LOVE AND CUPID'S CHEMICALS

(1) What is love? Why do humans feel love and is there a purpose for it? Let's explore some of these questions. Scientists who study love usually break it down into three main components. The first is the *sex drive* which compels people to seek out romantic and sexual partners. The second is *attraction* which causes people to narrow down their search to only a few individuals. This helps conserve time and energy during the search. The third is *attachment* which causes a committed bond to form, making it possible to support and help one another in life and in child rearing.

(2) The first component, *sex drive* (also known as libido), is affected by psychological and biochemical components. Illness, stress, depression, anxiety, distraction, body image issues and a history of abuse or trauma can be psychological components that decrease sex drive. Biochemically, testosterone has a huge effect on the sex drives of all humans. Men make testosterone in their testes and women make it mostly from their ovaries and adrenal glands. One symptom of low testosterone levels is lowered sex drive. For those for whom a lack of libido is distressing, they can be prescribed medication to help increase their sex drive and often testosterone is one of the primary medications recommended. Not surprisingly, for most males, their libido is the highest in their teens and twenties when their testosterone levels are also at their highest.

(3) Endocrinologists (doctors who specialize in the hormonal systems of the body) are also beginning to realize that estrogen plays an important role in both male and female sex drives. Without adequate levels of estrogen, both men and women experience a decrease in libido. A recent study, published in the *New England Journal of Medicine*, took 400 healthy men between the ages of 20-50 and wiped out their sex hormones. The men were then given treatments with testosterone gel but half also received a drug to prevent them from making estrogen. After several weeks on the drugs, their levels of libido were examined. Those without the ability to make estrogen were not able to regain their sex drive as well as those who were still able to make estrogen. Further studies need to be done to understand the full effects of estrogen on libido.

(4) When it comes to the second component of love, *attraction*, the chemicals and feelings created by them are very similar to the chemicals and feelings created by using cocaine. This might be why love is sometimes called a "drug". It creates a sense of euphoria (an intense feeling of excitement and happiness). Brain scans of both people in love and people who are cocaine addicts show a similar pattern of activation in the areas that control reward, pleasure and motivation. During attraction, adrenaline is released by the body. This causes your heart to beat faster, it dilates your pupils, it makes your palms sweaty, mouth dry and makes you feel giddy and nervous around the person to whom you are attracted. Dopamine, a neurotransmitter (brain chemical), is released in your brain when something pleasurable happens like when you consume sugar, when you're taking some types of drugs and when you're attracted to someone. Dopamine tells you that you're being rewarded by pleasurable feelings when you're around someone and this causes you to want to be around them more. Finally, serotonin, another neurotransmitter, causes you to have an obsessive focus on your love interest. You think about them all the time even when you should be focusing on other things.

(5) For a relationship to move beyond attraction and towards lasting attachment, the levels of adrenaline, dopamine and serotonin have to lower to make way for two other hormones: oxytocin and vasopressin. These hormones are important in helping people to feel bonded and devoted to one another. Oxytocin is often called the "cuddle hormone"

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and is released by mothers after giving birth. This causes them to strongly bond with their baby. Oxytocin is also released by both men and women after orgasm (sexual release) during sex. It causes them to feel closer to one another and more connected. Vasopressin is another hormone that began to draw attention as an attachment hormone due to the research conducted on prairie voles (which are rodents that look a lot like mice). Like us, prairie voles have sex beyond what is needed for reproduction and they form strong monogamous (having only a single sexual partner) bonds with their partners. Many will not seek out new mates once their mate dies. When researchers took a group of male voles and injected them with a drug that inhibited their vasopressin production, the strong bonds they had developed with their partners were erased and they were no longer devoted to their partners.

(6) Some evolutionary biologists say that attachment hormones have been vital for causing couples to stay with one another (even through difficult times) so that they can successfully raise children. Another theory says that attachment decreases promiscuity (having multiple sexual partners) and this is important to prevent the spread of sexually transmitted diseases that could harm reproductive ability and cause illness or death.

Article Questions

1) List the three components of love.

2) How does testosterone affect sex drive?

3) In the experiment with the 400 men and testosterone and estrogen, why were half of the men given a drug to inhibit their estrogen production and half of the men not given this drug?

4) Why do some people say that love is like a drug?

5) In the chart below, describe the effect of each chemical during attraction.

Adrenalin	Dopamine	Serotonin

6) If a person cannot make oxytocin, what problems might they experience?

7) Describe two reasons why it might have been useful for humans to develop strong bonds of attachment.