

## THE EFFECT OF OXYGEN FREE RADICALS ON HUMAN SPERM FUNCTION AND AGING

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### ABSTRACT

various scientific evidences elucidated that oxidative stress (os) have pivotal role, Instead as a causative factor of many degenerative processes, aging, and infertility. os is caused by increase in production of reactive oxygen species (ros) and decrease in antioxidant scavenging activity.

spermatozoa were produced within the testis unto ejaculated into reproductive female tracts, continuously exposed in oxidative environmental condition. on the other hand spermatozoa are very sensitive to ros, due to high level of unsaturated fatty acid in the spermatozoa membrane. the little amount of sperm cytoplasm will result in sperm possess a limited ability to produce antioxidant and dna repairing. accordingly, the existence of ros in ejaculates and female reproductive tracts will be a highly potential to influent male infertility status via declining sperm functions.

in addition to ros have effect to declines sperm functions ros also have the role in biological aging. among other aging theories, the free radicals theories are most prominent and have been accepted by large extent of scientist. the free radicals theories may explain the causes of aging better than many other theories. aging is the consequence of biomolecular damage accumulation caused by ros produced by cell that have been oxygen consuming. oxygen is highly necessitated in mitochondrial respiration, thus mitochondria and its dna (mtdna) as an oxidation target in mitochondrial respiratory, especially in postmitotic cells. meanwhile the repairing ability of mtdna in postmitotic cells is extremely low, therefore when the mtdna damage the aging process is initiated.

ros physiologically is byproduct of enzymatic oxidation-reduction process within cells. several cells inherently instead producing ros in charge with physiological function. for instance ros which is produced by leucocytes are very useful for defense mechanism, and ros produced by spermatozoa have some very important role for capitation, hyperactivation, and sperm-oozyte

fusion.  $\text{ros}$  is highly reactive and destructive toward cellular structures, therefore  $\text{ros}$  have dual action effect, physiologic in low level, and pathologic in high level. to avoid cells undergo oxidative stress, the antioxidant and pro-oxidant balance in cells are needed. for these purposes cells have been expressing several protein antioxidant genes such as superoxide dismutase (sod), catalase (cat), and glutathione peroxidase (gpx). various conditions arise from internal and external human bodies may push aside the balance to pro-oxidant, therefore inducing oxidative stress, infertility, and aging.

keywords:  $\text{ros}$ , sperm function, aging