

## Effects of Diabetes on the Male Genital System

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DOI: 10.31080/ASVS.2023.05.0627

Received: February 13, 2023

Published: March 16, 2023

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### Abstract

Diabetes is a disease that develops when the secretory gland called the pancreas in the body does not produce enough insulin hormone or the insulin hormone it produces cannot be used effectively. Diabetes brings the following problems: eye problems, foot wounds, kidney disorders, cardiovascular disorders, susceptibility to infections, sexual problems. The information given below has been compiled to highlight the relationship of diabetes with reproductive parameters.

**Keywords:** Diabetes Mellitus; Sperm Cell; Oxidative Stress; Reproduction; Testis

### Introduction

Diabetes mellitus; it is a chronic and complex metabolic disease that progresses with the disorder of protein, carbohydrate and fat metabolism and develops microvascular and macrovascular complications [7]. Insulin-dependent diabetes mellitus is characterized by elevated blood glucose levels due to a deficiency in insulin production. As a result, organ and function losses occur (9; 14). Diabetes Mellitus (DM) reduces sperm quality by causing changes in the blood testicular barrier [2].

In diabetic individuals, oxidative stress increased with the increase of reactive oxygen products and the protective power against antioxidants decreased. Mitochondrial DNA mutations are increased in diabetic tissues. This is thought to occur as a result of oxidative stress [10]. Diabetes also causes a decrease in sperm DNA integrity [2]. Diabetes reduces sperm concentration and ATP level, increases lipid peroxidation and oxidative stress [2]. Diabetes causes histopathological changes in testicles, decreasing testosterone levels, increasing degeneration and inflammation in testicles [8]. Diabetes causes a decrease in testicular weight and narrows the tubules [11].

While there is a decrease in the progressive motility rate in spermatozoa from diabetic patients, there is an increase in DNA fragmentation and a decrease in the blastocyst and pregnancy rate obtained from this sperm cells [15]. Low mitochondrial membra-

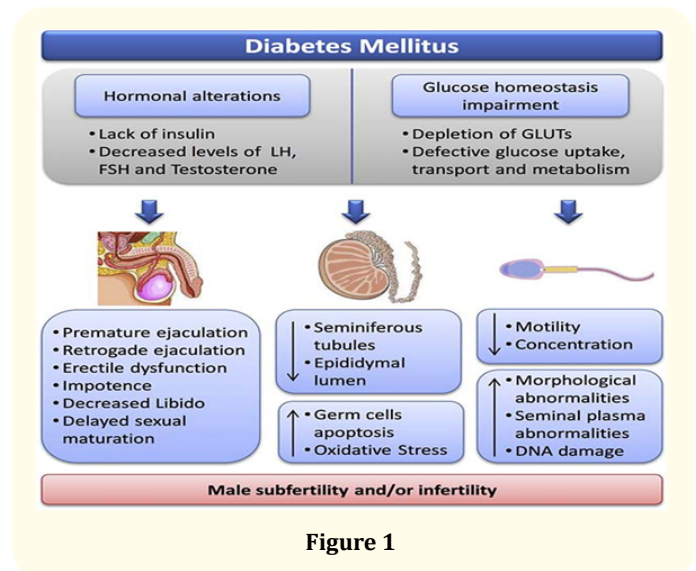


Figure 1

ne potential and activated caspase 3 are also noted in spermatozoa from diabetic patients [16].

Some researchers think that the decrease in sperm concentration is due to the drastic effect of hyperglycemia in the late stages of spermatogenesis. This is probably due to the increase of reactive oxygen products. This type of oxidative damage can also cause loss of sperm motility (1; 13; 19). Changes in carbohydrate homeostasis, such as diabetes, cause dysfunction in the reproductive systems

of laboratory animals, and adversely affect not only the hypothalamic cycle but also the reproductive organs (6; 12; 20).

Diabetes causes weight loss in the body and reproductive organs. These changes are associated with metabolic changes. For example; decrease in testosterone levels. Diabetes; it causes impotence, infertility, backward ejaculation, decreased fertility and libido by causing decreased semen number in testicles and epididymis [4]. DM can affect the male reproductive tract due to many factors. These factors are; may be directly impaired spermatogenesis, impaired penile erection and ejaculation [18].

Hyperglycemia in type 1 diabetes; It also affects energy level and sperm concentration. In this disease, decreased ATPase and phosphatase enzyme activity in epididymis and spermatozoa have been observed. Such factors affect the motility and fertility capability of sperm [17].

## Conclusion

Diabetes mellitus not only affects metabolic events but also negatively affects the reproductive system. In this sense, the negative effects of diabetes should be minimized by taking the necessary precautions.

## Conflict of Interest

There is no conflict of interest between the authors.

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