How Human Milk Is Made

"Not enough milk" is the most common reason for supplementing or discontinuing breastfeeding. Sometimes this is real; other times it is imagined. The progress in understanding milk synthesis comes partly from animal/dairy scientists (who have a financial interest in knowing exactly how cows make plenty of milk) and partly from those women breastfeed.

Before the 1940s, everyone thought milk was made mostly during the let-down reflex, because it flows faster during let-down. (This included dairy scientists as well as breastfeeding advocates.)

In 1944, Peterson showed that milk secretion was continuous, but let-down was a different and separate process. Letdown (or MER-milk ejection reflex) squeezes out milk that has collected in the alveolar lumen and pushes it through the ducts toward the nipple. Milk isn't made any faster during MER. It just flows faster.

Since the 1990s, researchers at the University of Western Australia in Perth working with Dr. Peter Hartmann's have studied actively breastfeeding women. They found that the rate of milk synthesis - how fast the lactocytes (secretory cells) make milk - is related to the degree of emptiness (or fullness) of the breast. This is called autocrine (or local) control. As the alveolar lumen fills, compounds in the retained milk itself (Feedback Inhibitor of Lactation or FIL: peptides, fatty acids, and possibly other components) signal the lactocytes cells to slow down making more milk. The emptier the breast is, the faster it tries to refill - similar to an automatic icemaker. The rate of milk synthesis in women ranges from 11 to 58 ml per hour per breast, or about 1/3 of an ounce to 2 ounces per breast per hour. Emptier breasts make milk faster than fuller ones. When milk is regularly and thoroughly removed from the breast, milk production is unrestricted.

This research has documented what we in La Leche League have known for a long time--that milk supply is regulated by baby's needs. A baby who nurses ‘on cue’ without restriction rarely empties all the milk available in the breasts. In 1993, they reported that babies take an average of 76 percent of the available milk from the breasts over a 24-hour period. This allows a baby to have short-term control of milk production.

I explain this using a modification of the "80:20 concept." The 80% (actually 2/3) represents the available milk is taken by the baby each day. The 20% (actually 1/3) of the remaining milk is milk that remains in the breasts. If more than 2/3 of the available milk is removed, total milk production *increases* to maintain the 2/3 – 1/3 ratio. If less than 2/3 of the milk is removed, production *decreases* to maintain the 2/3-1/3 ratio. Even though this is an over-simplification of a very complex process, the core principle has held steady as new research emerges.

Research shows that the mother's diet (quantity or quality) and fluid intake have little influence on milk production. If the "milk removal" piece of the puzzle is in place, mothers make plenty of good milk regardless of what they eat or drink. If the "milk removal" part isn't there, nothing else can make up the difference.

The major other risk factors to a full milk supply (assuming frequent, thorough milk removal by any means, preferably the baby) appear to be (1) breast surgery; (2) retained placenta; (3) Sheehan's syndrome or pituitary shock; (4) hormonal contraception; and (5) insufficient glandular tissue. If none of those are factors, it's exceedingly rare that the breasts won't make plenty of milk. Rare situations do exist, however.

The most common reasons for "not enough milk": (1) the baby isn't at breast enough minutes per day, nursing sessions are ended before the baby lets go, or feeding intervals are stretched out too far between, or something else is given to the baby to stretch out feeds, or (2) the baby is not effectively transferring milk, either because of shallow attachment at the breast or a sucking problem.

The research shows that preventing and promptly treating engorgement is critical. Ideally, all feedings should be directly at the breast following baby's cues. The best guidance on “one breast or both” is to let the baby to finish the first breast first. Watch for the baby to self-detach then watch for more feeding cues. About 25% of babies take only one breast per feed. About 15% never take the second side. At least half of babies studied alternate between taking one or both breasts per session. Babies typically nurse 8-12 times per day throughout the first six months. (The range in research is 6-18 times per 24 hours). Most babies will breastfeed a total of at least 140 or more minutes per day, averaging 10-30 minutes per nursing session. Breastfeeding is more than food – it’s also comfort, connection, and calming.

My plea to all: Look at the baby carefully. I don't hesitate to suggest hand expression or pumps as tools because I see so many young babies with temporary poor suck responses. The poor suck leaves milk in the breast, which compromises milk supply, resulting in a hungry disorganized baby and no milk. With a good milk expression routine, the breasts will make plenty of milk to nourish the baby while we figure out how to help the baby feed better at the breast. Milk supply is usually the easiest part to fix. Remember, it's still supply and demand, or "use it or lose it."