

# The Chemistry of Love

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**Abstract:** In this era of hate and lust, it would be interesting to know about the chemistry behind love. The boundary line between love and lust is very thin. To protect you from committing the misbehavior in the society culture and customs play a vital role no doubt, but it seems to the author that knowledge of the chemistry behind love would also be helpful to behave in society. Indeed there exist biochemical activities behind every human behavior. The whim, the logic, the act, the feeling everything has got involved a biochemical change pertaining to culture, circumstances and personality of every individual.

**Keywords:** Lust, Attraction, Attachment, Oxytocin, Dopamine, norepinephrine, adrenaline

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## 1 INTRODUCTION

IN this highly civilized society, so far, it is accepted that war is not the solution over the quest of conquering the others but the dialogue, and so is the love rolling all the negativity away from the life. However, the speedy lifestyle and technological development already have taken its toll by stealing the satisfaction from the life of modern human beings up to considerable level. The social transformation taking place drastically due to globalization has given birth to the new problems like homosexuality and the gay relationships. Humans are coming closer than earlier and the relationships are becoming complex. Due to recent developments in information technology the humans from distant regions could communicate with each other and most of the time the communication is observed to be taking place for appreciations. At the same time the poverty in society and the associated problems are surfacing vigorously. The ways provided to outburst the envy and the anger through the sophisticated way of sports, like Olympics and cricket, football are found to be effective. To balance the negativity in the nature the love is in existence since the life is on this earth surface. Even by the social scientists and the human behavior scientists like Maslow the need of to love and being loved is proclaimed for the healthy society.

Love is a wonderful phenomenon that almost everyone can relate to despite the challenging, perhaps even impossible task of defining it or describing its many different interpretations and implications. Curiously, the multi-dimensional construct of love leaves many of us with pressing questions, one of which involves the obvious notion that love must somehow be influenced by internal mechanisms, but which ones and how? Logically, it has been stated that love functions biologically to ensure the survival of a species through social attachment and reproduction, so it is no surprise that science has found great interest in explaining the biology behind love. When sparks fly between two people, we're quick to say they have "chemistry." Not everyone realizes that such couples literally have do have chemis-

try--it's what's behind those sweaty palms, the jumpy stomach, thumping heart, and nervous jitters. Chemistry also contributes to that warm, comfortable feeling you get from being with a longtime partner.

The following text elaborates the role of Chemistry behind love and the precautions to be followed in the love laboratory i.e. life.

### All in the chemical family

We all have "chemical families" associated with dopamine, serotonin, testosterone, and estrogen. People choose partners with chemicals that complement their own. For example, a person with a high amount of estrogen may be attracted to a high-testosterone type.

Psychology plays a role, too. Our choice of a mate is partly dictated by a "love map," an unconscious list of traits we want in an ideal partner that we construct during our childhood. We get used to our father's sense of humor or our mother's brand of affection and use this to build our list. When we meet a potential partner, we consciously and unconsciously determine if that person is right for us. "We often do this in less than three minutes," Fisher says.

### The science of love

And when it comes to sniffing around for love, you may have more in common with Fido than you think. Martie Haselton, PhD, with the communication studies and psychology departments at the University of California, Los Angeles, has been studying major histocompatibility complex, or MHC, a set of genes involved in immunity that might play a role in mating by way of our sense of smell.

"People rate the body odors of people with MHC genes dissimilar from their own as more attractive," Haselton says. Also, research shows that children who inherit different MHC from each of their parents have broader immunity.

If it's all chemical, do we have any control over the process? Researchers say you can trigger your body's chemistry to keep love alive by:

**-Keeping it fresh** Novelty drives up dopamine in the brain, this can help sustain romantic love. Go to the movies in a different part of town or head out for the evening without knowing where you'll end up.

**-Keeping in touch** Any kind of touching, such as holding hands or playing footsie, can drive up oxytocin. Sometimes called the hormone of love, oxytocin is associated with attachment.

**-Keeping it happening** Creating interests in day to day activities by adopting innovative ways of love making. If you've gotten out of the habit, work on getting back into it -- even if you need to seek professional help.

The most well-known love-related chemical is phenylethylamine -- or "PEA" -- a naturally occurring trace amine in the brain. PEA is a natural amphetamine, like the drug, and can cause similar stimulation. This natural upper contributes to that kick-up-your-heels, on-top-of-the-world feeling that attraction can bring, and gives you the energy to stay up all night talking to a new love. Sometimes this energy translates into the triple-espresso jitters; other times it simply keeps you wide-eyed and alert long past the time when you'd usually be yawning.

### Feeling Dopey

You can also get a non-romantic dose of PEA from high-intensity activities like skydiving, or by eating chocolate. According to Chocolate.org, chocolate contains small amounts of our love drug, PEA. That might be why some people use chocolate as "comfort food," getting the same warm, relaxed feeling from chocolate as others do from Mom's chicken soup.

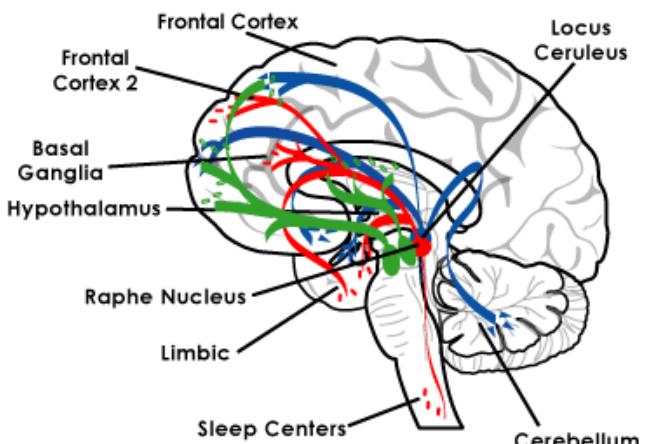
One of the substances released by PEA is the neurochemical dopamine. A recent study done at Emory University shows that female vole (small rodents) choose their mates in response to dopamine being released in their brains. When injected with dopamine in a male vole's presence, the female will pick him out of a crowd later. Our love food, chocolate, also elevates levels of dopamine in the brain.

**Figure:** Schematic presentation for different parts of brain which remains activated during activity of love

In turn, Dopamine stimulates the production of oxytocin, sometimes known as "the cuddle chemical." Oxytocin is best known for its role in mothering, stimulating contractions during labor and aiding with breast feeding. According to BirthPsychology.com scientists now think that both genders release this nurturing hormone when touching and cuddling, with the oxytocin level peaking during orgasm.

Another euphoria-inducing chemical in your brain, norepinephrine, stimulates the production of adrenaline and makes your blood pressure soar when near the person you're attracted to. That's why you might experience a pounding heart or sweaty palms when you see someone you've got the hots for.

### serotonin, norepinephrine, and dopamine pathways



There are three stages of love: lust, attraction, and attachment. Each stage is driven by a set of different hormones and chemicals. Lust, the first stage of love, is driven by the sex hormones testosterone and estrogen. From puberty onward, the amount of testosterone and estrogen released increases immensely. The testosterone level in a teenage boy's body is the same level as an adult's after drinking four to five shots of strong liquor. The feeling of lust is caused by the body's production of testosterone and estrogen, which peaks from puberty onward.

The next stage of love is attraction, when one can focus on little or nothing else other than the person he or she is attracted to. This stage is a result of a process under three neurotransmitters: dopamine, norepinephrine and serotonin. Norepinephrine is similar to adrenaline, which causes effects like a racing heart, sweaty palms, and flushed skin. Sound familiar? Yes, this is what happens when a person unexpectedly bumps into his or her new crush. Besides norepinephrine, dopamine plays an important role in the attraction stage. Dopamine is thought to be the pleasure chemical that produces the feeling of bliss. Researchers have used functional magnetic resonance imaging (fMRI) to observe people's brains when they are looking at a picture of their object of affection. The scans showed increased blood flow in areas concentrated with dopamine receptors, which are associated with states of euphoria, craving, and addiction.

Together, the combination of norepinephrine with dopamine produces elation, intense energy, sleeplessness, loss of attention, and exquisite delight from small details.

The third stage of love is attachment. This stage allows a couple to bond for a longer period of time. Two important chemicals that are responsible for this stage are oxytocin and vasopressin. According to researchers at University of California, San Francisco, the hormone oxytocin has been shown to be "associated with the ability to maintain healthy interpersonal relationships and healthy psychological boundaries with other people." Vasopressin, an anti-diuretic hormone, is another chemical that has

an effect on long-term relationships. It is believed that oxytocin and vasopressin interrupt the dopamine and norepinephrine pathways, which is a possible explanation of why passionate love fades as attachment grows within a couple.

### What The Brain Tells the Body

How do our emotions get translated into physical sensations? A U.S. News and World Report article explains the importance of the vagus, a nerve that threads through your whole body. It transports signals from your brain to your organs, "setting the heart pounding, making the stomach do flip-flops, and of course, lighting the loins on fire." Everyone knows that jumpy, sort of sick feeling in your stomach.

Tennov's group also reported "intrusive thinking," where it seems like your brain is fixated on the object of your affection. When your heart rules your head, there's actually one part of your brain running the other: the cortex is the area of your brain that controls logical thinking, while emotions are processed by the limbic system. When too many happy chemicals like PEA and dopamine flood your brain, they head straight for the limbic system.

### When The Honeymoon's Over

Some scientists believe that after a certain period, from 18 months to 4 years, one's body gets used to these love stimulants. After building up a tolerance to uppers like PEA, passionate romances can cool into what Helen Fisher, author of "Anatomy of Love" calls "attachment." In this phase of the relationship, your brain produces endorphins, brain opiates more like morphine than speed. "Unlike PEA," says Fisher, "they calm the mind, kill pain, and reduce anxiety." So what some people call "separation anxiety" might actually be a form of drug withdrawal.

The idea that the "honeymoon period" of a relationship is fueled by different brain chemistry than what is present during the mellower years that come later might explain why some people can't seem to hold long-term relationships: they prefer the revving-up affects of brain amphetamines to the pain-killing effects of endorphins.

"Divorce rates peak around the fourth year of marriage," says Charles Panati in his book "Sexy Origins and Intimate Things." "The initial 'highs' of love have lost their chemical underpin-

nings Marilyn Monroe's classic film "The Seven Year Itch" should be retitled 'The Four Year Itch."

Lynn Harris, co-creator of BreakupGirl.com wonders if it's the other way around. "Relationships take work. They just do. And people get lazy after a while," she says. "So do they get lazy because they're getting immune to the chemicals, or do they get lazy because they just do...which triggers a decline in the chemicals?"

In the end, even hard-core scientists agree that chemistry isn't everything. Culture, circumstances, personality, and scores of other variables help decide who turns your head and who leaves you cold. So don't try to reproduce that lovin' feeling in a basement chemistry lab--but do try your best to enjoy the natural highs that life gives you.

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