

SELENIUM DEFICIENCY AND MALE INFERTILITY

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The World Health Organization defines infertility as the inability of a sexually active couple (at least three times per month), not using contraception, to achieve pregnancy within one year. About 15 % of sexually active couples are infertile and male factor infertility contributes to about 50 % of the infertility cases. One of factors leading to infertility in men is deficiency of micronutrients.

Selenium (Se) is an essential trace nutrient for humans and animals. Se discovered by Berzelius as early as 1817. Plant foods are the major sources of Se most countries throughout the world. The amount of Se present in the plant material depends upon the concentration of Se in the soil of that region as it varies by region. In some northern regions of Ukraine Se decrease in soil is marked.

Se deficiency has been linked to reproductive problems in many animals. Se is required for normal testicular development and spermatogenesis in rats and supplementation with Se to improve reproductive performance at them. Low sperm production and poor sperm quality including impaired motility with flagella defects localized primarily to the midpiece has been a consistent feature in Se deficient animals.

Se, in the form of selenocysteine, functions as the catalytic center in the active sites of at least 9 human enzymes, including 4 glutathione peroxidase antioxidant enzymes (protective role of oxidative stress, present in spermatids which becomes a structural protein comprising over 50 percent of the mitochondrial capsule in the mid-piece of mature spermatozoa), 3 iodothyronine deiodinases involved in thyroid hormone metabolism (provides synthesis of testosterone).

Main role in testicular function is corroborated by the observation that, in mild deficiency, Se is preferentially retained in testis. With progressive Se deficiency pathogenesis it is presented morphological alterations of spermatids and spermatozoa. Extreme deficiency results in the complete disappearance of mature germinal cells. Low concentrations of seminal plasma Se may be harmful to male fertility. It is established, that serum Se lower in men with oligozoospermia and azoospermia than in healthy. Supplements with Se has been associated with positive effects on male infertility, which appear synergistic when used with other antioxidant. Optimal dosing appears to be between 100 and 210 μg on day.

Thus, Se is essential micronutrient for male reproductive system and Se deficiency associated with infertility.