

Our Team



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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.

## Learning Objectives

- Identify how the breast makes milk.
- Explain indications for expression of milk.
- Understand different mechanics of expression.
- Identify milk collection and storage guidelines.
- Explain different ways to troubleshoot common problems.



## Mammogenesis

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

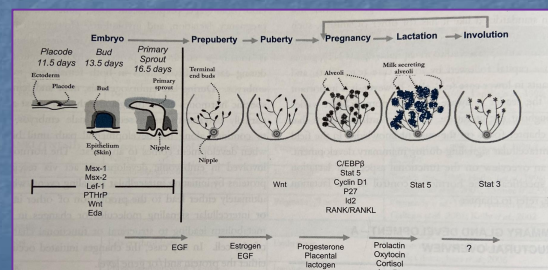


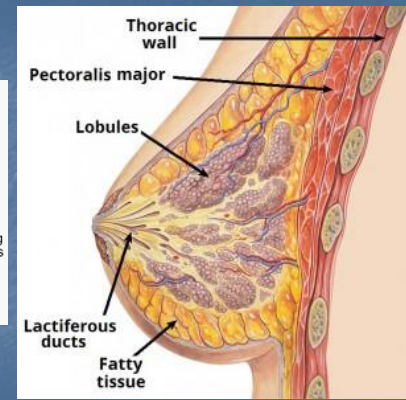
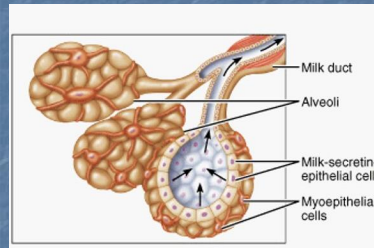
Figure from Rice & Hartmann, 2007

## How the Breast Makes Milk

## 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



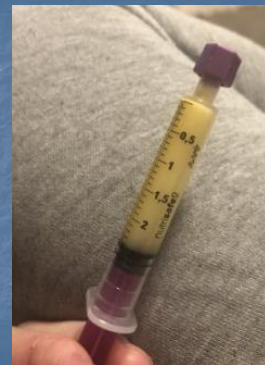
Medcaretips.com

## 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

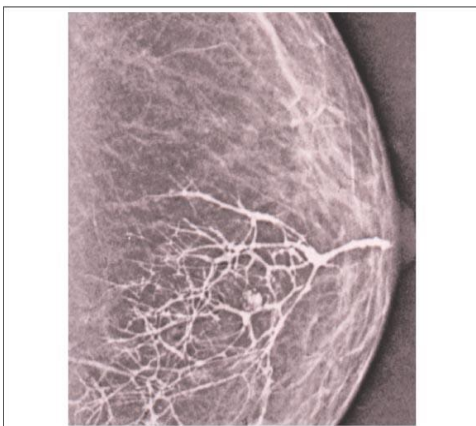
- Increased protein
  - Higher concentration of immunoglobulins
  - Overall dose to baby = 1 g/day
- Decreased fat
- Decreased lactose
- Low water/fluid volume



BabyCenter Australia

Milk ducts and ductules

Figure A.01



## Lactogenesis II

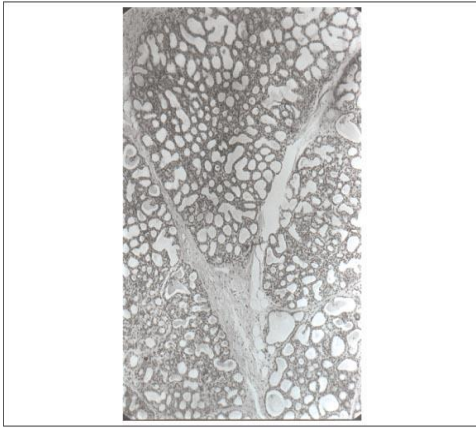
- Onset of copious milk secretion after birth
- Milk volume increases rapidly, then abruptly levels off
- Triggered by a rapid drop of progesterone after delivery of placenta
- Occurs 2-3 days after birth

Secretory activation with delivery of placenta



Milk droplets

Figure A.07



## Transitional-Mature Milk

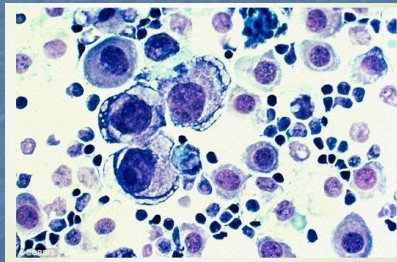
- Lower protein concentration
  - Overall dose to baby = 1 g/day
- Higher fat
  - Most recently made milk (end of feeding)
- Higher lactose
  - Less recently made milk (start of feeding)
- Higher water concentration (>85%)



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, neuts, lymphs, macrophages
- Enzymes - lactase
- Lactoferrin
- Oligosaccharides
- Hormones



Babbad, MD – Light Microscopy

## DID YOU EVER WONDER WHAT'S IN... ?

### BREASTMILK

#### COMPOSITION

#### COMPOSITIONAL FACTORS

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Prepared & updated in part by David L. Rasmussen, MD, PhD, University of Colorado Health Sciences Center, Denver, Colorado. © 2005 by KellyMom.com. Photo used with permission.

## 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"

## 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

## 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"

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:

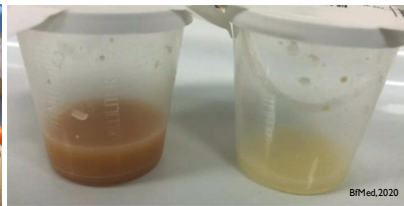
- Initiate pumping w/in 6 hours of delivery
  - Consider starting with hand expression
- Double-pump with a hospital grade breast pump
- Stimulate MER (breast massage, heat,...)
- Hands-on pumping!
- Pump 8-10 times/day for 10-15 min each
- Practice kangaroo care daily

## 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

Rusty pipe syndrome

Figure A.08



## 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

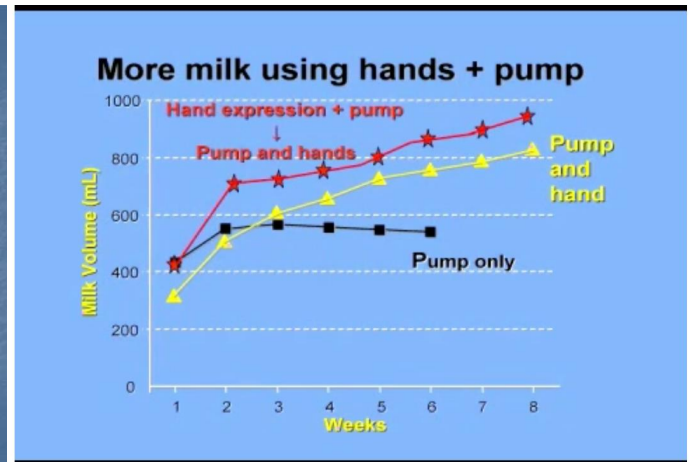
## Average Infant Intake

- 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!



## 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

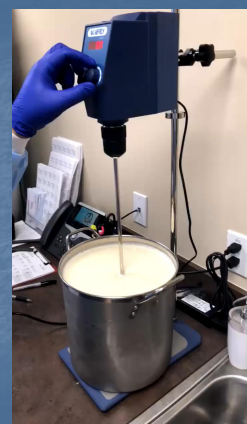


[www.okmilkbank.org](http://www.okmilkbank.org)

**Our New Home!**  
 940 NE 13<sup>th</sup>, Garrison Tower, Ste 1220  
 Oklahoma City  
 405-297-LOVE



## DONOR MOTHERS



Oklahoma Mothers' Milk Bank



## Silas Murphy Memorial Wall



## Unexpected Death In Utero



Oklahoma Mothers' Milk Bank

## Why donate milk after a perinatal or infant loss?

To be able to donate milk in honor and in memory of her, it's her legacy

*"This process has been so healing in my grief journey. I'm thankful you guys exist!"* Londyn, mother of Wolfgang

It felt good...like I'm still a mom

One way my loss can help other babies... one thing that I feel like I can do that's positive

*"I didn't want to let go of that physical connection to her. I wanted to do something in her honor to help other families."* Brandy, mother of Melody

