

The Chemistry of Love

Could the first opportunity to fall in love influence our ability to love for a lifetime?

an article by

Denise Fisher

MMidPrac, BN, IBCLC



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The Chemistry of Love: Could the first opportunity to fall in love influence our ability to love for a lifetime?

By Denise Fisher, MMidPrac, BNurs, IBCLC

There are many different types of love: sexual, romantic, platonic, filial, maternal, paternal, spiritual, love of self, love of country, love of possessions to name a few. Love for our mother, our first love, could be the pivotal love around which we build our ability to love in every other way. This paper will look at the chemistry that is involved in the baby's first opportunity to love at that crucial time surrounding birth and the consequences of denying that opportunity. Love is as important to the individual as it is to their society and our world.

At the time of birth, and for about an hour following birthing, the mother and her newborn baby are swamped in a cocktail of hormones. This time is a crucial time for the mother and baby to bond, to become attached ... to fall in love.

A baby born after a normal, unmedicated birth and immediately dried and placed in his mother's arms on her bare chest gives an initial cry but quickly becomes quiet and alert, seeking visual contact with her. He rests for awhile, looking at his mother intermittently. This is followed by lip-smacking, and mouthing of the fingers begins, with an outpouring of saliva onto the baby's chin. Then the baby begins to inch forward with his legs to push strongly into the mother's lower abdomen. His hands reach from his mouth out to her chest and breasts, moistening her nipples with his wet fingers. When he reaches the tip of the sternum, he bounces his head into her chest. While moving up, he often turns his head from side to side. As he comes close to the nipple, he opens his mouth widely and, after several attempts, makes a perfect placement on the areola of the nipple and begins suckling. The baby's heart rate and respiratory rate are rapidly stabilised, oxygen saturation remains normal and thermoregulation is rapidly achieved. There are no signs of stress.

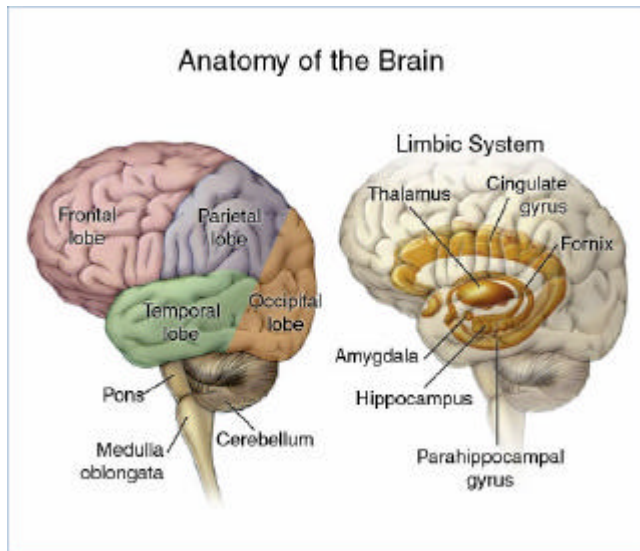
This species-specific set of innate behaviours is governed by and responsible for the release of the neurotransmitters that will influence the baby's and mother's relationship for a lifetime.

The hormones (neurotransmitters) involved:

Interesting studies have been conducted on voles. The prairie vole, or prairie dog, is one of only a few mammals that are monogamous – they mate for life with one partner. Both parents nurture their young and the adult pair spend most of their time together. The montane vole, a close cousin of the prairie vole, on the other hand, is very promiscuous; its life being filled with one-night-stands and is uncommitted to either a partner or their own offspring. Very little genetically separates these two animals ... only the presence of receptor sites for oxytocin in the area of the brain responsible for reward and pleasure, the limbic system, being one that the prairie vole has but the montane vole does not.



All of the neurotransmitters, the chemical messengers, that are involved in love and loving, care and being cared for and our emotional state arise from the Limbic System. This is an 'old' part of the brain, sometimes referred to as the 'mammalian' brain. Responses that arise from this part of our brain are not under the control of our 'thinking' brain, or the neocortex.



Oxytocin is produced in the hypothalamus, a part of the Limbic System, and sequestered in the posterior pituitary gland to be released in a pulsatile manner when stimulated. This stimulation could occur from sharing a meal with friends; in response to a hug from a friend; while making love; during birthing and immediately after birth; and it is an integral part of breastfeeding. Oxytocin is described as the 'hormone of love' because it is consistently involved in all forms of love.

All of these releases of oxytocin occur during a form of love. The hormones present at the same time as the oxytocin release determine how this love is directed. For example, during a shared meal with friends, oxytocin causes sociability; during romantic love oxytocin in the presence of high levels of dopamine and low levels of serotonin stimulates a desire for caring love making. When high levels of testosterone are present it causes sexual lust. In the presence of prolactin, the love is directed at nurturing and "mothering", and sexual desire is suppressed. Oxytocin also causes a reduction in stress and later stress-related diseases.

For oxytocin to have an effect on behaviour it must be available to the brain and for the brain to have receptors for it. Oxytocin cannot pass from the peripheral blood stream back into the brain – ie, artificially administered oxytocin cannot enter the brain and cause behavioural effects.

Around the time of birth oestrogen, progesterone, and prolactin blood levels are reaching all time highs in the mother, and circulating into the fetus. Beta-endorphin has also been steadily rising throughout pregnancy peaking at high levels during labor in response to the pain felt, and is also generated by the fetus. Oxytocin is released in a pulsatile manner periodically throughout the pregnancy by both mother and fetus, while labor is characterised by strong pulses of oxytocin that cause uterine contractions. After birthing Matthiesen et al (2001) reported a significant rise in maternal oxytocin in response to the massaging movements as well as the suckling of the newborn baby.

During the last contractions before the baby is birthed, adrenalin blood levels peak. Each of these hormones has its own characteristic effects, and in combination they are dynamite!

Beta-endorphin is a naturally occurring opiate that, like other opiates, acts as an analgesic, inducing feelings of pleasure, euphoria, and dependency or, with a partner, mutual dependency. Beta-endorphin is found in high concentration in pregnancy and increases throughout labor when levels of beta-endorphin reach those found in male endurance athletes during maximal exercise on a treadmill. It influences the beginning of attachment between mother and baby. Beta-endorphin is also found in colostrum – the neonate receiving it from his mother transplacentally prior to birth and more as soon as he starts to suckle, as well as his own endogenous production.

Prolactin is the ‘mothering’ hormone, regulating maternal behaviour and suppressing sexual desire. Oxytocin and prolactin together in high concentrations after the birth of the baby cause the mother’s love to be directed toward her baby. The innate behaviours exhibited by the baby when placed on his mother’s chest combine to increase oxytocin and prolactin levels in his mother – you could think the baby is pre-programmed to make his mother love him.

Adrenalin is the stress hormone – not usually associated with oxytocin! However, in normal birthing it only appears during the last couple of contractions prior to birth. The action can be seen in the mother as she gains energy, focus, strength, and alertness and may complain of thirst. The baby also gets a burst of adrenalin – being born alert, wide-open eyes and dilated pupils. The mother is fascinated by the newborn’s eyes – returning the gaze like star-struck lovers.

The scene is set for a dependent baby who wants and needs love and protection, born to a mother who is primed to love strongly and protectively.

How could this go wrong?

Easy – introduce both to the technological world of birthing. A mother who doesn’t understand or trust her body puts her fate and that of her baby into the hands of a paternalistic system where birthing interventions are the norm. The chemical cocktail gets shaken, not stirred!

Fear early in labor causes the labouring woman to release stress hormones, which inhibit oxytocin release and therefore contractions. So begins the cascade of interventions that start with an exogenous source of oxytocin that is unable to reach the brain to cause desirable behavioural responses, but increases labor pain levels to such an extent that analgesia or anaesthesia will be necessary. This in turn increases the incidence of birth complications, inhibits the release of beta-endorphin, and makes both mother and baby drowsy and less-responsive to each other. Baby is quickly separated from his mother for resuscitation.



A baby separated from his mother is stressed! Stress and love are mutually exclusive!

Picture the newborns contorted facial expression, the exaggerated body movements, the crying, and know that there are undesirable changes in heart rate, respiratory rate, blood pressure, oxygen saturation, vagal tone and plasma cortisol. These are the signs and symptoms of stress.

Raine, et al (1997) studied criminals at 18 years of age, and the same cohort at 34 years of age. In both studies these researchers were able to predict which ones committed a violent crime (ie rape, murder, robbery, domestic violence and assault) by studying their birth records. The violent offenders were the ones who experienced a complication during their birth (eg. forceps delivery, breech delivery, cord prolapse, preeclampsia, or long birth duration) and experienced maternal rejection. Odent (1999) describes this as the ultimate form of an inability to love – no love for self or others or society.

There are other studies, particularly in the psychological literature, describing the effects of birth trauma and a failure to love or be loved at birth and long-term psychological and psychiatric defect.

The number of children reported to authorities in Australia as suffering some form of abuse in 2003/4 totalled 146,562. The age group most affected were babies less than 12 months old.

With increasing medicalisation of birthing and thoughtless separation of mother and baby the picture is not pretty, but we can do something very basic, very quickly, with minimal cost ... and it starts with empowering women to trust and care for their bodies and trust in normal childbirth.

After a natural birth it is a natural response to put the newly born baby into his mother's arms to be held against her bare chest, but **essential** that we do this after a birth where there was any intervention. When birthing has been disturbed, the mother and her health carers must work extra hard over the next few hours and days to re-create an environment that will cause oxytocin and prolactin and beta endorphin to flow naturally in both mother and baby, giving them every chance to fall in love with a love that will last the baby a lifetime.

Bibliography:

Australian Institute of Health and Welfare. Child Protection Australia 2003-04.

Retrieved 11/2/05 from:

<http://www.aihw.gov.au/childyouth/childprotection/index.cfm>

Buckley, S. (2002). Ecstatic Birth: The hormonal blueprint of labor. *Mothering* Issue 111. Retrieved 30/3/05 from:

http://www.mothering.com/articles/pregnancy_birth/birth_preparation/ecstatic.html

Economist, Science and Technology. The Science of Love. I get a kick out of you.

Published 12 Feb 2004, retrieved 11 Feb, 2005 from

http://www.economist.com/printedition/PrinterFriendly.cfm?Story_ID=2424049

Fisher HE, Aron A, Mashek D, Li H, Brown LL., 2002. Defining the brain systems of lust, romantic attraction, and attachment. *Arch Sex Behav*;31(5):413-9.

Lewis T, Amini F, Lannon R. (2000). *A General Theory of Love*. Vintage House, NY.

Matthiesen AS, Ransjo-Arvidson AB, Nissen E, Uvnas-Moberg K. (2001).

Postpartum maternal oxytocin release by newborns: Effect of infant hand massage and sucking. *Birth*; 28(1):13-9.

Odent M. 1999. *The Scientification of Love*. Free Association Books, London.

Odent M, Preventing Violence or Developing the Capacity to Love: Which Perspective? Which Investment? Retrieved 11/2/05 from:

<http://www.birthpsychology.com/violence/odent1.html>

Porter FL, Grunau RE, Anand KJ. (1999) Long term effects of pain in infants. *J Dev Behav Pediatr*.;20(4):253-61

Raine A, Brennan P, Mednick SA. (1997) Interaction between birth complications and early maternal rejection in predisposing individuals to adult violence: specificity to serious, early-onset violence. *Am J Psychiatry*; 154:1265-1271

Rand ML. As It Was In The Beginning: The Significance of Infant Bonding in the Development of Self and Relationships. Retrieved 11/2/05 from:

<http://www.birthpsychology.com/birthscene/ppic2.html#asitwas>

Zanardo V; Nicolussi S; Carlo G; Marzari F; Faggian D; Favaro F; Plebani M. (2001) Labor Pain Effects on Colostral Milk Beta-Endorphin Concentrations of Lactating Mothers. *Biology of the Neonate*; 79:87-90

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