



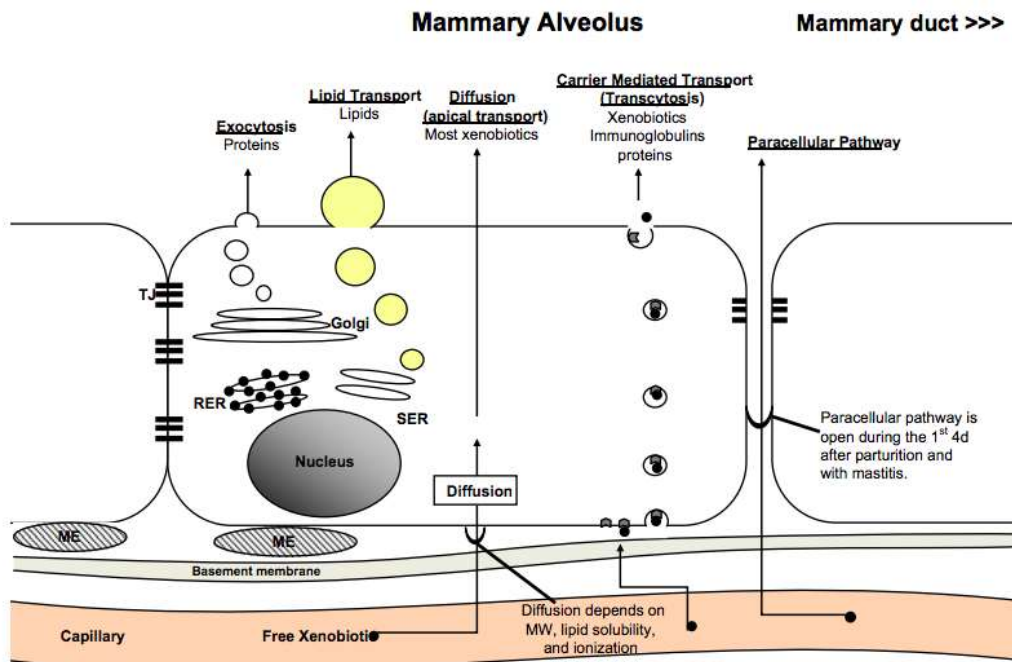
Clinical Pharmacology & Toxicology Pearl of the Week

Can I breastfeed while taking this medication?

- ✓ Almost all drugs appear in human breast milk to some degree
- ✓ As with all xenobiotics, the dose determines the potential for toxicity
- ✓ Drug safety in breastfeeding resources:
 - <https://mothertobaby.org/> and Lactmed <https://www.ncbi.nlm.nih.gov/books/NBK501922/>

How is breast milk synthesized?

- ✓ Mammary alveolus is similar to pulmonary alveoli
 - Inner alveolus is only one cell layer away from capillaries
- ✓ Alveolar cell synthesizes proteins and transports lipids into the inner alveolus making the bulk of the breast milk
- ✓ Xenobiotics can enter breast milk through three mechanisms:
 - Active carrier transport: Used for immunoglobulins and proteins. Xenobiotics transported includes nitrofurantoin, penicillins, and ranitidine
 - Passive diffusion: Major pathway for drug transfer. Dependent on xenobiotic concentration gradient, molecular size, lipid solubility, and ionization
 - Paracellular pathway: Diffusion down concentration gradient. Only open during first four days of breast feeding and during inflammatory conditions including mastitis.



Source: Hendrickson et al, Clinical Toxicology 2012, 50:1, 1-14

Factors that determine xenobiotic potency in breast milk

- Maternal determinants:
 - Maternal absorption, distribution, metabolism, and elimination pharmacokinetics
 - Example: Ultra-rapid metabolizers of codeine to morphine via CYP-2D6 may transfer larger quantities to their infant in their breast milk.
- Xenobiotic determinants:
 - Ability to diffuse through membranes: lower molecular weight, lipid solubility, and higher maternal free drug concentration
- Human milk determinants:
 - Milk pH is 7.0. Tends to ion-trap weak bases, increasing their concentrations
 - Example: Amphetamines, opioids
 - High lipid of milk leads to high concentrations of lipophilic xenobiotics

IV. Infant determinants:

- a. Infant absorption, distribution, metabolism, and elimination pharmacokinetics
- b. Volume of meals relative to body weight (highest at birth and trends down)
- c. Drug tolerance can develop if exposed to xenobiotic in utero

Do I need to pump and discard after drinking alcohol?

- ✓ Breast milk is generated as needed on demand. There is no storage of milk within breast tissue.
- ✓ Drug levels within the breast milk are dependent on current maternal blood levels.
- ✓ Discarding breast milk is discouraged
 - Can potentially lead to:
 - Decreased milk supply
 - Switch to formula feeding
 - Discontinuation of breast feeding
 - Discontinuation of required medications
- ✓ Breast feeding while actively intoxicated is discouraged due to risk of sedation and smothering the child

Infant alcohol exposure calculation

Maternal ETOH level 21 mmol/L (BAC 0.1%)


Infant meal: 100mL = 2.1 mmol ETOH

2.1 mmol ETOH in 5 kg child = 0.52 mmol/Kg

Comparison: 1 std drink in 70 kg adult = 5.2 mmol/Kg

Contraindications to breast feeding

- ✓ Infant with classic galactosemia or maple syrup urine disease
- ✓ Maternal HIV
- ✓ Severe maternal illness preventing mother from caring for child
- ✓ Communicable disease that may be transmitted to child (Ex: TB, brucellosis)
- ✓ Active maternal substance abuse (risk of transmission to child, risk of inability to care for child)
- ✓ Certain medications may preclude breastfeeding in the short term
 - Refer to LactMed and Mother to Baby for more resources

 The Calgary Clinical Pharmacology physician consultation service is available Mon-Fri, 9am-5pm. The on-call physician is listed in ROCA. Click [HERE](#) for clinical issues the CP service can assist with.

 The Poison and Drug Information Service (PADIS) is available 24/7 for questions related to poisonings. Please call 1-800-332-1414, and select option 1.

References:

1. Robert G. Hendrickson & Nathanael J. McKeown (2012) Is maternal opioid use hazardous to breast-fed infants?, Clinical Toxicology, 50:1, 1-14, DOI: [10.3109/15563650.2011.635147](https://doi.org/10.3109/15563650.2011.635147)
2. Drugs and Lactation Database. (LactMed). National Library of Medicine. <https://www.ncbi.nlm.nih.gov/books/NBK501922/#IX-C> Accessed Nov 30, 2019
3. Mother to Baby, Organization of Teratology Information Specialists. <https://mothertobaby.org/> Accessed Nov 30, 2019
4. Contraindications to Breastfeeding or Feeding Expressed Breast Milk to Infants, CDC, <https://www.cdc.gov/breastfeeding/breastfeeding-special-circumstances/contraindications-to-breastfeeding.html> , Accessed Nov 30, 2019