ANTHROPOGENETIC VARIABILITY IN THE GROUPS OF HOMO-
AND HETEROSEXUALLY ORIENTED INDIVIDUALS

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This population-genetic study compares morphophysiological and genetic variability in a group of homosexually oriented individuals from Serbia (N=96) with control group of heterosexual individuals (N=96) using a test of determination of homozygously recessive characteristics in humans (HRC-test).

Results of our study revealed a statistically significant difference in the mean values of genetic homozygosity (control group 5.0±0.2 ; homosexuals 3.4 ±0.1 HRCs, out of 20 observed characteristics) the differences in the distribution type, as well as in the variances of presence of specific combinations of such traits. These results suggest a complex polygenic difference between two observed systems.

There is no difference in the degree of genetic homozygosity between the genders in each tested group of individuals. However, both homosexually oriented females and males have significantly lower mean values of HRCs compared to female and male heterosexuals.

Key words: anthropogenetic variability, genetic homozygosity, homosexuals, homorecessive characteristics

INTRODUCTION

Individual variation is based on genetic-physiological balances that depend on allelic variants in polymorphic loci. Dominant-recessive relationships of these allelogenes establish also specific balances that vary in certain limits. The proportion of homozygously-recessive loci in individuals may have a normal variation, with extremes resulting sometimes in elite, and sometimes in less fit or in deviant phenotypes.

Determining homozygosity in humans is highly delicate since only a small number of loci with allelic genes are known that control an exact biochemical process. Provided the type of

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inheritance and variability is known, it was determined that a series of more than twenty qualitative morpho-physiological traits are controlled on dominant-recessive basis by one or several genes. Making use of this information, several authors of Belgrade population-genetic school have studied the distribution and frequency of a series of such clearly expressed recessive morpho-physiological characters (HRC-test) in order to estimate individual and group differences (i.e. comparison between ill and healthy individuals, pupils from special and regular schools, alcoholics, left-handed individuals, carriers of special talents etc.; MARINKOVIC, 1989; BLAGOJEVIC et al., 1989; MARINKOVIC et al., 1990; MARINKOVIC and CVJETICANIN, 1991; MARINKOVIC et al., 1994; CVJETICANIN and MARINKOVIC, 2005a; MARINKOVIC et al., 2008; MARINKOVIC and CVJETICANIN, 2007; PESUT, 2004; PESUT and MARINKOVIC, 2009; PETRICIĆ and CVJETICANIN, 2011; MARINKOVIC and CVJETICANIN, 2013).

In a majority of mentioned studies, the presence of homo-recessive characters in compared samples was higher than in control group of individuals. On the contrary, among top sportsmen (CVJETICANIN and MARINKOVIC, 2009; MARINKOVIC and CVJETICANIN, 2013), as well as in a preliminary studied sample of serbian homosexuals we found an opposite tendency, i.e. a decrease in the presence of homo-recessive characters, and decided to analyse them in this study.

On the assumption that homosexual orientation is genetically controlled and inheritance is multifactorial, we arrived at a hypothesis that changed genetic homozygosity degree, as well as changed scope of variability in the group of homosexuals (compared with control), could be a population-genetic parameter for this type of sexual orientation.

The gene which is so far known to be involved in individual variations in sexual orientation in man is Xq28 (OMIM number 306995). Also the genes 7q36, 8p12 and 10q26 probably may have some influence on sexual orientation (MUSTANSKI et al., 2005; RODRIGUEZ-LARRALDE and PARADISI, 2009).

Here studied homo-recessive characters are obviously controlled by genes located on different human chromosomes; thus they could be considered genetic markers of these chromosomes, as well as of numerous surrounding genes controlling different fitness elements. The amount of recessive homozygosity established by our HRC-test is practically an estimation of genetic loads present in any specific sample of humans.

Numerous studies show that the percentages of ABO and Rh blood types were found to differ in samples of patients suffering from different diseases, in aged individuals, as in homosexuals (JANARDHANA et al., 1991; SLATER et al., 1993; GEKHT et al., 1995; SU et al., 2001; CHOI and PAI, 2004; SHIMIZU et al., 2004; CVJETICANIN and MARINKOVIC, 2005a; JESCH et al., 2007; ELLIS et al., 2008). VOGL (1975) claimed that individuals with blood type O are more resistant to infective diseases, and also that sportsmen usually have O blood type, regardless of the population they come from. Our previous studies of sportsmen samples showed also an increased presence of O blood group, compared with a control from general population (MARINKOVIC and CVJETICANIN, 1991; CVJETICANIN and MARINKOVIC, 2009).

In some studies the frequencies of Rh blood types in the individual longevity cases show decrease in Rh negative percentage in advanced-aged groups in comparisons to the entire population (TODOROV, 1998). Some studies show that the percentages of Rh blood types differ in similar direction in samples of sportsmen (CVJETICANIN and MARINKOVIC, 2009; MARINKOVIC and CVJETICANIN, 2013), while study of ELLIS et al. (2008) shows “unusually high proportion of Rh- individuals among homosexuals”. 
METHODS
During our 20-years of studies it has been realized that a number of clearly recessive morpho-physiological traits may serve as an indicator of a degree of homozygosity of numerous genes that characterize a human individual. As phenotypic markers of these genes, we selected 20 to 30 clearly recessive traits that may manifest the proportion of homozygosity of corresponding polymorphic genes that control observed characters (Table 1). The test that determines the proportion of such genes in every individual is developed at the Chair of genetics and evolution at the Faculty of Biology in Belgrade since early 1990s, and named as “HRC-test” (MARINKOVIC, 1989; MARINKOVIC, et al., 1990; MARINKOVIC and CVJETICANIN, 1991, 2005a, 2008, 2013). The test was permanently improved and developed in every new observation, and now it has a high degree of repeatability that gives a confidence in obtained results. In a large-scale analysis of more than 10,000 inhabitants from different localities of Republic of Serbia, the HRC-test for the presence of 20-30 homozygously recessive characters has been so far applied. It was found that the average proportion of such characters varies moderately and within quite similar limits from one locality to the other, where studied populations were used as control-samples, amounting 21-26% average homozygosity.

Bearing in mind the experience of numerous collaborators studying the nature of inheritance of genetically controlled qualitative traits (BLAGOJEVIC et al., 1989; MARINKOVIC et al., 1990, 1994; MARINKOVIC and CVJETICANIN, 1991, 2007; MARKOVIC-DENIC et al., 1992; PESUT, 2004; CVJETICANIN and MARINKOVIC, 2005b; NIKOLIC et al., 2010; PETRICEVIC and CVJETICANIN, 2011), HRC-methodology was applied additionally in this paper, to estimate the proportion of such homozygously recessive characters (HRC's) in a sample of homosexuals, as compared with control group of heterosexuals (Table 1).

Tested homozygous-recessive traits in the region of human head are: attached ear lobe (OMIM number 128900), continuous frontal hair line (O. number 194000), blue eyes (gene location 15q12, 15q13, O. number 227220; 5p13 O. number 227240; 14q32.1, O. number 210750; 9q23 O. number 612271), straight hair (1q21.3, O. number 139450), soft hair and blond hair (gene location 15q12, 15q13, O. number 227220; 14q32.1, O. number 210750; 12q21.3, O. number 611664; 11q13.3, O. number 612267), double hair whorl, hair whorl orientation-opposite from clock-wise (O. number 139400), as well as an inability to roll, fold and curve the tongue (O. number 189300), a guttural “r and Daltonism (gene location Xq28, O. number 303800; ISCHICHARA, 1973). Such homozygously-recessive traits are also clearly expressed in human arms and legs, such as distal or proximal hyperextensibility of the thumb, index finger shorter than the ring finger (O. number 136100), left-handedness (gene location 2p12-q22, O. number 139900), hand clasping pattern (O. number 139800) (Table 1).

HRC test is highly suitable method for estimating individual homozygosity in a number of individuals, as it takes only a few minutes to analyse the presence of 20 characteristics of the person observed. Comparative analyses were made by the same person, with equal criteria for determining clearly pronounced homozygously recessive characters in tested groups of observed individuals.

Variations in their presence were estimated applying standard statistical procedures, and by comparing the means, variances, and the distribution shapes between groups of homosexuals and control consisted of heterosexually oriented individuals. Common tests to determine the differences in the mean values, scope and type of variability (t-test, $S^2$, $\chi^2$ and F-test, respectively)
have been used. Presence of the studied genetically controlled recessive characters was used as a parameter for homozygosity of corresponding genes and chromosomes.

Groups of tested individuals (control and homosexuals) belong to the same ethnic group (Serbian population), and from approximately same locality.

The group of homosexually oriented individuals (H) consisted of 96 individuals (66 males and 30 females).

Table 1 Frequencies of homozygous recessive characteristics in the groups of homosexuals and control (heterosexuals)

<table>
<thead>
<tr>
<th>Homozygously recessive trait</th>
<th>Control sample</th>
<th>Homosexuals</th>
<th>Control sample</th>
<th>Homosexuals</th>
<th>Control sample</th>
<th>Homosexuals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=96</td>
<td>N=96</td>
<td>X^2</td>
<td>X^2</td>
<td>X^2</td>
<td>X^2</td>
</tr>
<tr>
<td>1. blond hair</td>
<td>19.8</td>
<td>2.1</td>
<td>15.8 ***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. straight hair</td>
<td>47.9</td>
<td>26.0</td>
<td>10.0 **</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. two hair circles at vertex</td>
<td>12.5</td>
<td>9.4</td>
<td>0.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. opposite direction of hair circle</td>
<td>23.9</td>
<td>9.4</td>
<td>8.8 **</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. soft hair</td>
<td>45.8</td>
<td>7.5</td>
<td>32.0 ***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. continuous hairline</td>
<td>50</td>
<td>10.4</td>
<td>31.4 ***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. attached earlobe</td>
<td>21.9</td>
<td>16.7</td>
<td>1.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. ear without Darvin’s lump</td>
<td>11.5</td>
<td>/</td>
<td>11.5 ***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. light eyes</td>
<td>27.1</td>
<td>21.9</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. color blindness</td>
<td>4.2</td>
<td>4.2</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. talking defects</td>
<td>8.3</td>
<td>10.4</td>
<td>0.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. inability of tongue rolling</td>
<td>34.4</td>
<td>19.8</td>
<td>6.2 *</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. inability of transversal tongue curving</td>
<td>7.3</td>
<td>9.4</td>
<td>0.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. right thumb over left thumb</td>
<td>41.7</td>
<td>36.5</td>
<td>0.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. top joint of the thumb ≥45°</td>
<td>27.1</td>
<td>16.7</td>
<td>4.0 *</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. inserting thumb in the metacarpophalangeal joint</td>
<td>12.5</td>
<td>9.4</td>
<td>0.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. thumb hyperextensibility</td>
<td>10.4</td>
<td>2.1</td>
<td>6.6 *</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. 3 strings in the wrist</td>
<td>44.8</td>
<td>64.6</td>
<td>8.8 **</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. left-handness</td>
<td>14.6</td>
<td>12.5</td>
<td>0.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. index finger longer than 4th finger (in males; opposite in females)</td>
<td>43.8</td>
<td>20.8</td>
<td>12.1 ***</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<0.05  **p<0.01  ***p<0.001  \[ΣX^2 = 153***\]

The control group of individuals (C) consisted of 96 randomly chosen heterosexually oriented individuals (66 males and 30 females) of approximately same age and from the same
locality. Results of our previous studies show that there is no difference in the degree of genetic homozygosity between the sexes (CVJETICANIN and MARINKOVIC, 2005b; NIKOLIC, et al., 2012).

RESULTS AND DISCUSSION
In the observed group of homosexuals more than a half (54 %; males 57 %, females 46 %) are highly educated. It is interesting that almost one third (29%) of those highly educated graduate some faculty of art and music and a fifth of them (19 %) are medical doctors. A half of observed homosexually oriented individuals (49%) are active in some kind of sports. Two thirds of tested homosexuals are from multimember families, 50% of them are younger children and 22% are older children.

When examining the HRC frequency distribution (Table 1), it is obvious that the mean HRC value in the group of homosexually oriented individuals is significantly lower compared with control (control group 5.0±0.2 ; homosexuals 3.4±0.1 HRCs, out of 20 analyzed characteristics). As for the distribution of HRC frequency among the tested groups of individuals, it can be seen that HRCs in the group of homosexuals have a tendency towards lower values, suggesting also that different genetic dispositions at the polygenic level exist between the tested samples (Figure 1).

![Graph showing distribution of homozygously-recessive characteristics (HRC-test)](image)

Control (C)                      \[ \bar{x}_{\text{hrc/20}}=5.0\pm0.2 \]
Homosexuals (H)                 \[ \bar{x}_{\text{hrc/20}}=3.4\pm0.1 \] (t_{CH}=6.1, p<0.0001)

Fig. 1 Distribution of homozygously-recessive characteristics (HRC-test) based on the study of 20 qualitative morpho-physiological traits in the groups of homosexuals and control (heterosexuals)
Control Female (CF)  N= 30  \( \bar{x}_{\text{CF}} = 5.0 \pm 0.4 \)

Control Male (CM)  N= 66  \( \bar{x}_{\text{CM}} = 5.0 \pm 0.3 \)  \( (t_{\text{CF/CM}} = 0.006) \)

Homo Female (HF)  N= 30  \( \bar{x}_{\text{HF}} = 3.2 \pm 0.3 \)

Homo Male (HM)  N= 66  \( \bar{x}_{\text{HM}} = 3.6 \pm 0.2 \)  \( (t_{\text{HF/HM}} = 0.2) \)

\( t_{\text{CF}} = 3.9, \ p=0.0003 \)  \( t_{\text{CM}} = 4.7, \ p<0.0001 \)

Fig. 2. Distribution of homozygously-recessive characteristics (HRC-test) based on the study of 20 qualitative morpho-physiological traits among genders (groups of hetero and homosexuals)

All tested recessive characteristics (20) are present in the control group of individuals, while in the group of homosexuals 19/20 are present (Table 1). Among control individuals, in 16 out of 20 observed characters recessive homozygosity was expressed to a greater degree compared to the group of homosexuals, and in 10 of these characters the difference was statistically significant. In the group of homosexuals three traits showed increase of HRCs, while in only one the difference was statistically significant. These results suggest a complex polygenic difference between two observed samples.

The type of individual variation in C vs. H studied groups of individuals was also significantly different (\( \sum \chi^2_{\text{CFH}} = 153, \ p<0.001; \ V_C = 42.5\%, \ V_H = 41\% \)), showing that their genetic dispositions might be different.
In the control group of individuals every fourth characteristic is homozygously recessive (1/4), while in the group of homosexuals every sixth (1/6).

Results of our study show that there is no difference in the degree of genetic homozygosity between the sexes in each tested group of individuals. Both homosexually oriented females and males have significantly lower mean values of HRCs compared to female and male heterosexuals (Figure 2; $t_{CF/HF} = 3.9$, $p=0.0003$; $t_{CM/HM} = 4.7$, $p<0.0001$).

Taking all this into account, it may be concluded that the studied group of homosexuals shows the lower degree of recessive homozigosity, as well as the higher variability for tested allelic gene-markers. Frequencies of ABO and Rh blood types in the group of homosexuals are similar to the frequencies in Serbian population (Table 2). But results between gender show that frequency of AB blood type is significantly different (decrease in the group of male homosexuals, while in the group of female homosexuals increase) (Table 3).

### Table 2: The frequencies of ABO and Rh blood types in the group of homosexuals

<table>
<thead>
<tr>
<th>Blood Type</th>
<th>Serbian Population %</th>
<th>Homosexuals (H) N= 76 (%)</th>
<th>$\chi^2_{SP/H}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>41.5</td>
<td>40.8</td>
<td>0.5</td>
</tr>
<tr>
<td>O</td>
<td>33.9</td>
<td>39.5</td>
<td>0.9</td>
</tr>
<tr>
<td>B</td>
<td>17.5</td>
<td>14.5</td>
<td>0</td>
</tr>
<tr>
<td>AB</td>
<td>7.1</td>
<td>5.3</td>
<td>0.5</td>
</tr>
<tr>
<td>Rh+</td>
<td>83.0</td>
<td>78.9</td>
<td>0.2</td>
</tr>
<tr>
<td>Rh-</td>
<td>17.0</td>
<td>21.1</td>
<td>1.0</td>
</tr>
</tbody>
</table>

### Table 3: The frequencies of ABO and Rh blood types between genders in the group of homosexually oriented individuals

<table>
<thead>
<tr>
<th>Blood Type</th>
<th>Serbian Population %</th>
<th>Homo Female (HF) N= 22 (%)</th>
<th>$\chi^2_{SP/HF}$</th>
<th>Homo Male (HM) N= 54 (%)</th>
<th>$\chi^2_{SP/HM}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>41.5</td>
<td>40.9</td>
<td>0</td>
<td>40.7</td>
<td>0</td>
</tr>
<tr>
<td>O</td>
<td>33.9</td>
<td>31.8</td>
<td>0.13</td>
<td>42.6</td>
<td>2.23</td>
</tr>
<tr>
<td>B</td>
<td>17.5</td>
<td>13.6</td>
<td>0.87</td>
<td>14.8</td>
<td>0.42</td>
</tr>
<tr>
<td>AB</td>
<td>7.1</td>
<td>13.6</td>
<td>6.0*</td>
<td>1.9</td>
<td>3.81*</td>
</tr>
<tr>
<td>Rh+</td>
<td>83.0</td>
<td>77.3</td>
<td>0.39</td>
<td>79.6</td>
<td>0.14</td>
</tr>
<tr>
<td>Rh-</td>
<td>17.0</td>
<td>22.7</td>
<td>1.91</td>
<td>17.2</td>
<td>0</td>
</tr>
</tbody>
</table>

*p<0.1
DISCUSSION

In this study we found that the average proportion of observed HRC amounts is 17% in the group of homosexuals, compared to 25% in our control sample. It is one of the lowest percentages compared to all groups from our previous studies (a sample of musical talents 19%, lefthanded individuals 23%, special schools students 28%, chronic lymphatic leukemia 28%, Balkan endemic nephropathy 29%, spinal dysraphism 30%, congenital hip dislocation 35%, alcoholics 37% (MARINKOVIC, et al., 1990, 1994; MARKOVIC-DENIC, et al., 1992; CVJETICANIN and MARINKOVIC, 2005a,b; MARINKOVIC and CVJETICANIN, 2008, 2013; NIKOLIC, et al., 2010; PETRICEVIC and CVJETICANIN, 2011). On the other side, our previous studies on elite Serbian sportsmen (basketball, waterpolo, handball, football, diving, karate) showed extremely low homozygosity of their recessive genes, even less than 10% (MARINKOVIC and CVJETICANIN, 1991; CVJETICANIN and MARINKOVIC, 2009).

The average proportion of HRC’s in our present control group of individuals is 25%, what is in correlation with results for control samples in numerous studies done before in Serbian population (CVJETICANIN and MARINKOVIC, 2005b; BRANKOVIC, 2006; MARINKOVIC, et al., 2008). No information on potential differences among ethnic groups in the estimated degrees of homozygosity is available, but relatively small variation among local populations does exist (BRANKOVIC, 2006; MARINKOVIC and CVJETICANIN, 2013).

According to the data given in our present study, the frequency distribution of the tested homozygously-recessive characteristics was different in compared groups of individuals (C vs. H), manifesting a population-genetic difference present among them (Table 1). In these comparisons, characteristic groups of traits were present in a different degree among homosexuals and control group of individuals. This may suggest a correlation between different combinations of polygenes which may be involved in certain processes that regulate development of adequate behaviors and fitness traits, being specific in the group of homosexually oriented individuals.

As the HRC-test covers homozygosity of numerous chromosomes, it may happen that specific genes, discovered to be responsible for predisposition for particular sexual orientation, could be located at some of these chromosomes and that expressivity of those genes may depend on the status of homozygosity of other loci. Being markers of different chromosomes, the genes controlling the qualitative characteristics studied here are also the markers of surrounding groups of polygenes with a possible direct impact on the development of specific behaviors and affinities (MARINKOVIC, et al., 2008; CVJETICANIN and MARINKOVIC, 2009; MARINKOVIC and CVJETICANIN, 2013).

A lower degree of genetic homozygosity may result in pleiotropic effects of specific genes responsible for different predispositions. In this case, these genes will determine not only the expression of homosexual behaviour, but also a group of other properties as well.

The genes that determine expression of tested traits may influence to a certain degree the adaptive value of the organism, and thus provide certain advantages in specific environmental conditions (PESUT, 2004; CVJETICANIN and MARINKOVIC, 2005a,b, 2007, 2009; MARINKOVIC, et al., 2008; MARINKOVIC and CVJETICANIN, 2013).

Again, a lower degree of genetic homozygosity in the group of homosexuals may bring such individuals into a specific state of genetic-physiological homeostasis which enables easier expression of reproductive activity. The fact that genetic homozygosity is significantly decreased in the group of homosexuals, gives an impression that genetic loads, which may cause diminished body activities, are reduced and decreased in such samples of human populations.
As social relationships could not be neglected, it should be taken into account that in our group of tested homosexually oriented individuals even two thirds are from multimember families, 50% are younger children and 22% are older children. These results are in agreement with findings of some other studies done in the groups of homosexually oriented individuals (Miller, 2000; Blanchard, 2004; King, et al., 2005; Rahman, et al., 2008).

Relatively large individual variation in the studied HRCs (from zero to 10/20 per individual; Figures 1 and 2), covering almost all parts of the human body, is also informative of how large a variation of genetic homeostasis may exist in human individuals. The changes described here show that genetically controlled morphophysiological characters can be used to manifest, at population-genetic level, the intrinsic changes in samples of individuals differing from other such samples in their preferences, capabilities, or talents, and probably also in their physiological and health capacities, to achieve specific life goals. Similarity in low HRCs between studied samples of homosexuals and active sportsmen suggests that decreased genetic loads with increased genetic-physiological activities may result in potential hyperactivities in their physical, reproductive and behavioral capacities, which can be individually manifested in different manners and directions. According to our observation almost half of tested homosexuals are active in some kind of sport and a majority of them having a high education.

There are no differences in frequencies of ABO and Rh blood types in the group of homosexuals compared with frequencies in Serbian population (Table 2). While results between gender show that frequency of AB blood type significantly decreases in the group of male homosexuals, in the group of female homosexuals they significantly increase (Table 3). These results point out that some “connection between sexual orientation and genes both on chromosomes 9 and 1 may exist” (Ellis, et al., 2008).

In conclusion, when studying morpho-physiological traits as markers of specific genes at human chromosomes, HRC-test may predict some developmental potential of human individuals, and as such should be applied comparatively, together with more sophisticated methods that are used in contemporary genetics and biomedicine.

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ANTROPOGENETIČKA VARIJABILNOST U GRUPAMA HOMO-
I HETROSEKSUALNO OPREDELJENIH POJEDINACA

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Izvod

Koristeći test za utvrđivanje homozigotno recezivnih osobina kod ljudi (HRO-test) u ovoj populaciono-genetičkoj studiji upoređivana je morfofiziološka i genetička varijabilnost u grupi homoseksualno opredeljenih pojedinaca iz Srbije (N=96) sa kontrolnom grupom heteroseksualaca (N=96). Rezultati naše studije pokazuju prisustvo značajnih razlika kako u prosečnim vrednostima genetičke homozigotnosti (kontrola 5,0±0,2; homoseksualci 3,4±0,1 HRO, od 20 testiranih karakteristika), tako i u distribuciji i varijabilnosti u prisustvu specifičnih kombinacija testiranih osobina. Ovi rezultati upućuju na kompleksnu poligensku razliku među testiranim grupama ispitanika. Razlike u stepenu genetičke homozigotnosti među polovima, u okviru pojedinačnih grupa nisu utvrđene. Međutim, homoseksualno orijentisane osobe oba pola pokazuju značajno smanjenu genetičku homozigotnost i uvećanu varijabilnost u poređenju sa heteroseksualno opredeljenim ženama i muškarcima.

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