ScienSage

Journal of Advanced Scientific Research

Available online through http://www.sciensage.info

ISSN
0976-9595
Review Article

CONCEALED CHEMICAL CUE IN HUMAN RELATIONSHIP WITH SMELL

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ABSTRACT

Since the aurora of human civilization, visual cues play a premier reliable role for the judgement of making mate preference. Due to an evolutionary perspective, facial attractiveness for mate selection has been considering as one of the primitive tool. But role of smell in human relationship is considered as a significant factor. The influence of smell in human relationship is well connected with diversified factor including human body odor, physiological or behavioral responses, genetic factor etc. The present article has sketched a concise relationship of smell with human relationship.

Keywords: Human Relationship, Body Odor, Pheromone, Genetic influence

1. INTRODUCTION

Relationship is a sincere gift of nature. Various forms of human relation have its causes and various variations. There are many factors known to be recognizing as the driver of the beautiful relationship. One of these drivers is smell, which can bring a strange living life in many colorful lives. The sense of smell has proven itself as the important sense from the primordial penetration of creation [1].

Even the single-celled bacteria awakened up to the smell [2] they could only 'smell' the nutritional food of the food, they could understand what foods should be avoided. In childhood, the child was introduced to the new world with the help of the mother. Smell act as the chemical cue among the mother and offspring. In addition to that it is also used for maternal and offspring recognition [3]. It has been observed for a number of mammals that, odors help their suckling behaviour [4, 5].

Many of the current studies have shown that odor plays a very important role in selecting partner. Most mammals, including mice, cats and dogs are not only survivors, but also relate to indigenous tenderness on the smell of the stomach. In this case, partner selection is considered to be an important component of the body's odor (BO) companions [6].

It is astonishing to think that each of us has different fingerprints in this vast world, just as the smell of each of our bodies is different, which is to be cherished as a subconscious mindset. According to researchers, body odor (BO) can affect deeply the human relationship [7, 8]. According to the scientists, this large number of information regarding odor is hidden in a genome called 'Major Histocompatibility Complex Genes' or MHC gene in short [9].

There are enormous studies regarding the partners' compatibility in various domains and prosperity in their long life relationship has been demonstrated in many articles. The major factors have been shown as everlasting relationship included the life satisfaction [10], resemblance in health [11], and personality [12]. Among the following factors, personality traits are found to be relatively stable over time [13]. The some of the interesting observations demonstrated that even attractiveness due to facial appearance of spouses help them to spent together over the long time [14].

An important study have explored that a shift in chemosensory perception is deeply related with the duration of relationship. Converge of partners' characteristics for long time assumed to be argument in this regard [15]. In addition to that several environmental factors can be ascribed for the fact. Smith and Zick (1994) mentioned the shared resource hypothesis according to which spouses/cohabitants share the identical environment, social network, and financial resources results the changes in behavior of both partners [16]. In other words, according to the social control hypothesis, changes in behavior is the consequence of controlling attempts of one partner over his or her cohabitant to check him/her from fascinating in risky or ineffective behaviors [17]. Coherence of partners in multiple domains may lead

to prosperous relationship and durability [18]. Personality traits may be attributed as argument for satisfied and unsatisfied couples in various aspects [19]. Therefore, greater the congruence may lead a better adjustment and minimizes the potential disagreement and unnecessary tension. The same theory may also apply to banquet and consequently preferences of taste and smell should be considered as key drivers.

Groyecka and his group [20] examined the relationship between the degree of sharing gustatory and olfactory preferences among the heterosexual couples and duration and stability of the couples' togetherness. On the other hand, they investigated the degree of satisfaction of the relationship. The research team also hypothesized that the partners having more identical olfactory and gustatory preferences sustain their togetherness for longer duration. They also expected the investigated pattern as the clear indication of satisfied relationship.

It is the fact that the primordial breathing truth of our varied life is the relationship. There is a grammar for any language practice, but there is no scope for relationships to be studied. However, building and developing of stronger relationships are much more difficult rather than learning languages. Like the range, diversity, and equations of sea water flow, relationships are also constantly changing. There are various forms of human relation and these depend on various aspects. Among them one of major influential fact is smell, which can bring a strange living life in many colorful lives.

2. BODY ODOR AND RELATIONSHIP

Since the dawn of human civilization, visual cues play a reliable role for the judgment of making mate preference. The basic advantage on facial attractiveness for mate selection is justified due to an evolutionary perspective. The major attribution behind it may be considered as identification and selection of high quality partner [21]. Various research investigations have disclosed that attractiveness due to face [22] and color attractiveness [23] are linked with physiological health. Albeit, several studies suggest that allusions identified by the visual sense are not solely reliable on visual hints to assess the auspiciousness of potential partner but also make their determinations using their feeling of smell [24]. The effective relationship among the partner can be assessed by sense of smell among them [6]. It is not a surprising fact that the BOs play a role in mate attraction, and preference through the signal of physical health and genetic compatibility among the potential partners. It is known to us from the research group of Bijland that sense of smell can be used as a diagnostic tool for confirmation of the many diseases. Physicians can recognize reliably the infections like gangrene and diseases like diabetic ketoacidosis (DKA) by the BOs emitted from the patients [25].

If the genetic compatibility factor of a couple is considered, a set of genes that encoding the major histocompatibility complex (MHC) and cell-surface proteins involved in resistance of pathogen [26] that directly linked with our BOs [27] -which may also act as the important tool for mate fidelity owing to BO preference. Some investigations revealed that women have greater interest for the BO of men having dissimilar MHC alleles [28-30]. Howsoever, a recent phylogenetically controlled meta-analysis on the impact of MHC gene in mate preference concluded that mate preference for more MHC- diverse mates is effective for humans and likely conserved across primates [31].

Reasons related to BOs can change owing to various factors including diet, menstrual cycle etc. A study in regards to that fact revealed that a diet with higher in meat consumption is connected with unpleasant smelling BO in comparison to non-meat diet one [32]. But in another report by Zuniga et al. demonstrated that consumption of higher meat was linked with BO having more pleasing smell [33], Not but what frequency of meat consumption was based on data by self-report which may account for the contradiction to Havlíˇcek and Lenochova [32].

Besides that, preferences of men for female BO alter depending on the different periods of a women's menstrual cycle that are directly associated with the levels of hormonal changes. Gildersleeve and his hroup demonstrated that the higher favoritism ratings for women's BO during the fertile phase of their cycle compared to those in the non-fertile phase [34]. Whereas research investigation regarding the changes in hormone levels mainly focus on the menstrual cycle. Many studies have established differences in hormone levels of men based on position of their relationship. According to many researchers, heterosexual men having higher levels of testosterone, the less likely the men are to involve in marriage [35-38] and or in relationships for longer duration [39] while men having low testosterone levels were associated with romantic relationship. Since the

man's BO is directly related with the various hormones (e.g., oestradiol, progesterone, testosterone and cortisol) [40] and also attractiveness of the individuals [41].

Thornhill *et al.* [42] reported that BO of high testosterone men is preferred by women was comprehensively correlated with their conception risk probability, due to the fact that it is assumed that higher testosterone may offer some form of evolutionary fitness within them [43]. In a similar way, Butovskaya et al. (2013) explored that women prefer the BO of men having masculine qualities during the most fertile periods of their menstrual cycle [44] and a number of studies have highlighted that BO of men having symmetrical faces remain in the women's sub-conscious mind and their preference [45-47].

Lobmaier and his group tested the relationship between the women's individual levels of reproductive hormones (e.g. oestradiol and progesterone) attractiveness towards smell and extent of attractiveness of different BOs. They found most interesting observation that endogenous oestradiol and progesterone levels of women predicted their BOs attractiveness. Higher oestradiol levels and the lower their progesterone levels indicate the more attractiveness of women's BOs. Levels of cortisol and testosterone were not significant with attractiveness of women's body odors [41].

Mahmut and Stevenson (2019) hypothesized that BO of single men smelled stronger than that of partnered and in connection to attractiveness, the rating of single men's faces were found to be more masculine than partnered men's faces. The possible advantages of females being able to identify single males are addressed in the Discussion [48].

3. PHEROMONE, SMELL AND HUMAN RELATIONSHIP

The word 'pheromone' derived from the Greek words 'pherein' (to carry) and 'hormon' (to excite) and was introduced by Karlson and Luscher [50]. Pheromones are Semiochemicals and are mentioned to as 'ecto-hormones' as they are known to be chemical messengers that are emitted into the environment by living body to innate signals to elicit specific, invariant physiological or behavioral responses and transmit information between intra-species of the individuals. McClintock classified the pheromones into two classes as signal and primers pheromones. 'Signal pheromones' produces change in short-term behavior and point out to function as attractants and repellents. The 'primer pheromones' produce long-term behavioral changes *via* their hypothalamic-pituitary-adrenal (HPA) axis activation [51]. Particularly, it is supposed that primer pheromones cause the secretion of gonadotropin-releasing hormone (GnRH) from the hypothalamus, which in turn leads to release of gonadotropins (LH, FSH) from the pituitary gland. These gonadotropins affect the gonadal hormone secretion, such as follicle maturation in the ovaries of females, testosterone and sperm production in males. Due to rising in testosterone level, exposures of females towards males have been linked [52]. It has been observed that there are four specific functions of pheromones have been traced namely attraction of opposite-sex, repulsion among the same-sex, bonding attraction among the mother and infant and menstrual cycle modulators [53].

The important role of pheromones is to make communication among the intra-species through chemical signal. According to several studies, pheromones lead an important role in mammalian social behavior and thus in humans as well. As per assumption of group of Kohl [54], for assessing potential partner, human being rely on visual and verbal cues and the sense of smell has been under reacted in reproductive behaviors and humans are assumed to be 'microsmatic' (poor smellers) [54,55]. On the contrary, ability of us being excellent smellers and having exquisite smell distinctions potentiality is not the confirmatory evidence for existence of pheromones within us [24, 56-58]. As we do not have any functional vomeronasal organ (VNO) or 'second nose', we smell through 'main olfactory system' [59]: though, this is no impediment to our effective use of pheromones like many mammals, including sheep and rabbits etc. to detect pheromones with the help of main olfactory system [60, 61].

Definitely visual stimuli act an authorized role in the human perceptions within a sociosexual context, most particularly at a distance of the individuals, but that smell also performs a vital role in a variety of sociosexual behaviours during the close and personal intimacy of the individuals. According to some updated studies, conscious and unconscious olfactions have a significant role in the field of human reproductive biology. It is clear from the hypothesis of Zajonc's 'affective primacy' which states the evocation of both positive and negative affect with minimum stimulus input and only nominal cognitive involvement. Even in the discontinuous perception of an olfactory stimulus, olfactory signals incite emotional responses: The reason in this context is that olfactory receptors do not only send projections in

the direction of neocortex for favoring conscious processing but also to the limbic system owing to emotional processing [62].

Not only have the genes, along with the gene, scientists found the role of chemical substances behind the transport of smell. They named it pheromone. This pheromone is thought to play a significant role in the process of managing the brain and promoting reproduction in the brain by performing a cortical nerve called 'nerve zero' [63]. Based on the results of this research, the gender identity, social status, region, reproduction, and many can be determined depending on the odor. The proof of this was in a study of Hilda Bruce on rats in 1959 [64]. The results of the study found that after meeting, if a rat finds the smell of any other disorder that is absent or disadvantaged, then the embryo falls without falling into its uterus. But the smell of familiar favorite companions never prevents pregnancy. Thus, with the help of pheromones, such mice can confirm or prevent pregnancy through a preferred partner. The renowned Nobel laureate Linda Brown Buckand his associate, while researching a cancer research center in Seattle in 2006, found that 15 members of the new family of proteins were identified. The results of their research have shown that these customers who have found a rat nose can detect the pheromones.

As per as the role of pheromone is concerned, the animals other than human depend heavily on odor in their survival and companionship selection. But in the different types of evolution, the usefulness and importance of odor have gradually decreased in human species. In fact, the way people have increased dependence on their eyesight, hearing or intellect, not exactly dependent on the smell. Nevertheless, scientists have found the existence of about 347 different types of sensitive neurons in our olfactory epithelium [64]. These neurons can detect different odors, but the smells are mixed in our head many times but in case of other animals, remain separately.

According to the research of scientist Linda Baq on rat, pheromone customers found in the gene of rat are also available in human being. According to result of his research there are six such pheromone customers in human body. A study by the University of Chicago researchers Martha Clintak and Kathleen Stern shows that the possibility of pheromone impact on people's journey of life like other animals. Scientists have long been proven that if many female students stay in the same room at the university's dorm or hostel, and spend a lot of times near each other start to get periods at the same time. This mysterious thing is called menstrual synchrony. Martha Clinton showed the fact in his research that pheromone plays a vital role in this regard [65].

In 1998, Martha Clinton extended her previous research and showed that pheromone is not only synchronization of menstrual cycle, but also plays a significant role in regulating irregular women's menstrual cycle. Generally the hairy parts of the body are considered as pheromone sources. Martha Clinton, for some of these volunteers, tested the pheromone of sweating from the men's bulging lips and watched women for a few weeks; this resulted in regular menstruation cycle [66]. It's not unusual. Many scientists believe that the smell of the human body is very much like the other animals, but it also has a hidden role in the formation of immune system, and it is hidden beneath the evolutionary cause. In this context, Helen Fisher's book 'Anatomy of Love' is notable [67].

The smell of sweat (sweating) of men helps to normalize the menstrual cycle. Maybe that's why the boys are unconscious on the smell of sweat; a strange attraction of girls is probably evolutionary. However, the use of men's perfume and the liking of girls are because the product producers' advertisers blew the aggressive cultural mind, resulting in sweat being treated unexpectedly. It should be very important to remember that the odor of sweat that we dislike and the smell of pheromones is not the same. The main reason for sweating is to bite the sweating bacteria, which spreads in the climate for some time. But on the other hand, the fragrance of the pheromone is basically body-centric which is not very sensitized and consciously felt. Although we are clean, it is always believed to have gone out of the body. Since childhood, human baby has to go through different flavor variations. When the boys reach adolescence (at the age of eleven years), their body becomes a storehouse of new kind of odor, which is very different from the smell of earlier childhood. Neurologist Lohan Bridgendin mentioned in her 'Mail Brain' that the main reason for this new flavor is the balanced combination of pheromone and endrostenoid emitted from the male's body sweat from the testosterone hormone [68]. Naturally, this smell of

the boys gets girls, not through olfactory coatings, but also through a separate organ which is known as VNO [69].

The smell speaks secretly to the heart. The deep attraction of the beauty of the mind is such that. The smell also plays a role in changing the mood of the human mind, which we commonly know from everyday examples of daily life. During various festivals, burning incense, or lighting the fire in the Milad Mahfil, it is necessary to maintain a sense of pride for other types of desires by eliminating the ecstasy through odor. Scientists may have found a deep link between the smell and smell of the heart. We feel freshness of mind by the smell of lemon, the reduction of blood pressure in the smell of phenyl alcohol, or with the scent of the eucalyptus leaves, with regular events such as breathing. But beyond all these scientists have found a greater role of smell.

4. GENETIC INFLUENCE, SMELL AND RELATIONSHIP

In this context, it has been found that many animals can detect MHC genes through the smell. In this way, they may refrain from having physical relationship with their own family or near relatives. This refrain was created through evolutionary way. In human society, the physical relationship between close family members (father, mother, sister or close relative) is seen in hatred; socially it is considered 'adultery'. It is found that in the case of very close family members, the child's diversity of childbirth has reduced due to adultery, and thus the child's immune system weakens. Not only that, biologists have studied that if a father or mother has a genetic illness, then in 25 percent of cases, there is a possibility of a child born with a defective genetic trait. In the terminology of science, it is known as congenital birth defects.

It can be said without question that our primitive father-in-law realized this for generations that the relationship between close relatives of close family members is becoming a child, and the mortality rates of those children are unimaginable. Then socially felt the urge to resist it. And that is why, in the long run of evolution, our instincts have been controlled in such a way that most people do not get excited by the primitive aspiration of seeing their family members. Many scientists speculate that people like other animals also decide the matter with the help of unconsciousness. The hidden relationship behind the relationship between human beings is hidden in the secret room of the genes.

In one of the tests, Professor Claus We in of Berne University of Switzerland separated 100 college students and put them in their shirt cloth for two days. Those two days prevent them from eating any fried food, smoking. They were prevented from using any deodorant and aromatic soap in order to avoid any effect in the nondescript manner. Then they gathered their shirt and filled them in another box with other girls being strangled with strangers. To smell their smell, they are said to be 'attractive' to the smell of any shirt. Girls who own different genes from their MHC genes, girls prefer the smell of their wearing t-shirts. And those whom MHC genes seem to be close to their genes, girls think of them as their own brother! One such study by the University of Chicago geneticist Carole Obama in 1997 found that the same MHC gene carriers are generally reluctant to be physically related to each other [70].

Not only that, scientists have found that in this world many couples have a big reason for infertility and pregnancy problems are actually hiding among couple due to similarity of MHC genes. Doctors know about this fact very well. They have seen that many women are physically and mentally fit to have children, but unfortunate to have because of having her own MHC gene near her husband's genes. In many cases the child is born, but it is very low in weight. And the rate of miscarriage rates is higher than usual in the case of similar MHC genes [71].

We have 'Human Leucocyte Antigen' (HLA), an essential part of our DNA that is involved in the prevention of body disease. Zurich's geneticist Tamara Brown's research shows that HLA play an important role in the selection of "true love people". It is believed that arrangement and formation of HLA is the key to the attraction and firmness of our close companion. The more diversified of your preferred partner's HLA format with you, the greater the level of your attraction and the potential for lasting relationships [72].

It is well established fact that the sense of smell is important art in regards to biological and evolutionary aspect and is discussed extensively in mating context [20]. Some previous observation revealed that hints of odor give information regarding the individual's genetic make-up, with the MHC (major histocompatibility complex) which plays a vital role in shaping body odor of

the individual. In immune processes, MHC carry out its crucial role which was already reported by Penn et al. [73]. Even for the choosing of partner preference, MHC-related body odor is greatly dependent on most favourable level of genetic resembles [74, 75]. Person's MHC and odor preferences are also indirectly related to each other [76, 77]. Therefore, mentioned evidence is also a clear indication of preference for similar odors and may be important cue to disadvantageous similarities in the MHC. It is also assumed that lower genetic coherence of partners may be connected with lassitude in satisfaction of relationship [78].

These observation findings highlight the need for more research intended at exploring mating mechanisms connected with partners' compatibility in odor preferences and the satisfaction of relationship.

5. CONCLUSION

Interested clients or their spatial examination can be sure that how the diversity of the HLA pattern of his future partner can attract or induce him. Who knows, the genetic form of 'arranged marriage', which has long been fond of third World countries, will be seen in the future of 'Advanced Earth'.

However, it is worth mentioning that this invincible effort to select a companion based on 'genetic match' or ancestral pair is not going to be very successful, because the human relationships are more complex and varied than other animals. Today, the civilized people have passed the tests of many obstacles in every step of evolution from the cave man. And at every step of the fight against adversity, homophobia or socialism was the main instrument to preserve itself. So the foundation and durability of human relationships depends much more on the environment and socialization of relations.

So it is seen that in spite of unhealthy results in the hereditary examination, in many cases, only a deep and far-reaching effect of social factors has created relationships and there is no problem in development. Despite this, many scientists have argued that in the future, in the selection of companions in the world, genealogical subjects can have a favorable effect on building relationships.

Clauss Wind, Carol O'Brien, and Tamara Brown think that this love sign in our DNA eventually reached our brain through the pheromone flow, whose soul is mainly hidden in the smell of the companion. And because of that, match-making sites spend much money and are now interested in understanding the chemistry of love and DNA analysis and above all smell of smell.

Relationship is an earnest gift of Creation. Its provenance, permanence, extent and diversity are not limited to the boundaries of space, time, individuality or geographical boundaries. The Smell is rich in nature owing to its own virtue. So its secret presence and influence in the relationship is a blessing of nature in human life. And the sweetness of this relationship brings peace with the soul and brings the taste of the nectar in human life. Then the most popular chronic and ancient words of the world resonate in the heart - peace! Peace! Peace!

6. ACKNOWLEDGEMENTS

Authors are grateful to the Department of Chemistry, Krishna Chandra College, Hetampur, Birbhum for providing necessary infrastructural facilities.

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