THE APPLE DOESN'T FALL FAR FROM THE TREE*

English Proverb from 19th Century
PERSPECTIVES

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I was sitting in my comfortable chair after an exhaustion of a tiring week's day and watching my wife and my 16 months old son playing. They were in such a joy that it seemed that they were not aware of anything going on around them. That scene brought me to the years of psychiatry residency and than after. On those days, I had an impression that the hypothesis on mother and infant relationship for psychiatric disorders in psychoanalytic theories were exaggerations of few people working in the area and too much theoretical. Perhaps that was the reason why I focused on neuroscience and molecular basis of psychiatric diseases which were more dependent on evidences rather than interpretations. However, in the last one and half years my ideas on mother and infant relationship had changed so much. The relationship between my son and wife was so full of much intimacy and warmness. This scene was certainly a motivation not only for a psychoanalyst but also for a neuroscientist also.

A couple of words from the television disturbed my concentration very sharply "An abandoned baby found .....". The anchor lady was giving news about an abandoned baby who has been found in a hospital garden. How can a mother abandon her baby? Is it possible for a mother to leave her baby in spite of their relationship? Is this behavior a result of nature or nurture? If it is due to nature, shouldn't it disappear via the evolution as an abandoned baby has a little chance to survive? If this is due to nurture, what kind of environment caused such kind of behavior? Or is it just due to socio-economical problems?

I knew that in some species this behavior is more common than the other species. For example the female Japanese Macaques, a type of monkey might abandon their infants up to 40% especially during their first labor (Schino and Troisi 2005). Some people believe that this behavior is related to lack of experience or lower social-rank of the mother because this rate is not high in experienced mothers and females with high social rank in the monkey society. Suddenly I remembered an interesting statistic showing similar situation for human. A fact sheet published by University of California at Berkeley's Abandoned Infants Assistance Resource Center in 2002 stated that woman who kill or abandon their babies were generally "very young, unmarried, physically healthy woman who were pregnant for the first time and not addicted to substances." It was an impressive finding of animal studies that pre-experience with infants increases the mother-infant attachment (Fleming et al 1999). Thus, this might be another evidence for the importance of experience in motherhood behavior. Thus, let us advice every mother candidate to spend some time in nursery school. Could it be a solution for this kind of deadly behavior of new mothers? I might believe that I was a genius and found a solution for this problem unless I had attended a conference in Stockholm last year.

Conference was about social attachment. It was my first time to hear that voles which are small animals like mice or rats that live in fields or near rivers and have a different kind of motherhood behavior (Thomas et al 2001, Insel 2003). One kind of vole, praire vole which is monogamous shows a strong motherhood behavior and lives with a single spouse all through its life. The other kind of vole, montane vole plays less affiliative behavior and do not form an intimate relationship with its sexual partners and infants. Even montane voles let their infants grown up by praire voles and highly surprising, praire voles do this job very agreeably. When researchers looked into the brains of these voles, they found no difference except one small detail.

The brains of voles like other mammals, including those which are human made, consist of billions of neurons. During everyday life, these neurons have communications with other neurons to realize the number of functions we do like reading, watching, walking and even sleeping. It is fascinating that these neurons are not in contact with each other and leave a very small space in-between them. However, the communication between these is done via tiny proteins called neurotransmitters. One neuron secretes a neurotransmitter and sends a message to the other neuron. This is like sending an e-mail or a SMS to a friend. This message should go and attach to the correct neuron via the address on the second neuron. Thus, if the address on the e-mail matches the address on the neuron, the message will be reached.

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One transmitter or message is quite different from others. It is called oxytocin and secreted enormously during labor and when the infant touches its mother breast. Both the brain and the body with message of oxytocin prepare themselves to the baby. What is fascinating about oxytocin is; it gives a positive message to satisfaction and pleasure center in the brain. Thus, with the oxytocin the baby becomes a new center of joy for its mother. However, this is not seen in montane voles which leave their newborns to praire voles. The only difference between a montane and praire vole is the missing address for oxytocin in the neurons of joy and satisfaction centers of the brains of montane voles. But who is responsible from this?

The oxytocin address on the message receiving neuron is regulated by our genes which are brought to us from our mothers and fathers equally. It is generally known that genes shape our body like color of eye or skin and some carry diseases like Huntington's chorea, a disease related to uncontrolled motions in the extremities. Actually I knew that they code every protein that we have but this was the first time I ever heard such a direct involvement of our genes regulating such an important behavior for continuation of a species. We have somewhat about 38.000 genes. Some of them are at "on" and some of them are at "off" position depending on the need(s) of the body. In the case of montane vole, the behavior of neglecting and abandoning of the pups is the result of the silencing of the genes writing correct address for oxytocin in the joy and pleasure center. Is it due to nature? And is the same situation true for humans? If it is true, we can not blame the mothers who abandoned their infants as they have the genes in this way.

While sitting in my comfortable chair and thinking of these things, I felt a sudden soar. This situation should not be described as easy as this. Have the gene, you are a good mother or you do not have the gene; you are not a good mother. All of a sudden, I remembered a serious of studies done in Canada (Meaney et al 2002, Weaver et al 2001, Champagne and Meaney 2001). There are substantial, naturally occurring variations in maternal licking/grooming in rat dams. Maternal licking/grooming behavior of pups occurs most frequently while the mother nurses in the arched-backed position which helps pups to suck their mothers' breast better. Some mothers are good-nurses with licking and grooming their pups at the arched-backed position, although some are not. When the pups were followed, it is observed that they do the same thing that they have seen from their mother. Thus, the pups of good nursing mother become good mothers and the pups of bad nursing mother become bad mothers. The pups of bad nursing mother are generally behind the other pups during food search and exploring the novel media which are very important for surviving. When the pups of good and bad mothers were exchanged just after the birth but not later, the pups brought up by the bad mothers behave as their original mothers during their adulthood and they became good mothers even though they have not seen such a behavior. What about the pups of bad mothers reared by the good mother? Fascinatingly, they became good mothers. So, even though good motherhood highly depends on genetics, bad motherhood can be changed by correct motherhood. Researchers later discovered that good motherhood may turn on some genes while silencing the others. The result were clear, our behavior depends on our genes but the genes can be turn on or off by the nurture in our early lives. Is that why Freud and other psychoanalyst had focused on early life experiences? Was I unfair to them? Or is it possible to find an apple far from tree?

I felt a small hand touching my knee. It was my son inviting me to play. By the way, has anybody focused on fatherhood behavior?

Well! Who cares now? I should go and play with my son.

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