

Ecstatic birth - nature's hormonal blueprint for labor

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Giving birth in ecstasy: This is our birthright and our body's intent. Mother Nature, in her wisdom, prescribes birthing hormones that take us outside (ec) our usual state (stasis), so that we can be transformed on every level as we enter motherhood.

This exquisite hormonal orchestration unfolds optimally when birth is undisturbed, enhancing safety for both mother and baby. Science is also increasingly discovering what we realize as mothers - that our way of birth affects us life-long, both mother and baby, and that an ecstatic birth -- a birth that takes us beyond our self -- is the gift of a life-time.

Four major hormonal systems are active during labor and birth. These involve oxytocin, the hormone of love; endorphins, hormones of pleasure and transcendence; adrenaline and noradrenaline (epinephrine and norepinephrine), hormones of excitement; and prolactin, the mothering hormone. These systems are common to all mammals and originate deep in our mammalian or middle brain.

For birth to proceed optimally, this part of the brain must take precedence over the neocortex, or rational brain. This shift can be helped by an atmosphere of quiet and privacy with, for example, dim lighting and little conversation, and no expectation of rationality from the laboring woman. Under such conditions a woman intuitively will choose the movements, sounds, breathing, and positions that will birth her baby most easily. This is her genetic and hormonal blueprint.

All of these systems are adversely affected by current birth practices. Hospital environments and routines are not generally conducive to the shift in consciousness that giving birth naturally requires. A woman's hormonal physiology is further disturbed by practices such as induction, the use of pain killers and epidurals, cesarean surgery, and separation of mother and baby after birth.

Hormones in Birth

Oxytocin

Perhaps the best-known birth hormone is oxytocin, the hormone of love, which is secreted during sexual activity, male and female orgasm, birth, and breastfeeding.

Oxytocin engenders feelings of love and altruism; as Michel Odent says, "Whatever the facet of love we consider, oxytocin is involved." Oxytocin is made in the hypothalamus, deep in our brains, and stored in the posterior pituitary, the master gland, from where it is released in pulses. It is a crucial hormone in reproduction and mediates what have been called the ejection reflexes: the sperm ejection reflex with male orgasm (and the corresponding sperm introjection reflex with female orgasm); the fetal ejection reflex at birth (a phrase coined by Odent for the powerful contractions at the end of an undisturbed labor, which birth the baby quickly and easily); and, postpartum, the placental ejection reflex and the milk ejection, or let-down reflex, in breastfeeding.

As well as reaching peak levels in each of these situations, oxytocin is secreted in large amounts in pregnancy, when it acts to enhance nutrient absorption, reduce stress, and conserve energy by making us more sleepy. Oxytocin also causes the rhythmic uterine contractions of labor, and levels peak at birth through stimulation of stretch receptors in a woman's lower vagina as the baby descends. The high levels continue after birth, culminating with the birth of the placenta, and then gradually subside.

The baby also has been producing increasing amounts of oxytocin during labor; so, in the minutes after birth, both mother and baby are bathed in an ecstatic cocktail of hormones. At this time ongoing oxytocin production is enhanced by skin-to-skin and eye-to-eye contact and by the baby's first attempts at suckling. Good levels of oxytocin will also protect against postpartum hemorrhage by ensuring good uterine contractions.

In breastfeeding, oxytocin mediates the let-down reflex and is released in pulses as the baby suckles. During the months and years of lactation, oxytocin continues to act to keep the mother relaxed and well nourished. Oxytocin expert and researcher Professor Kerstin Uvnas Moberg calls it '...a very efficient anti-stress system, which prevents a lot of disease later on.' In her study, mothers who breastfed for more than seven weeks were calmer, when their babies were six months old, than mothers who did not breastfeed.

Outside its role in reproduction, oxytocin is secreted in other situations of love and altruism, for example, sharing a meal. Researchers have implicated malfunctions of the oxytocin system in conditions such as schizophrenia, autism, cardiovascular disease, and drug dependency, and have suggested that oxytocin may mediate the antidepressant effect of drugs such as Prozac.

Beta-endorphin

As a naturally occurring opiate, beta-endorphin has properties similar to pethidine (meperidine, Demerol), morphine, and heroin, and has been shown to work on the same receptors of the brain. Like oxytocin, beta-endorphin is secreted from the pituitary gland, and high levels are present during sex, pregnancy, birth, and breastfeeding.

Beta-endorphin is also a stress hormone, released under conditions of duress and pain, when it acts as an analgesic and, like other stress hormones, suppresses the immune system. This effect may be important in preventing a pregnant mother's immune system from acting against her baby, whose genetic material is foreign to hers.

Like the addictive opiates, beta-endorphin induces feelings of pleasure, euphoria, and dependency or, with a partner, mutual dependency. Beta-endorphin levels are high in pregnancy and increase throughout labor, when levels of beta-endorphin and corticotrophin (another stress hormone) reach those found in male endurance athletes during maximal exercise on a treadmill. Such high levels help the laboring woman to transmute pain and enter the altered state of consciousness that characterizes an undisturbed birth.

Beta-endorphin has complex and incompletely understood relationships with other hormonal systems. In labor, high levels will inhibit oxytocin release. It makes sense that when pain or stress levels are very high, contractions will slow, thus '...rationing labor according to both physiological and psychological stress.'

Beta-endorphin also facilitates the release of prolactin during labor; prolactin prepares the mother's breasts for lactation and is thought to be important in preparing the baby's lungs and heat-regulating systems for life outside the womb.

Beta-endorphin is also important in breastfeeding. Levels peak in the mother at 20 minutes, and beta-endorphin is also present in breast milk, inducing a pleasurable mutual dependency for both mother and baby in their ongoing relationship.

Fight-or-Flight Hormones

The hormones adrenaline and noradrenaline (epinephrine and norepinephrine) are also known as the fight-or-flight hormones, or, collectively, as catecholamines (CAs). They are secreted from the adrenal

gland above the kidney in response to stresses such as fright, anxiety, hunger or cold, as well as excitement, when they activate the sympathetic nervous system for fight or flight.

In the first stage of labor, high CA levels inhibit oxytocin production, therefore slowing or inhibiting labor. CAs also act to reduce blood flow to the uterus and placenta, and therefore to the baby. This makes sense for mammals birthing in the wild, where the presence of danger would activate this fight or flight response, inhibiting labor and diverting blood to the major muscle groups so that the mother can flee to safety. In humans, high levels of CAs have been associated with longer labor and adverse fetal heart rate patterns (an indication of stress to the baby).

After an undisturbed labor, however, when the moment of birth is imminent, these hormones act in a different way. There is a sudden increase in CA levels, especially noradrenaline, which activates the fetal ejection reflex. The mother experiences a sudden rush of energy; she will be upright and alert, with a dry mouth and shallow breathing and perhaps the urge to grasp something. She may express fear, anger, or excitement, and the CA rush will cause several very strong contractions, which will birth the baby quickly and easily.

Some birth attendants have made good use of this reflex when a woman is having difficulties in the second stage of labor. For example, one anthropologist working with an indigenous Canadian tribe recorded that when a woman was having difficulty in birth, the young people of the village would gather together to help. They would suddenly and unexpectedly shout out close to her, with the shock triggering her fetal ejection reflex and a quick birth.

After the birth, the mother's CA levels drop steeply. A warm atmosphere is important; a new mother is very sensitive to temperature and if she cools down significantly, the cold stress will keep her CA levels high, inhibiting her natural oxytocin release and therefore increasing her risk of postpartum hemorrhage.

Noradrenaline, as part of the ecstatic cocktail, is also implicated in instinctive mothering behavior. Mice bred to be deficient in noradrenaline will not care for their young after birth unless noradrenaline is injected back into their system.

For the baby also, birth is an exciting and stressful event, reflected in high CA levels. These assist the baby during birth by protecting against the effects of hypoxia (lack of oxygen) and subsequent acidosis.

High CA levels at birth ensure that the baby is wide-eyed and alert at first contact with the mother. The baby's CA levels also drop rapidly after an undisturbed birth, being soothed by contact with the mother.

Prolactin

Known as the mothering hormone, prolactin is the major hormone of breast milk synthesis and breastfeeding. Levels of prolactin increase in pregnancy, although milk production is inhibited hormonally until the placenta is delivered. Levels decrease during labor but then rise steeply at the end of labor and peak with birth.

Prolactin is a hormone of submission or surrender--in primate troops, the dominant male has the lowest prolactin level--and produces some degree of anxiety.

In the breastfeeding relationship these effects activate the mother's vigilance and help her to put her baby's needs first.

Prolactin has been associated with nurturance from fathers as well as mothers, earning the additional label "The hormone of paternity". New fathers with higher prolactin levels are more responsive to their babies' cries. Animal studies show that prolactin release is also increased by carrying infants.

The baby also produces prolactin in pregnancy, and high levels are found in amniotic fluid, secreted by the baby's membranes as well as the mother's uterine lining. Prolactin is also secreted into breastmilk, at

least in the rat.

According to one researcher, "... there is evidence that prolactin plays an important role in the development and maturation of the neonatal [newborn] neuroendocrine [brain-hormone] system."

Undisturbed Birth

Undisturbed birth is exceedingly rare in our culture, which reflects our ignorance of its importance. Two factors that disturb birth in all mammals are firstly being in an unfamiliar place and secondly the presence of an observer. Feelings of safety and privacy thus seem to be fundamental. Yet the entire system of Western obstetrics is devoted to observing pregnant and birthing women, by both people and machines, and when birth isn't going smoothly, obstetricians respond with yet more intense observation. It is indeed amazing that any woman can give birth under such conditions.

Some writers have observed that, for a laboring woman, having a baby has a lot of parallels with making a baby: the same hormones, the same parts of the body, the same sounds, and the same needs for feelings of safety and privacy. How would it be to attempt to make love in the conditions under which we expect women to give birth?

When I gave birth to my fourth baby, Maia Rose, I arranged a situation where I felt very private, safe and undisturbed, and had my easiest and most ecstatic labor and birth: one-and-a-half hours with an unexpectedly breech baby. I believe that this birth proceeded optimally because of this lack of disturbance, and because of my freedom to follow my own instincts.

Undisturbed birth is possible in a variety of settings, but must always involve a feeling of emotional security for the birthing woman. A familiar and supportive companion, such as a midwife or doula, can play an important role in creating and protecting a private space for the laboring woman, especially in a hospital setting.

Impact of Drugs and Procedures Induction and Augmentation

In Australia in 2002, approximately 26 percent of women had an induction of labor, and another 19 percent have an augmentation--stimulation or speeding up of labor—through either artificial rupture of membranes or with synthetic oxytocin (Pitocin, Syntocinon). In the US in 2004, 53 percent of women reported that they had Pitocin administered in labor to strengthen or speed up contractions.

Synthetic oxytocin administered in labor does not act like the body's own oxytocin. First, Pitocin-induced contractions are different from natural contractions, and these differences can have significant effects on the baby. For example, waves can occur almost on top of each other when too high a dose of Pitocin is given, and it also causes the resting tone of the uterus to increase. Such over-stimulation (hyperstimulation) can deprive the baby from the necessary supplies of blood and oxygen, and so produce abnormal FHR patterns, fetal distress (leading to caesarean section), and even uterine rupture.

Birth activist Doris Haire describes the effects of Pitocin on the baby: The situation is analogous to holding an infant under the surface of the water, allowing the infant to come to the surface to gasp for air, but not to breathe. These effects may be partly due to the high blood levels of oxytocin that are reached when a woman labors with Pitocin. Theobald calculated that, at average levels used for induction or augmentation/acceleration, a woman's oxytocin levels will be 130 to 570 times higher than she would naturally produce in labor. Direct measurements do not concur, but blood oxytocin levels are difficult to measure. Other researchers have suggested that continuous administration of this drug by iv infusion, which is very different to its natural pulsatile release, may also account for some of these problems.

Second, oxytocin, synthetic or not, cannot cross from the body to the brain through the blood-brain barrier. This means that Pitocin, introduced into the body by injection or drip, does not act as the hormone of love. However, it can interfere with oxytocin's natural effects. For example, we know that

women with Pitocin infusions are at higher risk of major bleeding after the birth and that, in this situation, the uterus actually loses oxytocin receptors and so becomes unresponsive to the postpartum oxytocin peak that prevents bleeding. But we do not know the psychological effects of interference with the natural oxytocin that nature prescribes for all mammalian species.

As for the baby, 'Many experts believe that through participating in this initiation of his own birth, the fetus may be training himself to secrete his own love hormone.' Michel Odent speaks passionately about our society's deficits in our capacity to love self and others, and he traces these problems back to the time around birth, particularly to interference with the oxytocin system.

Opiate Painkillers

The most commonly used drug in Australian labor wards today is pethidine (meperidine, Demerol). In one state, 38 percent of laboring women in 1998 were given this drug. In the U.S., several opiate-like drugs have been traditionally used in labor, including meperidine nalbuphine (Nubain), butorphanol (Stadol), alphaprodine (Nisentil), hydromorphone (Dilaudid), and fentanyl citrate (Sublimaze).

The use of simple opiates in the labor room has declined in recent years, with many women now opting for epidurals, which may also contain these drugs (see below) As with oxytocin, use of opiate drugs will reduce a woman's own hormone production, which may be helpful if levels are excessive and inhibiting labor. The use of pethidine, however, has been shown to slow labor, more so with higher doses, which is consistent with the known reduction in oxytocin that natural opiates can cause.

Again we must ask: What are the psychological effects for mother and baby of laboring and birthing without peak levels of these hormones of pleasure and co-dependency? Some researchers believe that endorphins are the reward we get for performing reproductive functions such as mating and birthing; that is, the endorphin fix keeps us having sex and having babies. It is interesting to note that most countries that have adopted Western obstetrics, which prizes drugs and interventions in birth above pleasure and empowerment, have experienced steeply declining birth rates in recent years.

Of greater concern is a study that looked at the birth records of 200 opiate addicts born in Stockholm from 1945 to 1966 and compared them with the birth records of their non-addicted siblings. When the mothers had received opiates, barbiturates, and/or nitrous oxide gas during labor, especially in multiple doses, the offspring were more likely to become drug addicted. For example, when a mother received three doses of opiates, her child was 4.7 times more likely to become addicted to opiate drugs in adulthood. This study was recently replicated with a U.S. population, with very similar results. The authors of the first study suggest an imprinting mechanism, but I wonder whether it may be a matter of ecstasy--if we don't get it at birth, as we expect, we look for it later in life through drugs. Perhaps this also explains the popularity (and the name) of the drug Ecstasy.

Animal studies suggest a further possibility. It seems that drugs administered chronically in late pregnancy can cause effects in brain structure and function (eg chemical and hormonal imbalance) in offspring that may not be obvious until young adulthood. Whether such effects apply to human babies who are exposed for shorter periods around the time of birth is not known; but one researcher warns, 'During this prenatal period of neuronal [brain cell] multiplication, migration and interconnection, the brain is most vulnerable to irreversible damage.'

Epidural Drugs

Epidural drugs are administered over several hours via a tube into the space around the spinal cord. Such drugs include local anaesthetics (all cocaine derivatives, eg. bupivacaine/marcaine), more recently combined with low-dose opiates. Spinal pain relief involves a single dose of the same drugs injected through the coverings of the spinal cord, and is usually short acting unless given as a combined spinal-epidural (CSE).

Epidural pain relief has major effects on all of the above-mentioned hormones of labor. Epidurals inhibit beta-endorphin production, and therefore also inhibit the shift in consciousness that is part of a normal

labor. This may be one reason why epidurals are so acceptable to hospital birth attendants, who are not prepared or trained to deal with the irrationality, directness, and physicality of a woman laboring on her own terms.

When an epidural is in place, the oxytocin peak that occurs at birth is also inhibited because the stretch receptors of a birthing woman's lower vagina, which trigger this peak, are numbed. This effect probably persists even when the epidural has worn off and sensation has returned, because the nerve fibers involved are smaller than the sensory nerves and therefore more sensitive to drug effects.

A woman giving birth with an epidural will therefore miss out on the fetal ejection reflex, with its strong final contractions designed to birth her baby quickly and safely. She must then use her own effort, often against gravity, to compensate. This explains the increased length of the second stage of labor and the extra need for forceps when an epidural is used. Use of epidurals also inhibits catecholamine release, which may be advantageous in the first stage of labor; close to the time of birth, however, a reduction in CA levels will, as with oxytocin, inhibit the fetal ejection reflex and prolong the second stage.

Another hormone also appears to be adversely affected by epidurals. Prostaglandin F2 alpha helps to make a laboring woman's uterus contractible, and levels increase when women labor without epidurals. In one study, women with epidurals actually experienced a decrease in PGF2 alpha, and average labor times were increased from 4.7 to 7.8 hours.

Drugs administered by epidural enter the mother's bloodstream immediately and go straight to the baby at equal, and sometimes effectively greater, levels. Some drugs may be preferentially taken up into the baby's brain, and almost all will take longer to be eliminated from the baby's immature system after the cord is cut. For example, the half-life of bupivacaine -- the time it takes to reduce blood level by 50% -- is 2.7 hours in the adult, but around 8 hours in a newborn baby.

Another indication of the effects of epidurals on mother and baby comes from French researchers who gave epidurals to laboring sheep. The ewes failed to display their normal mothering behavior; this effect was especially marked for the ewes in their first lambing that were given epidurals early in labor. Seven out of eight of these mothers showed no interest in their offspring for at least 30 minutes.

Some studies indicate that this disturbance may apply to humans also. Mothers given epidurals in one study spent less time with their babies in hospital, in inverse proportion to the dose of drugs they received and the length of the second stage of labor. In another study, mothers who had epidurals described their babies as more difficult to care for one month later. Such subtle shifts in relationship and reciprocity may reflect hormonal dysfunctions and/or drug toxicity and/or the less-than-optimal circumstances that often accompany epidural births--long labors, forceps, and cesareans.

Incredibly, there have been no large studies of the effects of epidurals on breastfeeding, although there is evidence that babies born after epidural have a diminished suckling reflexes and capacity consistent with drug-related effects. One study showed that healthy full-term babies exposed to epidurals during labor were less likely to be fully and successfully breastfed on hospital discharge.

Caesarean Surgery

Cesarean surgery can be a life-saving operation for mothers and babies, but it is often overlooked that it involves major abdominal surgery. Cesarean delivery increases the risk of maternal death by about four times, and can significantly affect the mother and baby's health in subsequent pregnancies. Cesarean rates are currently 27 percent in Australia, and 27.6 percent--the highest level on record--in the U.S.

Obviously there is a shorter or absent labor with cesarean birth, and the peaks of oxytocin, endorphins, catecholamines, and prolactin are reduced or absent. Furthermore, mothers and babies are usually separated for some hours after birth, so the first breastfeed is usually delayed. Both will also be affected to some extent by the drugs used in the procedure (epidural, spinal, or general anaesthetic) and for post-operative pain relief. The consequences of such radical departures from our hormonal blueprint are

suggested in the work of Australian researchers who interviewed 242 women in late pregnancy and again after birth. The 50 percent of women who had given spontaneous vaginal birth were the most likely to experience a marked improvement in mood and an elevation of self-esteem after delivery. In comparison, the 17 percent who had caesarean surgery were more likely to experience a decline in mood and self-esteem. The remaining women had forceps or vacuum assistance, and their mood and self-esteem were, on average, unaltered.

Another study looked at the breastfeeding hormones prolactin and oxytocin on day two, comparing women who had given birth vaginally with women who had undergone emergency cesarean surgery. In the cesarean group, prolactin levels did not rise as expected with breastfeeding, and the oxytocin pulses were reduced or absent. In this study, first suckling had been at 240 minutes average for cesarean babies, and 75 minutes average for babies vaginally born. The authors comment These data indicate that early breastfeeding and physical closeness may be associated not only with more interaction between mother and child, but also with endocrine [hormonal] changes in the mother. Other research has shown that early and frequent suckling positively influences milk production and the duration of breastfeeding. The authors of the hormonal study above found that duration of breastfeeding was not affected, and conclude, '...other factors...can compensate for deficient hormonal release.'

These studies not only indicate important links between birth and breastfeeding, but also show how an optimal birth experience can influence the long-term health of mother and baby. For example, successful breastfeeding confers advantages such as reduced risk of breast cancer and osteoporosis for the mother and reduced risk of diabetes and obesity long-term for the child. And enhanced self-esteem after a natural birth – which can be a life-long effect, in my experience and observation -- is a solid base from which to begin our mothering.

The connections between events at birth and long-term health certainly deserve more study. But we cannot afford to wait for years for researchers to prove the benefits of an undisturbed birth. Perhaps the best we can do is trust our instincts and vote with our birthing bodies, choosing models of care that increase our chances of undisturbed- and ecstatic- birthing.

Early Separation

Even in non-interventionist settings, it is uncommon for the baby to remain in the mother's arms for the first one to two hours. And yet nature's blueprint for this time includes a specific and genetically encoded activation of the brain and nervous system for both mother and baby. For example, when the newborn baby is in skin-to-skin contact, at the mother's left breast (which is where new mothers in all cultures instinctively cradle their babies) and in contact with her heart rhythm, according to Joseph Chilton Pearce, 'a cascade of supportive confirmative information activates every sense, instinct and intelligence needed for the radical change of environment ... thus intelligent learning begins at birth.'

For the mother also, 'A major block of dormant intelligences is activated...the mother then knows exactly what to do and can communicate with her baby on an intuitive level.' This awakening of maternal capabilities is well known among animal researchers, who link it to the action of pregnancy and birth hormones on the brain of newly delivered mothers. Such intuitive capacities are sorely needed in our human culture, where we rely so heavily on outside advice from books and experts to tell us how to care for our babies.

When these activations do not occur within about 45 minutes of birth, cut off from his mother's nurturing and with none of the encoded expectancies met, the newborn's adrenals continue to release steroids in the face of maximum fear and abandonment. The infant screams for a short time and then silence falls.

The damage caused by separation, Pearce writes, is '...massive and past the point of repair.' Like Odent, he believes that our current birth practices are psychologically crippling to babies, mothers, and society as a whole, and the evidence in his book is compelling.

Optimizing the Ecstasy

The following suggestions will help a woman to use her hormonal blueprint and so optimize the experience and safety for herself and her baby. Remember that birth is 'orgasmic in its essence' so that conditions for birth are ideally as close as possible to conditions for lovemaking.

- * Take responsibility for your health, healing, and wholeness throughout the child-bearing years
- * Choose a model of care that enhances the chance of a natural and undisturbed birth (eg home birth, birth center, one-on-one midwifery care).
- * Arrange support according to individual needs; trust, a loving relationship, and continuity of care with support people are important.
- * Consider having an advocate at a hospital birth- a private midwife or doula is ideal.
- * Ensure an atmosphere where the laboring woman feels safe, unobserved, and free to follow her own instincts
- * Reduce stimulation of the neocortex (rational mind) by keeping lighting and noises soft, and reducing words to a minimum.
- * Cover the clock and any other technical equipment.
- * Avoid drugs unless absolutely necessary.
- * Avoid procedures (including obvious observations) unless absolutely necessary.
- * Avoid caesarean surgery unless absolutely necessary.
- * Don't separate mother and baby for any reason, including resuscitation, which can be done with the cord still attached.
- * Breastfeed and enjoy it!

Giving birth is an act of love, and each birth is unique to the mother and her baby. Yet we also share the same womanly physiology, and the same exquisite orchestration of our birthing hormones. Our capacity for ecstasy in birth is also both unique and universal, a necessary blessing that is hard-wired into our bodies, yet that requires, especially in these times, that we each trust, honor, and protect the act of giving birth according to our own instincts and needs.

Dutch professor of obstetrics G. Kloosterman offers a succinct summary, which would be well placed on the door of every birth room: Spontaneous labor in a normal woman is an event marked by a number of processes so complicated and so perfectly attuned to each other that any interference will only detract from the optimal character. The only thing required from the bystanders is that they show respect for this awe-inspiring process by complying with the first rule of medicine--nil nocere [Do no harm].