



Our Team



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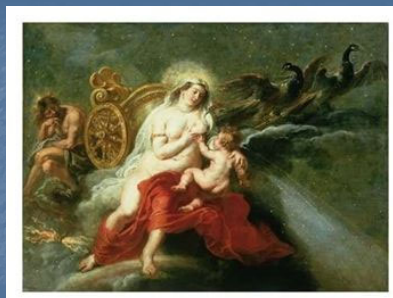
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Disclosure

- This class will not refer to products, drugs, or devices of a commercial company with which we have a significant relationship.
- We have not accepted a fee from a commercial company for this class.
- Supported with funding from the Oklahoma State Department of Health.
- Mannel serves as Executive Director of the Oklahoma Mothers' Milk Bank, a statewide nonprofit.

How Does It Work? Milk Production and Expression

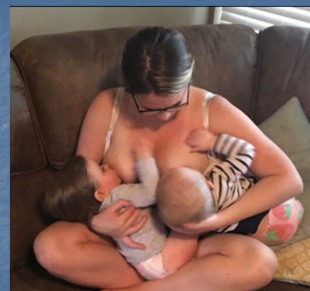
- How the breast makes milk
- Indications for expression of milk
- Mechanics of expression
- Milk collection and storage
- Troubleshooting common problems



How the Breast Makes Milk



US Breastfeeding Committee



With permission, Gannaway

Mammogenesis

- Breast development begins during first weeks of fetal gestation
- Next major development during puberty

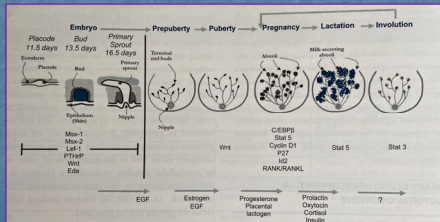
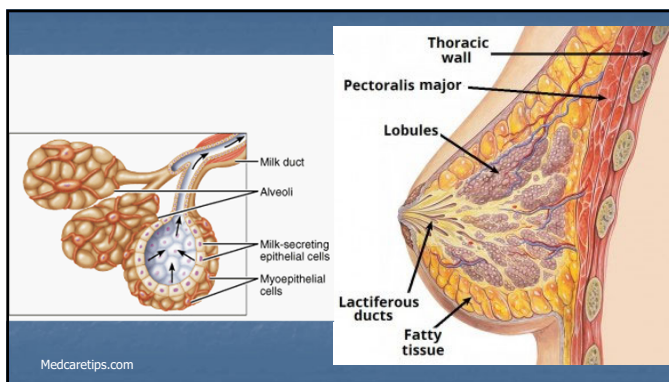


Figure from Holt & Robinson, 2002

Mammogenesis in Early Pregnancy

- Estrogen – ductal system
- Progesterone – lobes and alveoli
- Prolactin – nipple growth
- Placental lactogen – areolar growth

Transition of breast from non-secreting organ to secreting organ



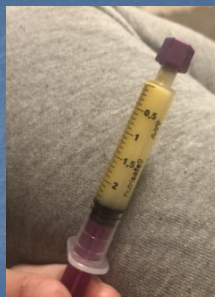
Medcaretips.com

Lactogenesis I

- Lactogenesis I = capacity of mammary gland to secrete milk from mid-pregnancy to late pregnancy
- Lactation occurs after 16 weeks of pregnancy
- Lactogenesis I continues until 2-3 days after birth

Colostrum

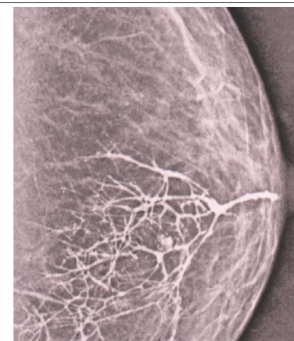
- Increased protein
 - Higher concentration of immunoglobulins
 - Overall dose to baby = 1 g/day
- Decreased fat
- Decreased lactose
- Low water/fluid volume



BabyCenter Australia

Milk ducts and ductules

Figure A.01

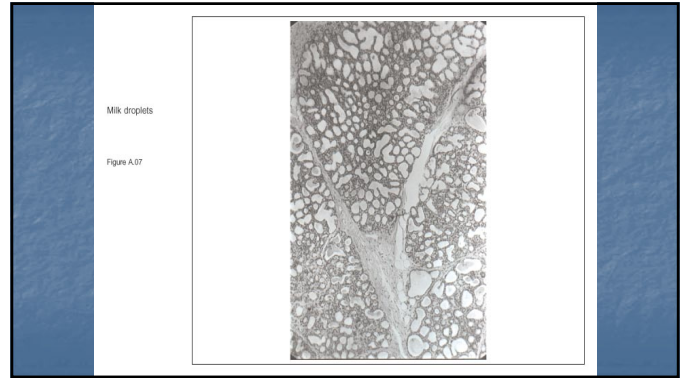


Lactogenesis II

- Onset of copious milk secretion after birth
- Milk volume increases rapidly, then abruptly levels off
- Triggered by a rapid drop of progesterone after delivery of placenta
- Occurs 2-3 days after birth


Secretory activation with delivery of placenta

- Secretory activation with delivery of placenta



Transitional-Mature Milk

- Lower protein concentration
 - Overall dose to baby = 1 g/day
- Higher fat
 - Most recently made milk (end of feeding)
- Higher lactose
 - Less recently made milk (start of feeding)
- Higher water concentration (>85%)



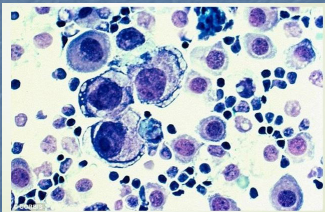
Two bottles of breastmilk are shown side-by-side on a white surface against a black background. The bottle on the left is white with a white cap, and the bottle on the right is yellow with a yellow cap. Both bottles are filled with a milky liquid. The white bottle is slightly taller and has a wider base. The yellow bottle is shorter and has a narrower base. The lighting is soft, highlighting the texture of the milk and the caps.

Breastmilk at the beginning and end of a pumping session.
kellymom.com. Photo used with permission.

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- Breastmilk at the beginning and end of a pumping session.**
 KellyMom.com. Photo used with permission.

Milk is a Bioactive Substance

- Immunoglobulins
 - Secretory IgA, IgG, IgM, IgD, IgE
- White blood cells
 - T & B cells, neutrs, lymphs, macrophages
- Enzymes - lactase
- Lactoferrin
- Oligosaccharides
- Hormones



Babbad, MD - Light Microscopy

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[illegible]

Lactogenesis II

- Continued milk production
- What is it dependent on??
 - MILK REMOVAL
- Reflects infant's appetite rather than mom's ability to make milk
 - "supply and demand"



©BBC

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Delayed or Impaired Lactogenesis

- Cesarean birth
- Diabetes, type I
- Obesity
- Polycystic Ovary Syndrome (PCOS)
- Hypertension
- Stress
- Retained Placenta
- Postpartum Hemorrhage

Indications for Expression of Milk

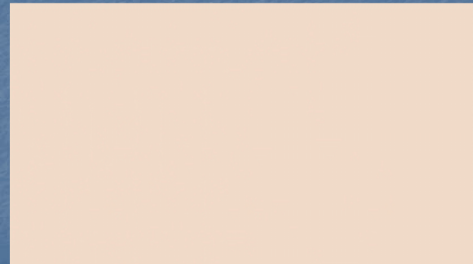
Indications for Expression of Milk

- Delayed initiation of breastfeeding
- Interruption of breastfeeding
- Decreased milk supply
- Relief of engorgement
- Donating to a milk bank



Marion, OH Medical Center

EXPRESSING MILK FOR your premature baby



Hand Expression



Hand Expression

- Most common form of milk expression
- Is more effective for expressing colostrum
- When mechanical breast pump not available
- Useful for stimulating milk ejection reflex (MER) before using mechanical pump
- When used after pumping, more effectively drains the breast: "hands-on pumping"

Early Hand Expression Increases Later Milk Production



Pumping with hand pump

Figure 1.13



Automatic Electric Pumps

- Double-pumping → ↑ milk collection
- Best for mothers working full-time
- Best for sustaining milk production (NICU moms)
- Faster pumping
- Less chance of injury



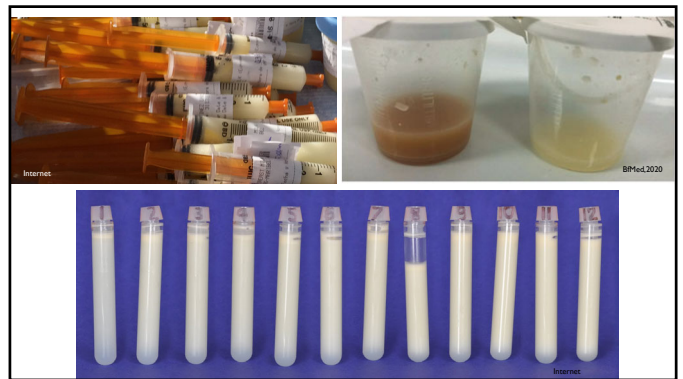
Milk Collection

Initiating and sustaining milk production for a preterm/sick infant:

- Double-pump w/ hospital-grade pump
- Initiate pumping w/in 6 hours of delivery
 - Consider starting with hand expression
- Stimulate MER (breast massage, heat,...)
- Hands-on pumping!
- Pump 8-10 times/day for 10-15 min each
- Practice kangaroo care daily

Pumping FAQs from moms

- ***When do I count the start of a pumping session?***
Pumping time starts from beginning of last session to beginning of next session
- ***How often do I need to clean/sanitize my pump parts?***
Sanitize pump once per day, rinse well after each use during the day
- ***Should I take some type of herbal supplement to increase my milk supply?***
There is no evidence to support, some will exclude you as a milk donor



Average Milk Volumes

PP Dy 1: 40 - 120 ml
 PP Dy 2: 100 - 200 ml
 PP Dy 3: 200 - 400 ml
 PP Dy 5 - 10: 500 ml (~ 1oz/brst q 3 hrs)

By 1 month postpartum, most mothers are producing 700-800 ml/day.

- ABM Protocol #3: Supplementary Feedings in the Healthy Term Breastfed Neonate 2017

Average Infant Intake

- Day 1: 2-10 ml/fdg
- Day 2: 5-15 ml/fdg
- Day 3: 15-30 ml/fdg
- Day 5: 30-60 ml/fdg

- ABM Protocol #3: Supplementary Feedings in the Healthy Term Breastfed Neonate 2017

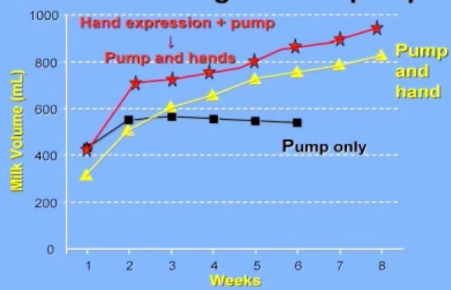
Low or Decreasing Milk Production

- Insure frequent pumping (8-10x/day)
- Tips to elicit milk release
 - Relaxation tips
 - Breast massage, heat
 - Kangaroo care w/ baby
- Fatigue, stress, pain, anxiety/depression
- Rule out maternal medications
- Insure effective type of pump
- Hands-on pumping!

Mannell, OU Medical Center

[Maximizing Milk Production with Hands On Pumping](#)

More milk using hands + pump



Pain with Pumping

- Insure proper flange fit
- Decrease length of pumping sessions
- Decrease vacuum
- Insure vacuum is released or interrupted during pumping sessions
- Rule out infection



Hennel, OU Medical Center



CSBC

CSBC





OKLAHOMA
mothers' milk bank



www.okmilkbank.org

Our New Home!
940 NE 13th, Garrison Tower, Ste 1220
Oklahoma City
405-297-LOVE



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OKLAHOMA
mothers' milk bank

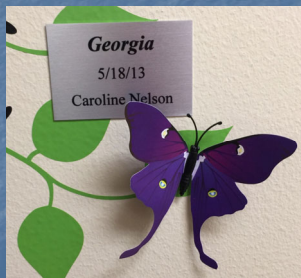


Oklahoma Mothers' Milk Bank

Silas Murphy
Memorial Wall



Unexpected Death In Utero



Why donate milk after a perinatal or infant loss?

