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THE WOMEN’S INHIBIN – A LEVEL WORKING AT THE ASTRAKHAN AS CONDENSATE COMPLEX

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The environmental factors are capable to exert various and often unfavorable influence upon the human organism’s health state [Isaev, 1997, Evdokimov V.V., 1998, Kurilo L.F., 2003]. And this is clearly being observed also in the Astrakhan region [Ushakov M.V. 2002]. In the Lower Volga, the «Astrakhan-GasProm» LTD is one of the main sources of the anthropogenic impact upon the human organism, having included in itself the enterprises’ complex, which are making the reservoir engineering of the Astrakhan gas condensate deposit and the produced gas condensate processing.

The natural gas of the Astrakhan gas condensate deposit (AGCD), its different components, and

their derivatives occupy ones of the central positions in the aggressive ecological factors complex and exert reliable influence upon the peculiarities of the morbidity structure in the Astrakhan region [Nikolayev A. A., 1999].

Therefore, the systematic influence study of the natural gas upon the various organs and the human organism’s functional systems, and also the experimental animals is being carried out. At the same time, the natural gas impact upon the reproductive function has not sufficiently been studied.

It is quite known, that the premature ovaries’ insufficiency (POI) is one of the least studied and the predictable ones in an aspect of the diagnostics and the medical treatment among the infertility reasons. So, the POI’s nature is not quite clear in the majority of the cases [Marchenko L.A., Alexandrova N.V., 2006]. The supply depletion of the primordial follicles up to its complete exhaustion and the atfollicular type of the POI’s formation, which is not peculiar to this age – related period, is the POI’s basis, independently from the aetiological factor. At present, it has been determined, that the methods, having based on the peptide level definition, and having generated in the ovary (e.g. the inhibin – A), possess the high level definition of the ovarian reserve. It is supposed, that the difference in the expression of the inhibin’s isoforms is depended from the follicle’s size.

The aim of our work has been the investigation of the women’s inhibin – A level, having worked at the AGCD, as the ovarian reserve indicator, depending on the length of working service at the given enterprise.

The ovarian reserve state has been estimated at 168 women from at the age of 22 up to 40 years (e.g. the average age has been $34,8 \pm 3,25$ years). 22 healthy women have made the control group of the analogous age – related structure with the preserved menstruations period, at whom the blood samples have been taken on the third day of the menstrual cycle. The ovarian reserve estimation (e.g. the inhibin – A level definition) has been carried out by means of the two – centered immune – enzyme test – system of the DSL firm (the USA).

The statistical data processing has been made at the PC IBM computer by means of the Microsoft Excel electronic worksheets and the application package of the Statistica for Windows v. 7.0, StatSoft Inc. (the USA). The connection between the studied indications has been estimated by the results of the correlation analysis with the calculation of the Pearson correlation coefficient (r) or the Spearman correlation coefficient (R) with the following definition of its significance by the t criterion.

The average inhibin – A level in the blood serum on the 3-rd – 5-th day of the menstrual cycle has been made up $15,2 \pm 2,4$ pg/ml ($10,8 – 19,2$ pg/ml) in the control group of the healthy fertile women.

The women, having worked at the AGCD, have been divided into 4 groups, depending on the length of working service at this enterprise. The women, having had the length of working service less, than 1 year (e.g. 45 persons) have been entered into the first group. The average inhibin – A level in the blood serum on the 3-rd – 5-th day of the menstrual cycle has been made up $17,6 \pm 6,1$ pg/ml (e.g. 8,8 – 22,2 pg/ml) in this group. The women with the length of working service at the AGCD from 1 year up to 2,5 years (e.g. 43 persons) have been entered into the second group. The average inhibin – A level in the blood serum on the 3-rd – 5-th day of the menstrual cycle has been made up $13,5 \pm 4,3$ pg/ml (e.g. 8,4 – 18,2 pg/ml) in this group. The women with the length of working service at the AGCD from 2,5 years up to 5 years (e.g. 49 persons) have been entered into the third group. The average inhibin – A level in the blood serum on the 3-rd – 5-th day of the menstrual cycle has been made up $9,8 \pm 6,1$ pg/ml (6,8 – 17,5 pg/ml) in this group. And, at last, the women with the length of working service at the AGCD more, than 5 years (e.g. 28 persons) have been entered into the fourth group. The average inhibin – A level in the blood serum on the 3-rd – 5-th day of the menstrual cycle has been made up $7,3 \pm 3,9$ pg/ml (5,3 – 15,5 pg/ml) in this group.

The statistical analysis has shown, that the reliable change of the serum inhibin – A level is not being registered at the women with the length of working service at the AGCD up to 2,5 years. The reliable ($p \leq 0,05$) decrease of the inhibin – A level in the blood serum is being registered at the more prolonged length of working service at the gas processing enterprise and the productions, which have been connected with it.

Thus, the received data testify, that the oxidation stress (Trizno N.N., 1996, Rezaev A.A., 2002) exerts the negative influence upon the women's endocrine system, and it causes the factors imbalance, having regulated the ovulation processes, and, having caused by the natural gas of the Astrakhan gas condensate deposit (AGCD), but more exactly, by the hydrogen sulfide, having contained in it. The sufficiently prolonged lag period presence between the contact beginning with the gas and the registered violations is permitted to hope, that the organized prophylactic arrangements in a right way will help to avoid the fertility violations.

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INFLUENCE OF DRINKING WATER QUALITY ON BLOOD PARAMETERS

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One of the global problems in the 21st century is to provide population with good-quality drinking water. The problem is especially acute in big cities.

The aim of our research was to study, how the quality of drinking water influences the hematological blood properties.

As a biological test object in our experiment, we used white outbred mature female rats (body weight 180-200 g). The experiment lasted 1 month. The animals were divided in two groups. The first (control) group included 15 female rats, which received bottled still water «Aqua Minerale» that has a balanced macro- and microelement content, according to the Russian sanitary standards. The second (experimental) group also contained 15 female rats, which drank the tap water provided by the city water facilities of Saransk in the Republic of Mordovia. The analysis of tap water's mineral content revealed, that a number of parameters exceed the maximal permissible concentration (MPC), for example: water hardness (8,22 mg/l; MPC – 7 mg/l), fluorine (1,85 mg/l; MPC – 1,5 mg/l), iron (0,34 mg/l; MPC – 0,3 mg/l), magnesium (72,9 mg/l; MPC – 40 mg/l), sodium and potassium (201,45 mg/l; MPC – 200 mg/l).

As a result, it was stated, that the animals from the experimental group showed no significant difference in appearance compared with the control group. However, we have observed a slightly higher agility of the animals that consumed the water with a higher level of macro- and microelements. Hematological blood analysis showed, that the erythrocyte content of blood in the experimental group was 11,7% higher than in control, leucocytes - 54,2% higher, hemoglobin - 4,2 % higher, erythrocyte sedimentation rate - 70 % higher, total protein - 19,4% higher, urea - 4,3% higher, creatinine - 113% higher ($p \leq 0,05$).

To sum up, the study results prove, that higher content of macro- and microelements in drinking water influences the hematological properties of blood and general health condition.

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