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Variability of Human Body Heat Conductivity in Population II. Diseases of Civilization

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ABSTRACT The purpose of the present research was to find out if wide variability of human body heat conductivity (BHC) in population influences the development of the so called "diseases of civilization". Peculiarities of individual's BHC suffering from alimentary form of obesity, alcoholism, drug addiction as well as healthy individuals were studied with the method of calorimetry. It was established that patients differ with significantly low BHC as opposed to control sample. Among patients, drug addicts had the lowest BHC, then alcoholics and individuals suffer from obesity. Obtained data confirm the assumption that possibly there is certain relationship between the level of human BHC and vulnerability to "diseases of civilization".

INTRODUCTION

Previously we have found out that individuals in population differ considerably from each other according to heat conductivity of their bodies (Ibraimov and Tabaldiev 2007). However, it turned out that the level of body heat conductivity (BHC) connects with sex, age and ethnicity (Ibraimov et al. 2010). Nevertheless, it is not clear if pheno-menon of wide variability of human BHC can impact in one way or the other on vital functions of physically and mentally healthy people.

Alimentary obesity, alcoholism and drug addiction turned out into serious medical and social problems for the recent decades. They are also called as "diseases of civilization" or "purely human being pathology". There exists a bulk of literature about obesity, alcoholism and drug addiction. Their detailed analysis is not our task. We limit ourself only by data presentation about picture of variability of BHC among human beings who suffer from "diseases of civilization".

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MATERIALS AND METHODS

Individuals suffering from alimentary obesity were selected from workers of hothouse economy of Bishkek Electro power Station. The age of examined women vary from 20 to 45 years. Women of Kyrgyz (n = 50) and Russian (n = 50) nationalities were examined in order to find out the possible role of racial and ethnical factor. Unfortunately, apart from the general medical examination and talks, we have not carried out subtle laboratory and instrumental studies aimed at detecting latent forms of endocrine disorders. Therefore, females with a weight of 20% or higher than a normal one fell into our test and the alimentary form of obesity from external clinical signs was diagnosed. The control consisted of phenotypically healthy Kyrgyz and Russian females of reproductive age whose weight was normal and they worked at the same place.

Alcoholics and drug addicts were selected from patients who are under supervision of narcologists in Bishkek City Narcological Dispensary. Age composition of patients was the same as in the group of individuals with alimentary obesity. However, their ethnic composition differ from the first group, that is except Kyrgyz and Russians were examined represen-tatives of all nationalities, who were treated and observed in the above mentioned medical establishment. All of them were males. The case is that thanks to the number of social and psychological factors in Kyrgyzstan women suffering from alcoholism and drug addiction either conceal it or do not seek medical care. That is why our sample included male alcoholics and drug addicts. Soldiers of the National Guard were used as control for diseased Kyrgyz (Ibraimov et al. 2010), as well as males in the age of 25-50 years old who do not abuse strong alcoholic beverage and narcotic substances.

Evaluation of individuals' body heat conductivity was carried out in closed room under the temperature of ~20°C. In the beginning the examined individual's temperature of left hand palm and armpit with the aid of mercury thermometer was taken. Palm temperature measurement was essential for preparing "hot" water in order to detect hand heat conductivity with the method of calorimetry. In order to prepare "hot" water for the given individual we added the figure nine to thermometer readings. For example, if individual's palm temperature is 31.0°C then the temperature of "hot" water for him should be 40.0°C.

Then we measured examined individuals' "hand volume" (HV) as we called it for convenience. For this purpose, they slowly immersed the left hand till the wrist into vessel with water full to the brim. Under the above mentioned vessel there is another vessel without water. The water pushed out by the hand of examined individual flowed out into the second vessel and was measured in milliliters. Then the value of that figure was multiplied by four with the aim that the received water volume allowed hand to exist free in the liquid and did not touch the vessel wall in the course of heat conductivity measurements. Such calculations were done in order to as much as possible decrease the influence of HV on the precision of estimation of heat conductivity of the given part of human body.

Examined individual sits on the chair, with body straightened, head is raised, hands are hanging on each side of the body naturally, and muscles are relaxed. Then examined individual slowly immersed left hand till the wrist (up to there where HV was detected) into domestic everyday thermos, volume is two liters, placed on the level of shin and filled with "hot" water. During the hand heat conductivity measurement which lasts for 20 minutes, examined individual does not have to distract, hands should be in the water and should not touch the wall of the thermos. In the end of the experiment, changes of the water temperature in the thermos were measured by mercury thermometer correct to the tenth degrees Celsius (t °C). For convenience of analysis of experiments, numerical results in every measurements when the level of mercury column coincide with uneven graduation line, its value was underestimated on one tenth part of degree in order to obtain even number. For example, if thermometer showed 1.5°C it was written down as 1.4°C. Shortly after hand immersion till the wrist into the thermos we layered on the water surface one teaspoon of vegetable oil for evaporation reduction. There were no other additional measures of protection against room temperature influence where researches were carried out. All measurements were carried out by specially trained medical personnel (Ibraimov et al. 2010).

The Student t-test was used to compare the mean numbers and Chi-square test to compare distributions of BHC characteristics.

RESULTS

Our previous experience showed that it is necessary to determine the difference of palm and armpit temperatures (T) for qualitative evaluation of human body heat conductivity. In order to estimate quantitatively hand heat-conductivity capacity of the given individual it is necessary experimentally measure the decrease of "hot" water T prepared taken into account his palm T (Ibraimov et al. 2010).

At the beginning we analyze the results of researches carried out on individuals who suffer from alimentary obesity. Data on the distribution and mean number of BHC in the samples studied are presented in tables 1 - 3. As can be seen from these tables, females with obesity regardless of their ethnic origin, are characterized by similarity in studied quantitative characteristics of BHC variability in population and allowed us to combine them into one group for subsequent comparative analyses.

However, individuals with alimentary obesity according to the same physical characteristics of BHC significantly differ from control - Kyrgyz and Russian females with normal weight (Tables 4 - 6). They are characterized by a consistently low value of the mean number and by narrow range of variability in BHC as compared with controls.

Quite a different picture of BHC distribution showed patients suffer from alcoholism (Tables 7 - 9) and drug addiction (Tables 10 - 12).

Table 1: Distribution of palms temperature (in ºC) with alimentary obesity

Temperature of palms (in ºC)	*Alimentary obesity*	
	Kyrgyz (n=50)	*Russians (n=50)*
29	9	13
30	20	16
31	10	7
32	8	7
33	3	6
34		1
Total	1526	1530
Mean number	30.52 ± 0.1621	30.60 ± 0.202
Statistics	t = 0.309; df = 98; P = 0.758;	
	χ^2 = 111.329; df = 12; P = <0.001;	

1 ± here and elsewhere standard error of the mean.

Table 2: Distribution of the temperature difference (in °C) between palm and armpit among female with alimentary obesity

Temperature difference (in ºC)	*Alimentary obesity*	
	Kyrgyz (n=50)	*Russians (n=50)*
3	4	8
4	7	6
5	10	8
6	21	18
7	8	10
Total	272	266
Mean number	5.44 ± 0.164;	5.32 ± 0.193;
Statistics	t = 0.474; df = 98; P = 0.637;	
	χ^2 = 122.232; df = 16; P = <0.001;	

Table 3: Distribution of body heat conductivity (BHC) among female with alimentary obesity

Temperature of palms (in ºC)	*Alimentary obesity*	
	Kyrgyz (n=50)	*Russians (n=50)*
2.2	3	1
2.4	3	4
2.6	3	8
2.8	16	18
3.0	15	12
3.2	6	4
3.4	4	3
Total	144.2	142.0
Mean number	2.88 ± 0.042	2.84 ± 0.035
Statistics	t = 0.781; df = 98; P = 0.436;	
	χ^2 = 88.056; df = 12; P = <0.001;	

Table 4: Distribution of female palms temperature (in °C) with alimentary obesity and in control sample taking into account their ethnic origin

Palms temperature (in ºC)	*Obesity (n=100)*	*Control*	
		Kyrgyz (n=30)	*Russians (n=30)*
	I	*II*	*III*
29	22		2
30	36	1	2
31	17	8	6
32	15	10	9
33	9	9	9
34	1	2	2
Total	3056	963	957
Mean number	30.56 ± 0.129;	32.10 ± 0.182;	31.90 ± 0.237;
Statistics	$t_{I, II}$ = 6.019; df = 128; P = <0.001;		
	$t_{II, III}$ = 0.671; df = 58; P = 0.505;		
	$t_{I, III}$ = 4.986; df = 128; P = <0.001;		

Table 5: Distribution of the temperature difference (in ºC) between palm and armpit among female with alimentary obesity and control sample

Temperature difference (in ºC)	*Alimentary obesity*		
	Obesity (n=100)	*Kyrgyz (n=30)*	*Russians (n=30)*
	I	*II*	*III*
2		2	2
3	12	9	9
4	13	12	10
5	18	6	5
6	39	1	2
7	18		2
Total	538	115	122
Mean number	5.38 ± 0.126;	3.83 ± 0.173;	4.07 ± 0.235;
Statistics	$t_{I, II}$ = 6.202; df = 128; P = <0.001;		
	$t_{II, III}$ = 0.800; df = 58; P = 0.427;		
	$t_{I, III}$ = 4.980; df = 128; P = <0.001;m		

Appropriate statistical analysis has shown (Tables 7 - 9) that alcoholics represented different ethnic group significantly do not differ from each other according to all studied quantitative characteristics of human BHC carried out by us. Patients suffer from drug addiction have shown the same picture within (Table 10-12), that allow us to combine them into two separate groups to consider as sample of alcoholics and drug addicts.

However comparative statistical analyses of

Table 6: Distribution of body heat conductivity (BHC) among females with alimentary obesity and in control taking into account their ethnic origin

BHC (in ºC)	*Obesity (n=100)*	*Control*	
		Kyrgyz (n=30)	*Russians (n=30)*
	I	*II*	*III*
2.2	4		
2.4	7		
2.6	11		
2.8	34		
3.0	27	1	4
3.2	10	3	4
3.4	7	6	6
3.6		10	7
3.8		10	9
Total	286.2	107.0	104.6
Mean number	2.86 ± 0.028;	3.57 ± 0.041;	3.49 ± 0.051;

Statistics $t_{I, II}$ = 12.584; df = 128; P = <0.001;
$t_{II, III}$ = 1.220; df = 58; P = 0.227;
$t_{I, III}$ = 10.677; df = 128; P = <0.001;

Table 7: Distribution of alcoholics' palms temperature (in °C)

Palm temperature (in ºC)	*Kyrgyz (n=30)*	*Control*	
		Russians (n=30)	*Mixed (n=30)*
	I	*II*	*III*
22	1	1	6
23			
24	3	4	
25	2	3	1
26	4	4	4
27			1
28	7	9	4
29	3		
30	3	3	3
31			2
32	5	4	1
33			1
34	2	2	1
Total	849	835	795
Mean number	28.30 ± 0.570;	27.83 ± 0.578;	26.50 ± 0.658;

Statistics $t_{I, II}$ = 0.575; df = 58; P = 0.567;
$t_{II, III}$ = 1.522; df = 58; P = 0.133;
$t_{I, III}$ = 2.567; df = 58; P = 0.043;

Table 8: Distribution of the temperature difference (in ºC) between palm and armpit among alcoholics

Temperature difference (in ºC)	*Kyrgyz (n=30)*	*Control*	
		Russians (n=30)	*Mixed (n=30)*
	I	*II*	*III*
2	2	2	1
3			1
4	4	3	1
4	4	3	1
5	1	1	2
6	3	3	3
7	3	5	
8	7	4	4
9			1
10	4	4	4
11	2	3	1
12	3	4	6
13	1	1	
14			6
Total	231	240	285
Mean number	7.70 ± 0.551;	8.00 ± 0.565;	9.50 ± 0.658;

Statistics $t_{I, II}$ = 0.380; df = 58; P = 0.705;
$t_{II, III}$ = 1.728; df = 58; P = 0.089;
$t_{I, III}$ = 2.096; df = 58; P = 0.040;

Table 9: Distribution of alcoholics' body heat conductivity (BHC)

BHC (in ºC)	*Kyrgyz (n=30)*	*Control*	
		Russians (n=30)	*Mixed (n=30)*
	I	*II*	*III*
1.6	4	6	3
1.8	10	9	11
2.0	9	10	8
2.2	4	3	3
2.4	3	2	5
Total	58.4	57.7	59.2
Mean number	1.95 ± 0.043;	1.92 ± 0.044;	1.97 ± 0.046;

Statistics $t_{I, II}$ = 0.378; df = 58; P = 0.707;
$t_{II, III}$ = 0.785; df = 58; P = 0.436;
$t_{I, III}$ = 0.426; df = 58; P = 0.672;

individuals suffer from alimentary obesity, alcoholism and drug addiction has shown that they significantly differ from each other over quantitative characteristics of human BHC (Tables 13 - 15). Notably, the lowest BHC had drug addicts, and then went alcoholics and individuals with obesity.

Table 10: Distribution of drug addicts palms temperature (in °C)

Palms Temperature (in ºC)	Drug addicts		
	Kyrgyz (n=30)	Russians (n=30)	Mixed (n=17)
	I	II	III
22	4	6	4
23	4	1	1
24	7	9	4
25	1		
26	6	4	4
27		2	
28	2	6	1
29	2		
30	1	1	2
31		1	1
32	1		
33	1		
34			
35	1		
Total	773	758	430

Mean number 25.77 ± 0.621; 25.27 ± 0.470; 25.29 ± 0.721;

Statistics $t_{I, II} = 0.642$; $df = 58$; $P = 0.523$;
$t_{II, III} = 0.033$; $df = 45$; $P = 0.974$;
$t_{I, III} = 0.478$; $df = 45$; $P = 0.635$;

Table 11: Distribution of the temperature differences (in ºC) between palm and armpit among drug addicts

Palms Temperature (in ºC)	Drug addicts		
	Kyrgyz (n=30)	Russians (n=30)	Mixed (n=17)
	I	II	III
2	1		
3	1		
5		1	1
6	1	1	2
7	2		
8	2	6	1
9	1	2	
10	5	4	4
11	2		
12	5	9	4
13	6	2	2
14	3	5	3
Total	306	321	181

Mean number 10.20 ± 0.601; 10.70 ± 0.463; 10.65 ± 0.707;

Statistics $t_{I, II} = 0.659$; $df = 58$; $P = 0.513$;
$t_{II, III} = 0.065$; $df = 45$; $P = 0.948$;
$t_{I, III} = 0.465$; $df = 45$; $P = 0.644$;

Table 10: Distribution of drug addicts palms temperature (in °C)

BHC (in ºC)	Drug addicts		
	Kyrgyz (n=30)	Russians (n=30)	Mixed (n=17)
	I	II	III
1.0	3		
1.2	5	8	4
1.4	2	8	2
1.6	5	4	4
1.8	4	2	1
2.0	4	4	2
2.2	4	1	2
2.4	3	3	2
Total	51.0	48.2	29.0

Mean number 1.70 ± 0.081; 1.61 ± 0.073; 1.70 ± 0.103;

Statistics $t_{I, II} = 0.853$; $df = 58$; $P = 0.397$;
$t_{II, III} = 0.801$; $df = 45$; $P = 0.427$;
$t_{I, III} = 0.044$; $df = 45$; $P = 0.965$;

Table 10: Distribution of drug addicts palms temperature (in °C)

Palms Temperature (in ºC)	Obesity (n=100)	Alcoholics (n=90)	Drug addicts (n=77)
	I	II	III
22		8	14
23			6
24		13	20
25		6	1
26		12	14
27		1	2
28		20	9
29	22	3	2
30	36	9	4
31	17	2	2
32	15	10	1
33	9	1	1
34	1	5	
35			1
Total	3056	2479	1961

Mean number 30.56 ± 0.129; 27.54 ± 0.353; 25.47 ± 0.339;

Statistics $t_{I, II} = 4.199$; $df = 165$; $P = <0.001$;
$t_{II, III} = 15.351$; $df = 175$; $P = <0.001$;
$t_{I, III} = 8.330$; $df = 188$; $P = <0.001$;

Further we compared alcoholics and drug addicts with the control. In all comparisons, examined groups of diseased individuals have shown significantly low values of BHC in

Table 14: Distribution of the temperature difference (in °C) between palm and armpit among individuals with alimentary obesity, alcoholics and drug addicts

Temperature difference (in °C)	*Obesity (n=100)* I	*Alcoholics (n=90)* II	*Drug addicts (n=77)* III
2		5	1
3	12	4	1
4	13	8	1
5	18	4	2
6	39	9	4
7	18	8	2
8		15	9
9		1	3
10		12	13
11		6	2
12		13	18
13		2	10
14		6	11
Total	538	756	808
Mean number	5.38 ± 0.126;	8.40 ± 0.349;	10.49 ± 0.331;

Statistics $t_{I, II}$ = 8.446; df = 188; P = <0.001;
$t_{II, III}$ = 4.308; df = 165; P = <0.001;
$t_{I, III}$ = 15.786; df = 175; P = <0.001;

Table 15: Distribution of body heat conductivity (BHC) among individuals with alimentary obesity, alcoholics and drug addicts

BHC (in °C)	*Obesity (n=100)* I	*Alcoholics (n=90)* II	*Drug addicts (n=77)* III
1.0			3
1.2			17
1.4			12
1.6		13	13
1.8		30	7
2.0		27	10
2.2	4	10	7
2.4	7	10	8
2.6	11		
2.8	34		
3.0	27		
3.2	10		
3.4	7		
Total	286.2	174.8	128.2
Mean number	2.86 ± 0.028;	1.94 ± 0.025;	1.66 ± 0.048;

Statistics $t_{I, II}$ = 24.265; df = 188; P = <0.001;
$t_{II, III}$ = 5.341; df = 165; P = <0.001;
$t_{I, III}$ = 22.636; df = 175; P = <0.001;

comparison with healthy males, both Kyrgyz and Russian nationalities. In Tables 16 - 18 represented results of such comparative analysis of diseased individuals with Kyrgyz control. The same results were detected during comparison with Russian males (data not shown). As it seen from Tables drug addicts differ with significantly low BHC in comparison with control and diseased individuals suffer from alcoholism.

Table 16: Distribution of palm temperature (in °C) among male alcoholics, drug addicts and in control sample

Palm temperature (in °C)	*Alcoholics (n=90)* I	*Drug addicts (n=77)* II	*Control (n=130)* III
22	8	14	
23		6	
24	13	20	
25	6	1	
26	12	14	
27	1	2	11
28	20	9	11
29	3	2	15
30	9	4	29
31	2	2	10
32	10	1	25
33	1	1	20
34	5		8
35		1	1
Total	2485	1961	3987
Mean number	27.31 ± 0.357;	25.47 ± 0.339;	30.67 ± 0.180;

Statistics $t_{I, II}$ = 4.331; df = 165; P = <0.001;
$t_{II, III}$ = 14.852; df = 205; P = <0.001;
$t_{I, III}$ = 8.331; df = 218; P = <0.001;

DISCUSSION

Our previous researches have shown that measurement of "hot" water temperature (T) decrease in °C is necessary for obtaining certain quantitative estimation, and knowledge of T difference between palm and armpit for qualitative evaluation ("express method") of the given individual body heat-conductivity ability (Ibraimov et al. 2010). Nevertheless it turned out that on the population level individuals differ from each other substantially according to the heat conductivity of their bodies; in such a case sex, age and racial and

Table 17: Distribution of the temperature difference (in ºC) between palm and armpit among male alcoholics, drug addicts and in control sample

Temperature difference (in ºC)	*Alcoholics (n=90)*	*Drug addicts (n=77)*	*Control (n=158)*
	I	*II*	*III*
1			1
2	5	1	9
3	1	1	20
4	8	1	29
5	4	2	13
6	9	4	33
7	8	2	24
8	15	9	15
9	1	3	10
10	12	13	3
11	6	2	1
12	13	18	
13	2	10	
14	6	11	
Total	756	808	877
Mean number	8.40 ± 0.349;	10.49 ± 0.331;	5.55 ± 0.167;
Statistics	$t_{I, II}$ = 4.308;	df = 165;	P = <0.001;
	$t_{II, III}$ = 14.862;	df = 233;	P = <0.001;
	$t_{I, III}$ = 8.284;	df = 246;	P = <0.001;

ethnical peculiarities substantially influence on this human body physical characteristic. Particularly: a) males BHC at the average higher than females; b) individuals from different age groups differ on BHC, its level among people varies with age toward reduction; c) native inhabitants of low-mountain regions of southern latitude differ at the average with higher BHC than inhabitants of high altitudes and northern latitude (Ibraimov and Tabaldiev 2007; Ibraimov et al. 2010).

In order to explain why out of numerous human diseases we selected namely these three groups of pathology we need to do little digression. As is known, non-genic part of human genome composes about 98% of cell nucleus DNA. About 15%-20% out of that non-coding part of human DNA represents constitutive heterochromatin (John 1988). There are two types of constitutive heterochromatin in human chromosomes: C- and Q- heterochromatin (Caspersson et al. 1970; Arrighi and Hsu 1971; Paris Conference 1971; Suppl. 1975). Chromosomal C-heterochromatin regions (C-HR) were detected in genome of all higher eukaryotes, whereas Q- heterochromatic regions (Q-HRs) are presented in genome of only three higher primates (Homo sapiens, Pan troglodytes and Gorilla gorilla) (Pearson 1973, 1977; Verma 1988). However there is a fundamental difference between them: quantitative variability of chromosomal Q-HRs in the genome only exists in human population (ISCN 1978). Moreover, chromosomal Q-HRs distributed in the genome of human population is far from being accidental. Particularly:

a) the amount of chromosomal Q-HRs in genome of human population depend on climate and geographical environment of a permanent place of residence, not of their

Table 18: Distribution of body heat conductivity (BHC) among male alcoholics, drug addicts and in control sample

BHC (in ºC)	*Alcoholics (n=90)*	*Drug addicts (n=77)*	*Control (n=130)*
	I	*II*	*III*
1.0		3	
1.2		17	4
1.4		12	1
1.6	13	13	1
1.8	30	7	2
2.0	27	10	7
2.2	10	7	3
2.4	10	8	6
2.6			6
2.8			10
3.0			14
3.2			11
3.4			6
3.6			8
3.8			11
4.0			12
4.2			9
4.4			6
4.6			2
4.8			3
5.0			2
5.2			3
5.4			
5.6			
5.8			3
Total	174.8	128.2	437.0
Mean number	1.94 ± 0.025;	1.66 ± 0.048;	3.36 ± 0.086;
Statistics	$t_{I, II}$ = 5.341;	df = 165;	P = <0.001;
	$t_{II, III}$ = 14.369;	df = 205;	P = <0.001;
	$t_{I, III}$ = 13.419;	df = 218;	P = <0.001;

racial and ethnic peculiarities. Most of chromosomal Q-HRs are presented in genome of populations residing in lowland subequatorial Africa and India, and the least have aboriginals of Far North of Siberia as well as highlanders of the Tien-Shan, Pamir and Ethiopian uplands (Ibraimov and Mirrakhimov 1982 b, c, d; Ibraimov et al. 1982, 1986, 1997; Kalz et al. 2005);

b) individuals capable of successfully adapting themselves to the extreme high-altitude climate (e.g. mountaineers) and newcomers of the Far North (e.g. oil industry workers of the Jamal peninsula of polar Eastern Siberia) are characterized by extremely low amounts of chromosomal Q-HRs in their genome (Ibraimov et al. 1990, 1991);

c) the amount of chromosomal Q-HRs per individual in a population is greatest in newborns than in older age groups (Buckton et al. 1976; Ibraimov and Karagulova 2006) despite the fact that the number, location and size of Q-HRs do not change in ontogenesis.

In other words, certain similarities were noticeable in the distribution of the amount of chromosomal Q-HRs and human BHC variability in population. Since wide quantitative variability of chromosomal Q-HRs was detected only in human population but alimentary obesity, alcoholism and drug addiction relate to the group of "purely human being pathology" we thought that it would be quite logically to study peculiarities of BHC of such diseased individuals. It seemed intuitively that such research would be important because these diseases in one way or other connect with thermo regulation (Ibraimov 2003, 2004).

Our intention to examine diseased individuals of the same sex mainly also had its own objective reasons. It was especially important for individuals with alimentary obesity because: a) although variability in the amount of chromosomal Q-HRs in the genome of females and males is only determined by seven Q-polymorphic autosomes, males, however, have a Y chromosome with the largest Q-HR segment in the human karyotype, which is characterized by extremely high polymorphism (Caspersson et al. 1970; Paris Conference 1971; Ibraimov and Mirrakhimov 1985); b) males, at least those living in our country, do not pay too much attention to their body mass. "In many cultures, obesity is considered to be sign of affluence and prestige, particularly among those cultures where food is less available" (Friedman 2000), and this almost fully keeping with the realities of the Kyrgyzstan of today; c) the results of numerous epidemiological studies carried out in many countries and regions have unequivocally shown that the frequency of obesity in females in two times higher than in males.

So we detected that individuals suffering from alimentary obesity differ by significantly low BHC in comparison with the control sample. Previously we showed that in a genome of individuals with alimentary obesity, the amount of chromosomal Q-HRs is extremely few than in the control (Ibraimov 2010; Ibraimov and Karagulova 2002). It seemed that this circumstance confirms our suggestion of possible relationship between the level of BHC and the amount of chromosomal Q-HRs in human genome (Ibraimov 2003, 2004, 2010). However, alcoholics and drug addicts have shown slightly different picture. The fact is that their level of BHC turned out to be lower than individuals with alimentary obesity have (see Tables 13-15). The amount of chromosomal Q-HRs was equally in genome of alcoholics and individuals with alimentary obesity, but it was lower then it was in the samples of healthy individuals. But along with this the most amount of Q-HRs were presented in drug addicts, in comparison with individuals suffer from obesity and alcoholism, including control (Ibraimov 2010; Ibraimov et al. 2002).

For the present time we do not know how explain such unexpected for us results. Perhaps such results connect with physical state of individuals suffer from alcoholism and drug addiction, who fell into our samples. The fact is that they take strong alcoholic beverages and heroin for years (not less than five) and in the present time they agreed to cooperate with narcologists only because they became practically disabled persons. So, being of age 26 ± 6.29 yrs, height 170.9 ± 7.16 cm and weight 59.9 ± 8.16 kg, they turned out to be unable to live without help of third persons. But along with this, both diseased individuals and healthy ones significantly do not differ on the average value of armpit temperature (Table 19). However temperatures of alcoholics' and drug addicts' palms were extremely low (see above), that indirectly testify about some disturbances in metabolism, physiological and perhaps cellular thermo regulation.

Table 19: Distribution of armpit temperature (in ºC) in patients and control

Armpit temperature (in ºC)	Drug addicts (n=77)	Alcoholics (n=90)	Obesity (n=50)	Control (n=60)
	I	II	III	IV
35.2	1			2
35.4	1			2
35.6	3			7
35.8		2	2	6
36.0	17	18	16	11
36.2	20	19	14	10
36.4	20	26	10	12
36.6	9	15	8	5
36.8	4	8		4
37.0	2	2		1
Total	2792.0	3271.2	1811.8	2167.2

Mean 36.26 ± 0.037; 36.35 ± 0.028; 36.26 ± 0.040; 36.12 ± 0.054; number

Statistics $t_{I, II}$ = 1.870; df = 165; P = 0.063;
$t_{II, III}$ = 1.839; df = 138; P = 0.068;
$t_{III, IV}$ = 1.955; df = 108; P = 0.053;

In order to remove these contradictions, it is important to examine alcoholics and drug addicts on initial stages of development of a disease, when they yet have normal weight and appetite. Since the amount of chromosomal Q-HRs does not change in the process of ontogenesis it is difficult to explain low values of BHC of alcoholics and drug addicts by peculiarities of their genome.

If we do not take into consideration the results of BHC obtained on drug addicts, all other data testify in the favor of our suggestion of possible connection between the level of BHC and the amount of chromosomal Q-HRs in human genome. It is remarkable in any case that samples of individuals with alimentary obesity, alcoholism and drug addiction significantly differ from each other, including control on their bodies heat conductivity. That is why for the present time we can not fully exclude that there probably exist some relation between the level of BHC, amount of chromosomal Q-HRs in genome and vulnerability of certain individuals in population to certain forms of purely human being pathology. As of practical value of these observations they will not come down of the fact that we do not know about fine mechanisms lying on their basis. It's true that the value of penicillin is not reduced because modern science does not know exactly how it effects on microbes.

And in conclusion, we decided deliberately to not dispute and accordingly to not discuss existing hypotheses about pathogenesis of alimentary obesity, alcoholism and drug addiction. As was neatly noted by Friedman (2000): "…because eating is an activity in which we all partake, it is not surprising that almost everyone has an opinion about this subject". Moreover, perhaps every adult person has his/her own opinion about obesity, alcoholism and drug addiction.

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