

Abstract

Reduced fertility is a growing problem through the population in fertile age. It currently affects 10-15% of couples; any method of assisted reproduction cannot help 10% of them. The effort to identify new prognostic markers that would help to improve the effectiveness of treatments of infertility assumes increasing significance.

The first part of this publication is focused on the study of levels of selected hormones and markers of oxidative stress in follicular fluid of women with diagnosis of infertility compared to healthy and fertile donors of oocytes. Levels of prolactin, free T3 and T4 hormone, homocysteine, malonydiladehyd, glutathione peroxidase and total antioxidant capacity and were analyzed.

Next part is devoted to the difference between these parameters in women with normal body mass index (BMI) compared to women suffering from overweight.

The second half of this work is focused on the male factor of infertility. The aim of our study was to determine comprehensively mitochondrial respiratory activity of sperm with normal and reduced motility and to evaluate the impact of propolis on human sperm motility. Respiratory activity of sperm was measured using oxygraph Oroboros.

The results showed significantly higher levels of prolactin and free T4 hormone in follicular fluid of infertile women in comparison to the group of healthy fertile oocyte donors. On the contrary, the study showed significantly higher homocysteine level in the follicular fluid of healthy fertile women. We observed significantly lower levels of glutathion peroxidase in the group of overweight women. The pregnancy success rate with women with normal BMI and overweight women did not differ significantly from each other.

In studies dealing with determination of oxygen consumption by human sperm, asthenozoospermatic samples displayed significantly reduced activity of complex I.

In samples treated with propolis, progressive motility was preserved in time. In these samples, oxygen consumption in the presence of adenosine diphosphate and substrates of the Complex I and Complex II were significantly increased.

Our study confirms that follicular fluid and its substances play a key role in the regulation of reproductive processes. Further study of oocyte donors and their detailed comparison with infertile patients with various gynecological causes of infertility will be beneficial further to clarify the pathophysiological mechanisms regulating fertility.

The results of the study formed on human spermatozoa suggest that increased leakage of protons from the mitochondrial matrix, which leads to reduced efficiency of phosphorylating process, could participate in the reduced sperm motility. Better characterization of male germ cells, either completely healthy or with affected motility, will help us to understand better the physiological process of fertilization and also to choose the most viable sperm for infertility treatment by methods of assisted reproduction.