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ORIGINAL ARTICLE

THE ANALYSIS OF THE PATHOGENETIC FACTORS FOR THE PSYCHOSOCIAL MALADAPTATION FORMATION IN PATIENTS WITH ALCOHOL DEPENDENCE

ANALIZA CZYNNIKÓW PATOGENETYCZNYCH NIEPRAWIDŁOWEJ ADAPTACJI PSYCHOSPOŁECZNEJ U PACJENTÓW Z UZALEŻNIENIEM OD ALKOHOLU

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ABSTRACT

Introduction: The search for early diagnostic markers of the psychosocial maladaptation formation in alcohol dependence to optimize the treatment, rehabilitation and preventive measures in this cohort of patients is one of the urgent tasks of the contemporary narcology to date.

The aim: The purpose of the paper was to reveal the significant pathogenetic factors for the psychosocial maladaptation formation in patients with alcohol dependence.

Materials and methods: 290 male patients with alcohol dependence, aged 23 to 59 years have been involved into the comprehensive study that has been carried out using the clinicopsychopathological, psychodiagnostic, neuropsychological, biochemical and statistical methods. To determine the characterological features the Leonhard-Schmieschek questionnaire has been used; neuropsychological study has been conducted using the method, developed by O.R. Luria; the level of neuropsychological deficit has been assessed using the I. F. Roschina's rating scale; the research on social indicators to determine the level of maladaptation has been made using the questionnaire of N.K. Liphardt, V.P. Radchenko; the diagnostics of the states of hormonal regulation of carbohydrate metabolism has been made according to the criteria, developed by Ya. I. Tomashevskii, O.Ya. Tomashevskia; statistical data processing has been done using the factor and discriminant analyses.

Results: Multicentric study has been carried out to identify the common peculiarities of the pathogenic mechanisms of the psychosocial maladaptation formation in patients with alcohol dependence, which permitted to distinguish six main factors, i.e., factors of neurocognitive deficit, the state of carbohydrate metabolism, the level of maladaptation, physico-typological features, the clinical manifestations and hereditary load. The findings of the discriminant analysis have defined a list of variables that have the most significant impact on the patient classification according to the groups depending on the stage and physico-typological features, confirming the findings of the multicentric study.

Conclusion: The findings of the research have presented the groups of indices that elucidated the main pathogenetic mechanisms of the maladaptation formation in patients with alcohol dependence. The resulting data complement the existing views on the common pathogenetic mechanisms of the development of alcohol dependence.

KEY WORDS: alcohol dependence, pathogenetic factors, maladaptation

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INTRODUCTION

Chronic ethanol intoxication induces the extensive suppression of different structures of the central nervous system, causing the disorganization and impairment of highly integrated processes, including those related to the maintenance of homeostasis, leading to the progression of the disease and adverse health and social outcomes [1-3]. While treating the alcohol dependence in terms of the triad of adaptive reactions, there is an opinion that there are common immanent factors that are ultimately responsible for psychosomatic transformation of negative emotional-and-personal experiences and the formation of the addictive mechanisms of behavior that lead to the pathological addiction to alcohol [4].

At the current stage of the clinical and experimental study of the mechanisms of the alcohol dependence formation it has been found that disorders of the higher forms of adap-

tive activity, i.e., psychoemotional and psychophysiological adaptation, as well as the dysfunction of the adaptive mechanisms that are localized in the limbic system to determine the functional state of the sympathetic, parasympathetic and neuroendocrine system, are of significant importance [5-7]. The processes of disintegration of the endocrine systems lead to the formation of the human maladaptive states, intensifying the symptomatology of alcohol motivation. With the loss of sociocultural traditions and spiritual values the transition from one psychoemotional state to another can be one of the key mechanisms in the process of the alcohol dependence formation [8, 9]. The search for early diagnostic markers of maladaptation formation in alcohol dependence to optimize the treatment, rehabilitation and preventive measures in this cohort of patients is one of the urgent tasks of the contemporary narcology.

THE AIM

The purpose of the paper was to reveal the significant pathogenetic factors for the development of psychosocial maladaptation in patients with alcohol-related mental and behavioral disorders.

MATERIALS AND METHODS

290 male patients with alcohol dependence, aged 23 to 59 years have been involved into the comprehensive study that has been carried out using the clinicopsychopathological, psychodiagnostic, neuropsychological, biochemical and statistical methods.

The basic clinicopsychopathological method of examination has been applied for the evaluation of patients and identification of features of clinical presentation and progression of pathological process. Nosological diagnostics, i.e., mental and behavioral disorders caused by alcohol use (MBDA), was based on the ICD-10 (F10) criteria. The assessment of the severity of the disease (phase, stage) was based on the classification, developed by F.F. Portnov, I.N. Piatnitska (1971) and M.M. Ivanets [10], in which a traditional clinico-dynamic approach is preserved that reflects a common pathologic model of the progression of chronic diseases. The analysis of social indicators to determine the level of maladaptation using a tailored questionnaire, which contains a description of occupational attitudes (OA), interpersonal relations (IR), the range of interests (RI), measured by the 4-score scale (N.K. Liphardt, V.P. Radchenko, 1982). According to the degree of expressiveness, three alternates for psychosocial maladaptation have been considered: minor (Level I), moderate (Level II) and severe maladaptation (Level III). To determine the characterological features of the subjects the Leonhard-Schmieschek questionnaire (1970) has been used. Neuropsychological study has been conducted using the method, developed by O.R. Luria [11], and the level of neuropsychological deficit has been assessed using the I. F. Roschina's 5-score rating scale [12].

The study of the carbohydrate metabolism disorders on the model of the functional state of the pyruvate dehydrogenase complex (PDC) has been conducted using the following techniques: determination of the total content of α -keto acids in the night portion of urine; determination of the total content of α -keto acids in the 2-hour portion of urine following a carbohydrate breakfast; the analysis of the pyruvate concentration and PDC activity of the capillary blood within 2 hours after carbohydrate breakfast; determination of the level of blood glucose within 2 hours after carbohydrate breakfast. The diagnostics of the states of hormonal regulation of carbohydrate metabolism has been made according to the criteria, developed by Ya. I. Tomashevskii, O.Ya. Tomashevskia [13].

According to ICD-10 criteria, among all examined patients 80 individuals (27.6%) were diagnosed with MBDA and alcohol dependence (F 10.20); 102 individuals (35.2%) were diagnosed with withdrawal state with delirium (F 10.40 – 64, F 10.41-38); 11 individuals (3.7%)

were diagnosed with hallucinatory disorder (F 10.52); 14 individuals (4.8%) were diagnosed with delusional disorder (F 10.51); 28 individuals (9.7%) were diagnosed with withdrawal state with convulsions (F 10.31); 23 individuals (7.9%) were diagnosed with withdrawal state without convulsions (F 10.30); 15 individuals (5.2%) were diagnosed with sustained cognitive disorder (F 10.74); 9 individuals (3.1%) were diagnosed with the amnesic syndrome (F 10.6); 8 individuals (2.7%) were diagnosed with dementia (F 10.73). According to the stage of the disease all patients were classified as follows: Stage 1 (initial) – 34 patients (11.7%) and Stage 1-2 (transitional) – 46 patients (15.9%); Stage 2 (median) – 125 patients (43.1%); Stage 2-3 (transitional) – 53 patients (18.3%); Stage 3 (terminal) – 32 patients (11.0%). Among the examined patients the Level I of psychosocial maladaptation has been registered in 75 individuals (25.9%) with the following mean indices of the social factors: the OA index was rated with the score of 2.4 and the RI index was rated with the score of 1.8; the Level II has been registered in 147 individuals (50.7%) with the following indices: the OA index was rated with the score of 2.9, the IR index was rated with the score of 2.1, and the RI index was rated with the score of 2.5; the Level III has been registered in 68 individuals (23.4%), where OA index was rated with the score of 3.6, the IR index was rated with the score of 2.9, and the RI index was rated with the score of 3.2. Taking into account the physico-typological features all patients have been assigned into 4 groups: Group I involved 86 individuals (29.7%) with syntonetic characterological features; Group II involved 92 individuals (31.7%) with characterological features of the excitable type; Group III involved 59 (20.3%) individuals with asthenic characterological features; Group IV involved 53 (18.3%) individuals with dysthymic characterological features. The groups were representative by the age and socio-demographic indices.

RESULTS AND DISCUSSION

The multicentric study has been conducted to identify the common features of the pathogenic mechanisms of the maladaptation formation in patients with alcohol dependence. For this purpose the graph of the eigenvalues of the factors (the "scree" graph) (Fig. 1) has been made. The figure shows that 6 factors, which explain over 72% of the population variance, are enough to describe the subject.

Factor loading matrix of the multifactor model is presented in Table I. The Table shows that the factor of neurocognitive deficit explains 25% of the population variance and is associated with the age of beginning and duration of the alcohol abuse, the stage, cognitive impairments and indices of carbohydrate metabolism. Over 17% of the population variance is caused by the factor that characterizes the state of carbohydrate metabolism. It is associated with the duration of the disease, the age of the beginning of the alcohol abuse, the presence of cognitive impairments and delirious states in both the history and during the physical examination, the integral index of the

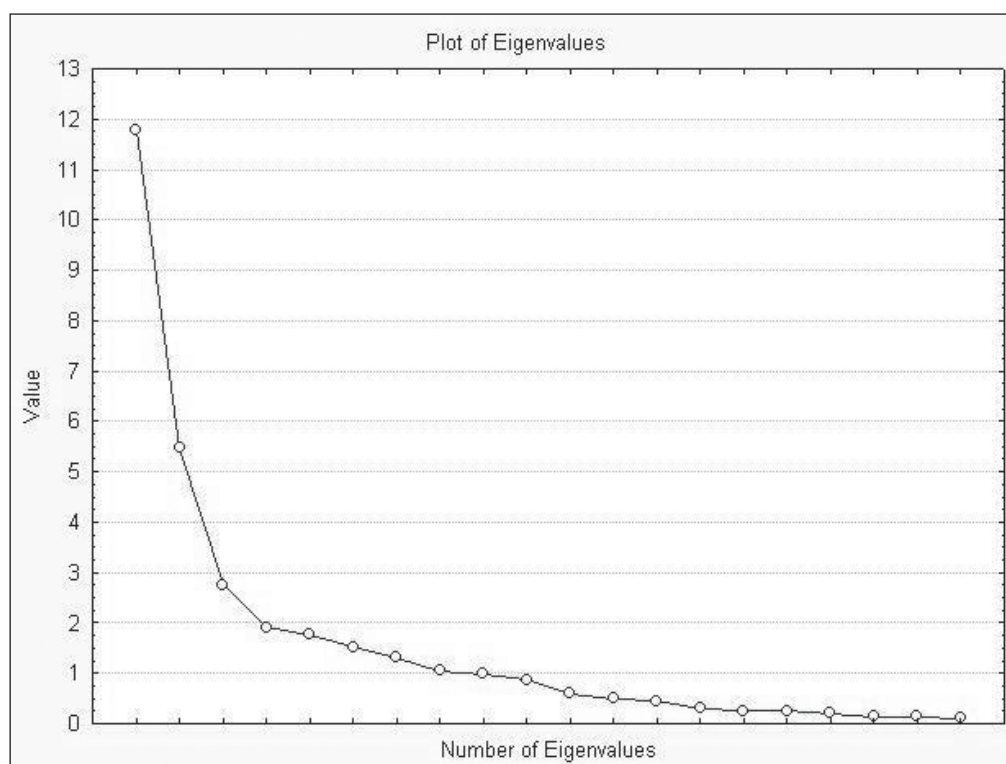


Fig. 1. The graph of the eigenvalues of the factors of the subject (n=290)

Table I. Factor loading matrix of the multifactor model in patients with alcohol dependence (n=290)

Manifestations	Factors					
	F1	F2	F3	F4	F5	F6
Group	0,007	0,129	0,231	0,894	0,166	0,538
Stage	0,845	0,209	0,179	-0,007	0,168	-0,062
Integral index of the findings of neuropsychological study	0,875	0,300	0,397	0,415	0,158	0,145
Integral index of the memory	-0,801	-0,231	0,247	0,168	-0,014	-0,241
Attention	-0,793	-0,197	0,110	0,009	0,056	-0,046
State of carbohydrate metabolism	0,489	0,573	0,143	0,291	0,146	0,054
Pyruvate	0,253	0,864	0,136	0,174	0,020	0,045
PDC	-0,355	-0,260	-0,206	-0,272	0,028	-0,086
Glucose	0,261	0,863	0,010	0,121	0,066	0,028
The age of the beginning of alcohol abuse	0,853	0,284	-0,511	0,059	0,145	-0,001
Duration of the disease	0,740	0,418	0,389	0,018	0,117	-0,008
Delirium	0,198	0,350	0,185	0,063	0,765	-0,075
Convulsions	0,094	-0,158	0,243	0,067	0,520	0,096
Cognitive impairments	0,799	-0,276	0,454	0,082	-0,474	-0,030
Recurrent delirium	0,177	0,351	0,216	0,001	0,699	-0,140
Duration of remission	0,061	0,182	-0,317	0,213	0,159	0,047
Level of maladaptation	0,174	0,052	0,649	0,078	0,097	0,239
Hereditary load of narcological diseases	0,076	0,021	0,364	0,053	-0,085	-0,668
Hereditary load of mental diseases	0,042	0,123	0,215	0,084	-0,134	0,718
Corrected dispersion	9,136	5,865	3,004	1,955	1,589	1,431
Stage of factorization	0,246	0,177	0,111	0,072	0,059	0,053

Note. Indices that are major ones in the formation of the corresponding factor are marked in bold.

Table II. Matrix of patient classification according to the stages of the disease

Stage	% of correctness	G_1:1	G_2:2	G_3:3
G_1:1	100,0	51	0	0
G_2:2	91,2	5	83	3
G_3:3	96,6	0	2	56
Total	95,0	56	85	59

Table III. The results of discriminant analysis of the patient classification according to the stages of the disease

Parameters	Analysis of discriminant function Number of the variables in the model: 8 the Wilks' Lambda: 0,08331, F (22,374)=41,899, p<0,0000					
	Wilks' Lambda	Partial lambda	F-extraction (2,187)	p-level	Tolerance	R ²
Age of the beginning of alcohol abuse	0,104	0,798	23,642	0,000	0,588	0,412
Convulsions	0,104	0,800	23,344	0,000	0,880	0,120
Psychoses	0,103	0,806	22,513	0,000	0,752	0,248
Delirium	0,091	0,916	8,596	0,000	0,756	0,244
Duration of the diseases	0,093	0,896	10,897	0,000	0,582	0,418
State of carbohydrate metabolism	0,090	0,924	7,668	0,001	0,495	0,505
Attention	0,110	0,758	29,829	0,000	0,704	0,296
Integral index of the findings of neuropsychological study	0,090	0,927	7,310	0,001	0,702	0,298

Table IV. Matrix of patient classification according to the physico-typological features

Group	% of correctness	G_1:1	G_2:2	G_3:3	G_4:4
G_1:1	85,5	47	6	2	0
G_2:2	81,7	5	49	3	3
G_3:3	61,7	5	8	29	5
G_4:4	73,7	1	4	5	28
Total	76,5	58	67	39	36

neurocognitive disorders. Over 11% of the population variance is caused by the factor that characterizes the level of maladaptation which closely correlates with the age of the beginning of alcohol abuse, duration of the disease, the presence of cognitive impairments, integral index of neurocognitive disorders, duration of remission, hereditary load of narcological diseases. Over 7% of the population variance is caused by the factor of the physico-typological features, associated with the integral index of the neurocognitive disorders and indices of carbohydrate metabolism. Clinical factor causes 6% of the population variance and demonstrates the close relationship of the acute psychoses and convulsions with cognitive impairments. Factor of the

hereditary load explains more than 5% of the population variance and determines the differences in the formation of the physico-typological features of the patients.

The Statistica 8.0 discriminant analysis of the patient classification according to the stages of the disease made by the method of incremental inclusion of the variables permitted to distinguish 8 signs that provide 95% accuracy of the patient classification. The classification matrix is presented in Table II.

In our study the key indices were the age of the beginning of alcohol abuse, duration of the diseases, convulsions and psychoses in the history, including delirium, the state of carbohydrate metabolism, attention impairments, the inte-

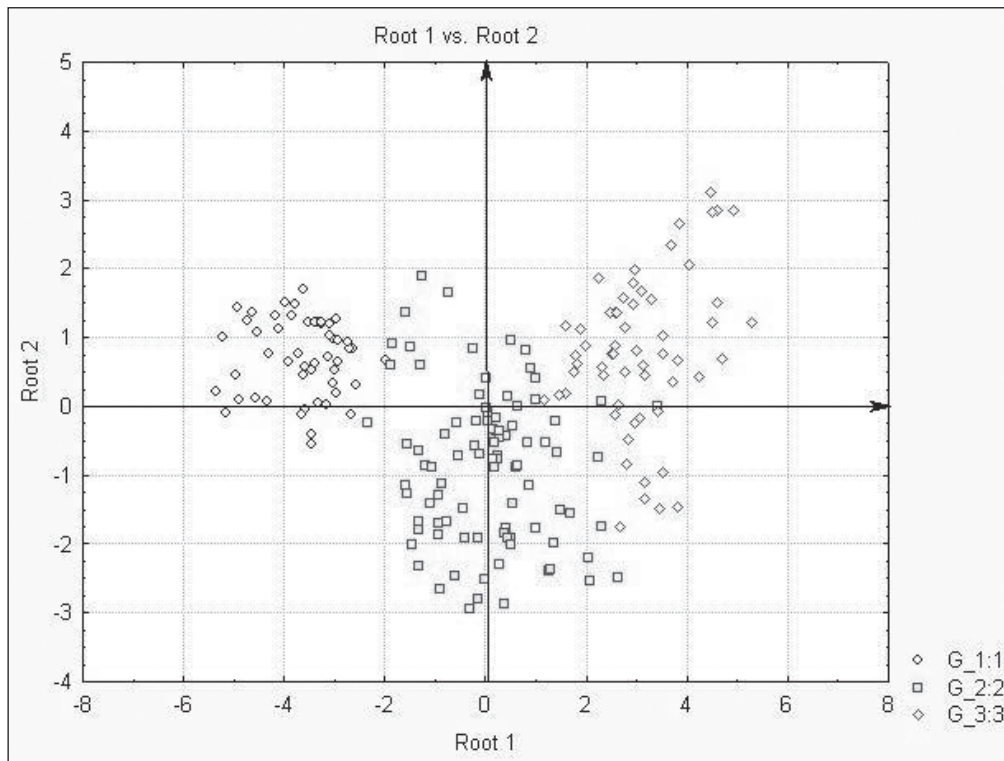


Fig. 2. Placement of groups of patient classification according to the stages of the disease in the space of the canonical variables

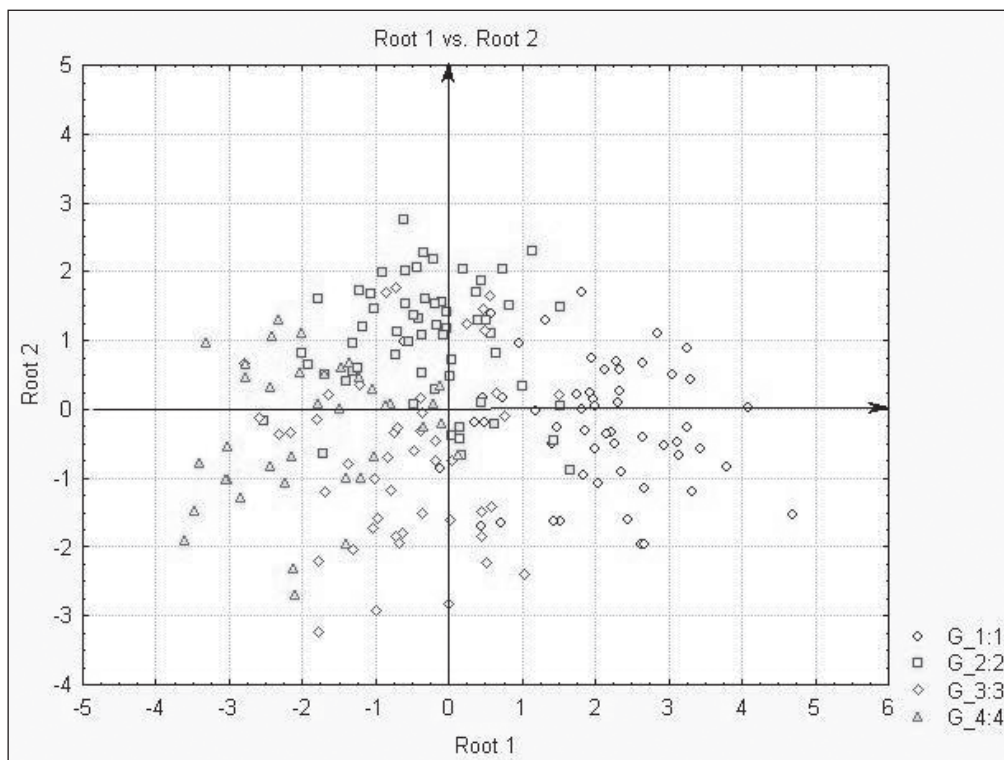


Fig. 3. Placement of groups of patient classification according to the physico-typological features in the space of the canonical variables.

gral index of the neurocognitive disorders. Close to zero the Wilk's value ($\lambda = 0.08$) and great $F = 41.9$ ($p < 0.0001$) statistic value give the evidence of the high capacity of the discriminative functions to identify the groups of classification. The results of discriminant analysis of the patient classification according to the stages of the disease are shown in Table III, and placement of groups of classification in the space of the canonical variables is presented in Fig. 2.

The discriminant analysis of the patient classification according to the groups depending on the physico-typological features made by the method of incremental inclusion of the variables permitted to distinguish 13 signs, providing 76,5% accuracy of the classification of patients. The classification matrix is presented in Table IV.

The results of discriminant analysis of the classification of patients according to the groups depending on the

Table V. The results of discriminant analysis of the patient classification according to the physico-typological features

Parameters	Analysis of discriminant function Number of the variables in the model: 13 the Wilks' Lambda: 0,15097 F (54,534)=8,7659 p<0,0001					
	Wilks' Lambda	Partial lambda	F-extraction (3,179)	p-level	Tolerance	R ²
Integral index of the findings of neuropsychological study	0,285	0,529	53,069	0,000	0,103	0,897
Attention	0,173	0,871	8,800	0,000	0,131	0,869
Long-range auditory-and-speech memory	0,168	0,899	6,667	0,000	0,155	0,845
Integral index of memory	0,165	0,913	5,690	0,001	0,045	0,955
Optospacial memory	0,163	0,929	4,595	0,004	0,120	0,880
Working memory	0,159	0,951	3,096	0,028	0,204	0,796
Pyruvate	0,179	0,844	11,038	0,000	0,429	0,571
The age of beginning of alcohol abuse	0,170	0,887	7,564	0,000	0,141	0,859
The level of maladaptation	0,161	0,939	3,854	0,011	0,805	0,195
Delirium	0,161	0,935	4,128	0,007	0,216	0,784
Recurrent delirium	0,162	0,930	4,516	0,004	0,421	0,579
Psychoses	0,160	0,945	3,439	0,018	0,606	0,394
Cognitive impairments	0,157	0,962	2,338	0,075	0,179	0,821

physico-typological features are shown in Table V, and placement of groups of classification in the space of the canonical variables is presented in Fig. 3.

In our study the major indices were the integral index of the neurocognitive disorders, reduced ability of focus, sustains, or shift attention, indices of the working, long-range auditory-and-speech and optospacial memory, the level of pyruvate, the age of beginning of alcohol abuse, the level of maladaptation, cognitive impairments, psychoses and delirious states in both the history and during examination. Close to zero the Wilk's value ($\lambda=0,15$) and $F=8,77$ ($p<0,0001$) statistic value give the evidence of the rather high capacity of the discriminative functions to identify the groups of classification.

The list of variables that have the most significant impact on the patient classification according to the groups depending on the stage and physico-typological features also confirms the findings of the multicentric study.

In the summary, it should be noted that findings of the study have revealed the diverse interactions of the investigated indices and their contribution to the maladaptation formation in patients with alcohol dependence. This shows the complexity and multilayered impairments of the processes of psychosocial adaptation under the influence of numerous biological, clinical and social factors.

CONCLUSIONS

Thus, the results of the factor and discriminant analyses permitted to form the groups of indices that elucidated

the main pathogenetic mechanisms of the maladaptation formation in patients with alcohol dependence. Such factors are neurocognitive deficit, the state of carbohydrate metabolism, the level of maladaptation, physico-typological features, clinical manifestations and hereditary load. The resulting data complement the existing views on the common pathogenetic mechanisms of the development of alcohol dependence.

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Conflict of interest:

The Author declare no conflict of interest

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