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**Editor**

**Komarytskyy M.L.**

*Ph.D. in Economics, Associate Professor*

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**e-mail:** [barca@sci-conf.com.ua](mailto:barca@sci-conf.com.ua)

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**THE INFLUENCE OF DIFFERENT TYPES OF ALCOHOL ON THE  
CELLULAR LINK OF IMMUNITY IN INFERTILE MEN**

**Vorontsova Lolita Leonidivna,**

Doctor of Medical Sciences, professor,

Head of the Department

**Kovalenko Victoria Anatoliivna,**

Candidate of Biological Sciences, Associate Professor

**Kozachuk Oleksandr Serhiyovych,**

Assistant

Department of Laboratory Medicine

Zaporizhzhia State Medical and Pharmaceutical University

Zaporizhzhia, Ukraine

**Abstract.** The relationship between changes in semen parameters in the presence of sperm DNA fragmentation in men of reproductive age with impaired reproductive function was investigated. It has been established that changes in semen analysis indicate the presence of astheno-, oligo- and teratozoospermia, dyskinesia, and are dependent on the level of sperm DNA fragmentation. Thus, the more severe the changes in the key parameters of the spermogram, the greater the probability that the frequency of sperm DNA fragmentation will be higher than normal.

**Keywords:** male infertility, the degree of immunological disorders, non-specific immunity, semen analysis.

According to the WHO, among the many factors that affect the reproductive function of men, a significant role belongs to lifestyle. [1, p. 579-584; 2, p. 8-17]. Of particular interest is the study of the influence of alcohol abuse on ejaculate fertility, which is widespread among the male population and, especially, among men of reproductive age [3, p. 50-52].

According to WHO in Ukraine the total annual consumption of alcohol in litres of pure ethanol per head (aged between 15 and elder) is 13.9 litres, annual consumption with regard for kind of alcoholic drink makes as following: strong

alcoholic drinks - 48 %, beer - 40 %, wine - 9 %, others - 3 % [4]. The most common alcoholic drink among young people is beer, according to the consumption of which Ukraine ranks second among European countries [5, p. 91-98].

В свою очередь, иммунная система также оказывает влияние на обеспечение нормального репродуктивного процесса [6, p. 54-62]. There is a small number of works [7, p. 54-63; 8, p. 339-350], devoted to the peculiarities of the violation of indicators of the cellular link of innate immunity in men in a state of alcohol intoxication, and the points of view on this problem are not unambiguous. The complexity of the interpretation of the frequency and severity of the resulting disorders is probably explained by the fact that there were absolutely no studies that took into account the intake of various types of alcohol, in particular - beer, strong and mixed alcoholic beverages.

In this regard, **the aim of our research** was to study the peculiarities of changes in cellular factors of innate immunity in men of reproductive age, depending on the type and amount of alcohol consumed.

### **Material and methods**

73 men aged between 24 and 45 years old (average age is 35) have been examined. All patients have been divided into three groups. The first (control one) included 17 healthy fertile men, who don't consume any alcoholic drinks and have 1-2 children. The second group (comparison) included 17 men fertile damages free, who consume all kinds of alcoholic drinks but don't abuse them (1 - 2 alcohol doses approximately once per 1 - 3 months). The third group has been composed of 39 men with ejaculate fertile damages, who drink excess alcohol (6 and more alcohol units for once only or 22 and more doses weekly). Depending on the kind of alcohol this group has been divided in three subgroups: 3a included 12 patients drinking excess strong alcohol; 3b included 15 patients drinking excess beer. 3c (combined group) numbered 12 patients drinking excess both beer and strong alcohol.

To assess alcohol consumption, the interrogation has been carried out with screening test AUDIT (Alcohol Use Disorders Identification Test) elaborated by WHO, where alcohol consumption has been assessed during last year [9, 10].

Proceeding from data obtained and WHO recommendations we have determined the following risks for using alcohol: higher (6 and more doses daily or more than 42 doses a week), middle (no more 5 doses a day or 22 - 41 doses a week); lower subgroup (no more than 3 - 4 doses a day or less than 22 doses a week [11]).

All men have been submitted to complex examination, including interrogation, semen analysis, studying condition of cellular agents in innate immunity and statistical interpretation of data obtained.

## **Results**

When examining the phagocytosis system in patients of group 2, a decrease in the absorbing and digesting capacity of neutrophils was revealed, an increase in the absorbing e and a decrease in the digesting function of monocytes was noted, which, nevertheless, indicates the incompleteness of phagocytosis of the indicated units against the background of the preservation of the functional and metabolic reserve of cells and the depletion of the microbicidal system.

In patients of group 3a, there was a decrease in both the absorbing capacity of neutrophils and their digesting function. When studying the monocytic unit, an increase in the absorbing function was observed, while the digesting capacity was reduced, which indicates the incompleteness of phagocytosis of both neutrophilic and monocytic units against the background of preserving the functional and metabolic reserve of cells and depletion of the microbicidal system.

When examining the phagocytosis system in patients of group 3b, a decrease in the absorbing and digesting function of both neutrophils and monocytes was revealed, which reflects the incompleteness of phagocytosis of the indicated units against the background of depletion of the functional-metabolic reserve and imbalance of the microbicidal system.

In patients of the 3c group, a decrease in the absorbing and digesting capacity of neutrophils was observed, an increase in the absorbing and a decrease in the digesting capacity of monocytes was observed, which, in turn, indicates incomplete phagocytosis of both neutrophilic and monocyte units against the background of depletion of the functional-metabolic reserve and microbicidal system.

Based on the obtained data, it was of interest to determine the degree of immunological disorders in all the groups of patients with reproductive disorders that we studied, depending on the type of alcoholic beverages consumed.

For group 2, the formula for disorders of the immune system of the neutrophilic unit has a type:  $NPI_{30}^{-1} NPN_{30}^{-2} NPI_{120}^{-1} NPN_{120}^{-2} NBT_{sp}^{-1}$  (which is typical for 1st-2nd degree insufficiency).

For a monocytic unit –  $MPI_{30}^{-1} MPN_{30}^{-2} MPI_{120}^{+1} MPN_{120}^{-2}$  (which is characteristic of 1-2 degree insufficiency).

For group 3a, the formula of the neutrophilic unit has a type:

$NPI_{30}^{-1} NPN_{30}^{-2} NPI_{120}^{-1} NPN_{120}^{-2} NBT_{sp}^{-1} NBT_{st}^{+1}$  (that characterizes changes from insufficiency to activation of the 1st degree).

For a monocytic unit –  $MPI_{30}^{-1} MPN_{30}^{-1} MPI_{120}^{+1} MPN_{120}^{-2}$  (that characterizes changes from insufficiency to activation of the 1st degree).

For group 3b, the formula of the neutrophilic unit has a type:

$NPI_{30}^{-1} NPN_{30}^{-1} NPI_{120}^{-1} NPN_{120}^{-2} NBT_{sp}^{-1} NBT_{st}^{-1}$  (which is characteristic of 1-2 degree insufficiency).

For a monocytic unit –  $MPI_{30}^{-1} MPN_{30}^{-1} MPI_{120}^{+1} MPN_{120}^{-2}$  (that characterizes changes from insufficiency to activation of the 1st degree).

For group 3c, the formula of the neutrophilic unit has a type:

$NPI_{30}^{-1} NPN_{30}^{-1} NPI_{120}^{-1} NPN_{120}^{-2} NBT_{sp}^{-1} NBT_{st}^{-1}$  (which is typical for 1st-2nd degree insufficiency).

For a monocytic unit –  $MPI_{30}^{-1} MPN_{30}^{-1} MPI_{120}^{+2} MPN_{120}^{-2}$  (that characterizes changes from insufficiency to activation of the 2nd degree).

## Conclusions

1. Phagocytosis incompleteness of neutrophils link was observed in all groups under research with retaining functional and metabolic reserve in drinking strong alcohol and its exhaustion in drinking excess mixed alcohol.

2. Judging by the results of the assessment of the degree of disorders of the immune system in patients of all studied groups, it is possible to conclude that the most immunologically compromised are the 3b and 3c groups, in which 1-2 degree

insufficiency was observed, which probably reflects the negative effect of beer on the cellular factors of the innate immunity.

3. The depressing effect on the phagocytic system of beer is probably connected not only with the effects of ethanol, but also with the action of the non-alcoholic components present.

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