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Introduction

The author tries to prove the importance of facial attractiveness on genetic diversity. He therefore carries out a background research to make predictions and then undertakes an empirical research to prove his hypothesis.

The study applies two approaches in its investigations. The first approach that it applies to study the relationship between facial features and their genetic human preferences is the novel approach where the author tries to investigate whether attractiveness has any association with mate quality. The second approach which applies the use of microsatellite markers in an empirical approach, investigates the structural facial characteristics which can be used to determine the relationship between facial attractiveness and the relative genetic diversity.

Goals of the Research

The main aim of the author is to establish the significance of facial attractiveness in genetic diversity in terms of mate preferences. The author tries to establish whether males also have unique preference for Major Histocompatibility Complex (MHC) heterogygosity in female's appearances. This was prompted by research results which have proved that MHC genotype has an influence in mate preferences for many species. Another goal that the author tries to find out is whether genetic diversity is also associated with female facial attractiveness.

The author also tries to show the role of MHC in human beings as regards to mate preferences. The author investigates the differences between the

influences of genetic diversity and the possible influences of MHC genetic diversity on humans' mate preferences. MHC could be essential particularly in mate preferences since MHC heterozygosity had no correlation with the general heterozygosity in many human samples. The author also tries to establish the relationship between human facial attractiveness and the genetic diversity that falls within as well as outside the MHC. Finally, the author investigates whether genetic diversity has any relationship with femininity, masculinity as well as averageness.

Hypotheses

The author predicts that there is a strong correlation between genetic diversity and facial attractiveness. The author also predicts that genetic diversity has a strong relationship with major histocompatibility complex and influences reproductive success and fitness. The author hypothesizes that facial characteristics shapes the selection for high-quality males.

Research Methodology

The research applied the use of microsatellite markers which is normally used to carry out researches on non-human animal studies to investigate the genetic significance of human facial attractiveness. The microsatellite markers are used in approximating the genetic diversity independently for non-MHC as well as MHC loci and in estimating the individual mean heterozygosity which the author symbolized by H as well as the standard mean which the author also symbolized as d2. The study involved taking DNA samples from 160 Caucasian students from the University of Western Australia who had written consents for their participation in the research. 80

males and females took part respectively and their ages averaged at 20 and 19 in that order.

The research procedures were endorsed by the Human Research Ethics Committee in the university. Thereafter, DNA samples were taken and two Buccal swabs were collected from each participant. These were then set up for Polymerase Chain Reaction (PCR) under the instructions of the manufacturer. The Australian Genome Research Facility did the PCR as well as fragment analyses. 12 microsatellites were typed at key loci in the MHC region that had linkages with disequilibrium in every HLA locus. In measuring the non-MHC genetic diversity, the researchers used eleven non-MHC microsatellites which were all from elevens different chromosomes. The MHC microsatellites as well as the non-MHC microsatellites chosen were qualitatively similar in terms of the number of alleles as well as the expected heterozygosity. Bayesian Clustering Method was to analyze the population ancestry for each participant (Donnley et al.

2000,). Genetic diversity for non-MHC loci as well as for MHC loci was measured separately. This was done using standard mean d2, the individual mean heterozygosity (H) as well as genetic distance in the alleles. Both H and d2 were calculated at each locus per individual. The d2 measure was standardized to achieve a higher weighting of every locus. The standardized values were averaged in all loci to achieve a standardized d2.

There was also the need to test for the underlying mechanisms of the effects of the genetic diversity particularly on the facial appearance. Here, Heterozygosity-heterozygosity (H-H) correlation test was used. It involved

randomly sampling the loci into two sets where each set was examined to establish whether each H that was calculated from the two groups was correlated to the other.

The procedure was replicated 100 times, each time randomly resampling to achieve a standard deviation, a strong correlation coefficient and mean for MHC as well as non-MHC loci. Multiple regression models were applied to analyze each locus so as to determine the local effects of genetic diversity. Quality digital color photograph was also taken of students who participated in the DNA sampling. The participants were asked to remove their make-ups or any facial hair before the photographs were taken. The researchers used separate groups from the same university mainly from the opposite sex to rate the attractiveness, masculinity, symmetry as well as averageness and femininity of each photograph.

Outliers in the face ratings who had extreme scores below and above the mean and the standard deviations were removed. Multiple regression models were then used to separately conduct male and female analysis. Pearson’s correlation coefficient was used to analyze face ratings: hierarchical multiple regression which included the use of SPSS 16 and Sobel’s test were used to analyze attractiveness.

Conclusion

The results of the study proved that MHC diversity has a critical effect on male facial attractiveness. It also proved that males’ and females’ particular attractive facial characteristics were related to their genetic diversity. It

established that the MHC is responsible for female preferences for the facial attractiveness of the male.

However, MHC plays no role in male preferences for the female's facial attractiveness. The study also provided evidence of the relationship between facial appearance and genetic diversity (Brown 1997; 1999). It also established that human facial attractiveness especially that of the male faces influenced the mate quality. Finally, the results showed that the males as well as the female are inclined at finding attractive genotype in the opposite sex faces.

The author boasts of having provided research results that links MHC genotype with male facial averageness.

Critique

The strength of the study lies in its methodology. The author applies the use of novel approach to provide the basis for his predictions on the relationship between facial attractiveness and genetic diversity in humans. It tests variables which are practical and easy to test using the available research methodologies and analysis models. It tests attractiveness, masculinity, symmetry as well as femininity and averageness. The various methods used in collecting the data, testing and analyzing the variables are standard and valid.

Although microsatellite marker that was used has majorly been applied in other non-human animals, it was used perfectly used as the researchers sought the guide of the manufacturers of the Polymerase Chain Reaction (PCR). The use of multiple regression models to analyze the variables makes

the research more credible. The multiple regression models enable the researchers to present reliable qualitative results which also lead to stronger conclusive results. The results are explained qualitatively and supported by quantitative results of the empirical research. According to the reviewer, the research failed to organize a sample size that could provide stronger results. The author acknowledges that there was a fairly small sample size for the research. Thus it was not possible to find significant relationship between attractiveness and the non-MHC standardized-mean.

The research could not provide significant statistical power to prove the relationship. Besides, the study has made use of all white Caucasians as the respondents. Perhaps if the research was a comparative study between say, the Caucasians and the African Americans, this would have helped to shed more light on the research. The methods that were used in the research are certainly appropriate as they helped investigate the possible associations between genetics and attractiveness in human beings through DNA sampling and use of photographs. According to the reviewer, the research method that was applied provided more conclusive results which could not have been possible through the use of another method. The previous results that had been done by other research methods could not establish MHC’s role in mate preferences as well as whether males had any unique preferences on the females’ facial attractiveness. This research was the first to provide evidence on the role of MHC diversity on male facial attractiveness.

It was also the first to establish that genetic diversity is related to unique facial attractiveness. This proves the feasibility and the credibility of the

research. Therefore, in the reviewer’s opinion, this was the best research methodology for the research topic.

However, the results presented could have been more comprehensive and stronger if he sample size could have been made larger and diverse.

Significance

The research makes significant contributions to the field of evolution. It provides evidences that support the relationship between genetics and human attractiveness. It enables us understand the underlying phenotypic characteristics which are associated with genotype in opposite-sex facial attractiveness, thus providing significant insights into human sexual selection. It enhances research in genetic diversity as it explores research areas which have never been proven by previous researches in the topic. The topic of the study in the article is well covered in the study book used in class (Ridley 2004).

The book covers many areas covered by the article and provides more insight in it since most of the contents of the article is related to several chapters and subtopics in the book. However, the research methodology used in the study; Microsatellite Markers, has not been fully elaborated in the book. The research methodology has proved to be more reliable and therefore more skills on its application would be very important in our research processes. I would also recommend that Ridley (2004) cite this article since it presents a professionally conducted research with strong conclusions.

The evidences presented in the article have quantitative data to support them. The article would offer more credibility to the information provided in the “ Quantitative Genetics” in chapter nine of the book (Ridley, 2004). The article provides relevant evidence to most sub topics in this chapter and this would offer learners and all those interested in the field of evolution a comprehensive learning material with more accurate and recent research results.

Follow-Up Design

The next level in the research should investigate the association of MHC-genotype and health. This would help justify the fact that genetic diversity has an effect on the reproductive success as well as fitness (Lie, Hanne and Simmons 2008).

In this case, the variables would be facial attractiveness, skin quality, masculinity, symmetry as well as averageness and femininity. The research would attempt to prove the fact put forward by Donnely et al (155), which explain that MHC heterozygous males have healthier skin as compared to less heterozygous males. Therefore the hypothesis for the study would be: there is a strong correlation between MHC genotype and skin quality.

The research methodology would involve the use of microsatellite in collecting DNA samples and in calculating the individual mean heterozygosity as well as standard mean for the DNA tests. Photographs would also be taken and analyzed by other separate groups from the non-participants. The results of all the tests carried out would then be quantitatively analyzed using multiple regression models.

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