Taylor, S.L., Weng, S.L., Fox, P., Duran, E.H., Morshedi, M.S., Oehninger, S., Beebe, S.J. (2004) Somatic cell apoptosis markers and pathways in human ejaculated sperm: potential utility as indicators of sperm quality. *Mol Hum Reprod*, 10, pp. 825-834.

Thornberry, N.A. and Lazebnik, Y. (1998) Caspases: enemies within. *Science*, 281, pp. 1312-1316.

Virro, M.R., Larson-Cook, K.L. and Evenson, D.P. (2004) Sperm chromatin structure assay (SCSA) parameters are related to fertilization, blastocyst development, and ongoing pregnancy in in vitro fertilization and intracytoplasmic sperm injection cycles. *Fertil Steril*, 81(5), pp. 1289-95.

Watson, P.F., Kunze, E., Cramer, P., Hammerstedt, R.H. (1992) A comparison of critical osmolality and hydraulic conductivity and its activation energy in fowl and bull spermatozoa. *J Androl*, 13, pp. 131-138.

Watson, P.F. (1995) Recent developments of concepts in the cryopreservation of spermatozoa and the assessment of their postthawing function. *Reprod Fertil Dev*, 7, pp. 871-891.

Wundrich, K., Paasch, U., Leicht, M., Glander, H.J. (2006) Activation of caspases in human spermatozoa during cryopreservation-an immunoblot study. *Cell Tissue Bank*, 7, pp. 81-90.

Zamboni, L. (1982) The ultrastructure pathology of the spermatozoon as a cause of infertility—the role of the electron-microscopy in the evaluation of semen quality. *Fertil. Steril.*, 48, pp. 711-734.

Zavos, P.M., Correa, J.R. and Zarmakoupis-Zavos, P.N. (1998) Antisperm antibody treatment mode: Levels of antisperm antibodies after incubation with TEST-yolk buffer and filtration using the SpermPrep™ II method. *Fertil Steril*, 69, pp. 517-521.

Zini, A. and Sigman, M. (2009) Are tests of sperm DNA damage clinically useful? Pros and cons. *J Androl*, 30(3), pp. 219-29.