

Five-Minute Stress Relief.com

The Biochemistry of Long-Term Attachment

The third phase of attraction and romantic love is long-term attachment. And this final phase is often referred to as the neuro-enhancement of love because a combination of hormones, mental capacities and personality chemistry all contribute as a biochemical process underlying the manifested actions of the two lovers.

Hormones

In the article, *The Biological Basis of Monogamy*, we noted how the hormone oxytocin was so necessary for bonding and monogamy, both in prairie voles and humans. This hormone continues playing a significant role in human's long-term attachment function. We know this continued medical research working with both young and older couples.

For example:

- In male and female rats, oxytocin bring potent physiological anti-stress effects. In addition, daily oxytocin injections (repeated over a 5-day period), showed decreased blood pressure (by 10-20 mmHg,) decreased cortisol levels (See *Cortisol, Belly Fat and Skin Wrinkles*), and the healing rate of wounds is increased.
- Those individuals who displayed evidence of elevated oxytocin levels for positive emotion and who maintained oxytocin levels throughout stressful emotions were less prone to tell of interpersonal problems regarding invasive, meddling problems.
- Women currently involved in a committed relationship experienced greater oxytocin increases in response to positive emotions than single women.
- Those who maintained sufficient oxytocin levels during sadness experienced lower anxiety in close relationships.
- In the brain, oxytocin is involved in social recognition and bonding, and may be involved in the *formation of trust* between people.
- Women involved in a close relationship showed greater amplification in oxytocin in response to positive emotion.

In other words, individuals (especially women) with higher oxytocin levels, experience less agitation, less emotional anxiety, and more positive responses concerning their partners.

Stress Hormones

Clinical testing of 90 newlywed couples (with a mean age of 25)– who were chosen based on strict physical and mental health standards – has shown that:

- Negative, hostile behavior during marital conflict were linked with increased levels of epinephrine, norepinephrine (adrenaline), growth hormone, and ACTH (produced in response to biological stress, whose principal effect is increased production of cortisol. Wives showed greater (and more persistent physiological changes) related to marital conflict than husbands.
- Subjects who displayed more negative or hostile behavior during a 30-minute discussion of marital problems demonstrated significant decreases in four immunological, natural killer cell types (decreased resistant to diseases).
- Once again, women were more likely to show negative immunological changes than men.

Trusting

The next significant factor for long-term relationships is establishing a deep trust with your partner. It is important to note beforehand that trust is a critical component of social interaction

that helps people cooperate with others, and this factor exists (in some degree) in all human interaction.

Aside from our mental processing of trust, trusting one's partner calms and reassures the emotions. Research testing of has shown that subliminal (subconscious) exposure of a beloved's name during verbal evaluation and decision tasks dramatically improves the performance of women who are in love.

The Human Factor

Aside from providing you with more additional scientific information, the most important underlying factor here is that trust = commitment. Without complete commitment, how can there be a deep trusting of each other?

Furthermore, the success of long-term commitment is relative to and completely dependent on the immeasurable, invaluable and totally necessary involvement of both partners' *will*. Where there is a strong will, there is a powerful commitment, creating and supporting the existence of trusting each other.

The Brain Factor

Neuroscientist researchers have now been able, through *fMRI* (functional magnetic resonance imaging), to observe the brain's functioning as it occurs. This has led them to document those specific brain regions involved with the process of trust and long-term commitment.

Here is a modest list of corresponding brain-emotion regions:

Brain Region

Corresponding Emotions

anterior temporal cortex	social behavior/ conceptual knowledge
medial prefrontal regions	positive social concepts
paracingulate cortex	building a trust relationship
ventral tegmental area	conditional trust
septal area	unconditional trust
superior anterior temporal lobes	honor-bravery
ventromedial prefrontal cortex	pride and guilt
orbitofrontal-insular cortices	indignation/anger

Conclusion

- a. Conditional trust activates the *ventral tegmental* area, a region linked to the evaluation of expected and realized reward.
- b. Unconditional trust selectively activates the *septal* area, a region linked to social attachment behavior.
- c. The *paracingulate cortex* is critically involved in building a trust relationship by inferring another person's intentions to predict subsequent behavior.

“This more recently evolved brain region can be differently engaged to interact with more primitive neural systems in maintaining conditional and unconditional trust in a partnership”...
“The interplay of these neural systems supports reciprocal exchange that operates beyond the immediate spheres of kinship, one of the distinguishing features of the human species.” (**Neural Correlates of Trust** *Proceedings of the National Academy of Sciences* 2007 Dec 4)

And this is the proof that our brains are truly wired for long-term, monogamous love relationships that are supported by a multitude of biochemical hormones, a psychological state of mutual trust and emotional commitment, and a social awareness that is unparalleled by any other species on earth.

Sources: Defining the Brain Systems of Lust, Romantic Attraction, and Attachment *Archives of Sexual Behavior* 2002 Oct;31(5):413-9 **Romantic Ideals, Romantic Obtainment, and Relationship Experiences** *Journal of Social and Personal Relationships* Vol. 24, No. 4, 517-533 (2007) **Neural Correlates of Trust** *Proceedings of the National Academy of Sciences* 2007 Dec 4: 18056800 **A Relationship Between Oxytocin and Anxiety of Romantic Attachment** *Clinical Practice and Epidemiology in Mental Health* 2006 Oct 11;2:28 **The Power of Love on the Human Brain** *Society for Neuroscience* 2006;1(2):90-103 **Preliminary Research on Plasma Oxytocin in Normal Cycling Women: Investigating Emotion and Interpersonal Distress** *Psychiatry* 1999 Summer; 62(2):97-113 **The Self-Fulfilling Prophecy in Close Relationships: Rejection Sensitivity and Rejection by Romantic Partners** *Journal of Personality and Social Psychology* 1998 Aug;75(2):545-60 **Commitment: Neuroenhancement of Love and Marriage: The Chemicals Between Us** *Neuroethics* Volume 1, Number 1 March, 2008 **The Neural Basis of Human Social Values: Evidence from Functional MRI** *Cereberal Cortex* 2008 May 22: 18502730 **Marital Stress: Immunologic, Neuroendocrine, and Autonomic Correlates** *Annals of the New York Academy of Sciences* 840:656-663 1998 **Negative Behavior During Marital Conflict is Associated with Immunological Down- Regulation** *Psychosomatic Medicine* 1993 Sep-Oct;55(5):395-409 **Prior Exposure to Oxytocin Mimics the Effects of Social Contact and Facilitates Sexual Behavior in Females** *Journal of Neuroendocrinology* 1999 Oct;11(10):765-9