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Opposites attract – how genetics influences humans to choose their mates

Vienna, Austria: New light has been thrown on how humans choose their partners, a scientist will tell the annual conference of the European Society of Human Genetics today (Monday May 25). Professor Maria da Graça Bicalho, head of the Immunogenetics and Histocompatibility Laboratory at the University of Parana, Brazil, says that her research had shown that people with diverse major histocompatibility complexes (MHCs) were more likely to choose each other as mates than those whose MHCs were similar, and that this was likely to be an evolutionary strategy to ensure healthy reproduction.

Females' preference for MHC dissimilar mates has been shown in many vertebrate species, including humans, and it is also known that MHC influences mating selection by preferences for particular body odours. The Brazilian team has been working in this field since 1998, and decided to investigate mate selection in the Brazilian population, while trying to uncover the biological significance of MHC diversity.

The scientists studied MHC data from 90 married couples, and compared them with 152 randomly-generated control couples. They counted the number of MHC dissimilarities among those who were real couples, and compared them with those in the randomly-generated 'virtual couples'. "If MHC genes did not influence mate selection", says Professor Bicalho, "we would have expected to see similar results from both sets of couples. But we found that the real partners had significantly more MHC dissimilarities than we could have expected to find simply by chance."

Within MHC-dissimilar couples the partners will be genetically different, and such a pattern of mate choice decreases the danger of endogamy (mating among relatives) and increases the genetic variability of offspring. Genetic variability is known to be an advantage for offspring,

and the MHC effect could be an evolutionary strategy underlying incest avoidance in humans and also improving the efficiency of the immune system, the scientists say.

The MHC is a large genetic region situated on chromosome 6, and found in most vertebrates. It plays an important role in the immune system and also in reproductive success. Apart from being a large region, it is also an extraordinarily diverse one.

“Although it may be tempting to think that humans choose their partners because of their similarities”, says Professor Bicalho, “our research has shown clearly that it is differences that make for successful reproduction, and that the subconscious drive to have healthy children is important when choosing a mate.”

The scientists believe that their findings will help understanding of conception, fertility, and gestational failures. Research has already shown that couples with similar MHC genes had longer intervals between births, which could imply early, unperceived miscarriages. “We intend to follow up this work by looking at social and cultural influences as well as biological ones in mate choice, and relating these to the genetic diversity of the extended MHC region”, says Professor Bicalho.

“We expect to find that cultural aspects play an important role in mate choice, and certainly do not subscribe to the theory that if a person bears a particular genetic variant it will determine his or her behaviour. But we also think that the unconscious evolutionary aspect of partner choice should not be overlooked. We believe our research shows that this has an important role to play in ensuring healthy reproduction, by helping to ensure that children are born with a strong immune system better able to cope with infection.”

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