

# The biology of maternal behavior in sheep and goats

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# Maternal bonding: two components

- “Responsiveness”
  - Maternal care & drive
    - Nursing, nurturing
    - Acceptance



- “Selectivity”
  - Only in some species
  - Exclusivity! “My offspring and only my offspring.”
  - No milk for anybody else!





# Ecology: *Why selective* maternal bonding?

- Sheep have few offspring at once, but live in a large social group. Ewes rejoin the flock within days.



- Maternal bonding evolved to maximize survival
  - Milk is a precious resource! Save it for *your* lambs.



# What does exclusive bonding look like?

## Ewes:

- Want only their lamb(s), and reject other lambs
  - Sometimes with surprising aggression!
- Are protective of their lambs
- Are quite upset when their lamb is removed
  - High-pitched distress bleats
- Bond strongly (bond is hard to break!)
- Can recognize their lamb by its voice within 24 hours

## Lambs

- Aren't nearly so selective
- Can recognize mom within a few days





# When does bonding happen?

- “Sensitive period” lasts for around 1 to 4 hours after birth
- Can take as little as 30 minutes for the bond to form



- This is why we use jugs! (Lambing/bonding pens)  
Or give ewes plenty of space out on pasture.



# What ewe behaviors are important for bonding?



- Licking and smelling!
- Low rumbling noises
- Reactions from the lambs
- Nursing
- Smell smell smell!



# What about lamb behaviors?

- The more vigorous the lamb, the better!
  - Louder, more bouncy lambs get more attention
    - Some breeds tend to be more lively as newborns
    - Difficult births make for less vigorous lambs (and ewes)
- Nursing – good for lamb and ewe alike
  - Not technically necessary for bonding but very helpful





# Amniotic fluid is important!

- Boosts both responsiveness and selectivity
- First-time mothers **need** to smell amniotic fluid for proper bonding
  - “Primiparous” ewes won’t accept a washed lamb
  - Experienced mothers aren’t as dependent on AF but it helps
- AF has a unique “signature” – goes beyond smell
- Primes to the brain to learn a lamb’s scent





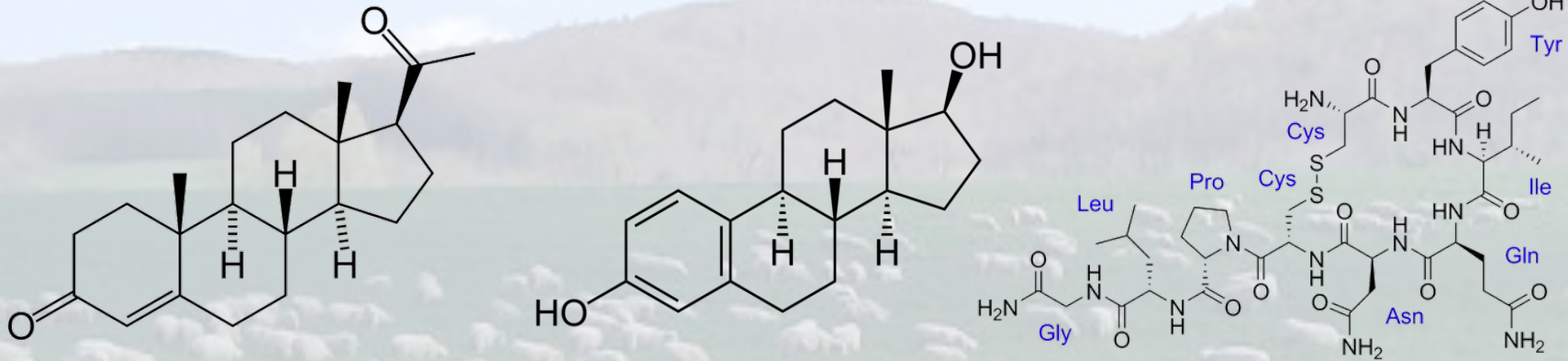
# The importance of VCS

- **Vaginocervical stimulation**
- “Stretch receptors” – nerves in the birth canal send signals to the brain, which releases oxytocin
- Fast-tracks the bonding process
- Can also be used to foster a new lamb or kid
  - Works up to 27 hours after parturition





# What's going on behind the scenes?



## Hormones, a brief description of the key players:

- Progesterone: maintains pregnancy (and much more)
- Estradiol: an estrogen. Promotes growth of tissues important for estrous, pregnancy (and also does much more)
- Oxytocin – the “love” hormone. Also contractions, lactation



# What's going on behind the scenes?

Hormones:

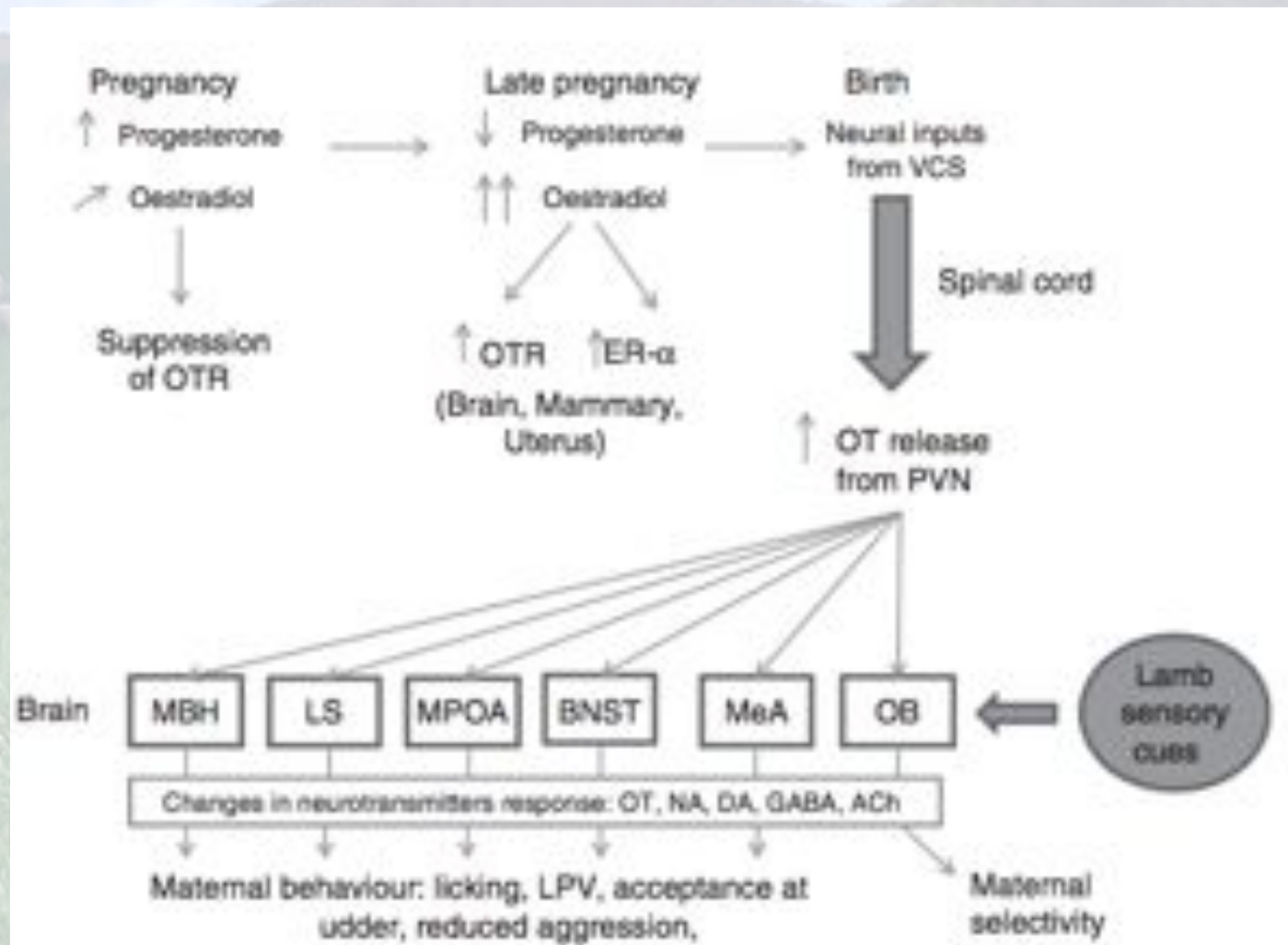
## Key

OT: Oxytocin  
OTR: Oxytocin receptor

ER- $\alpha$ : Estrogen receptor alpha

LPV: Low-pitched vocalizations

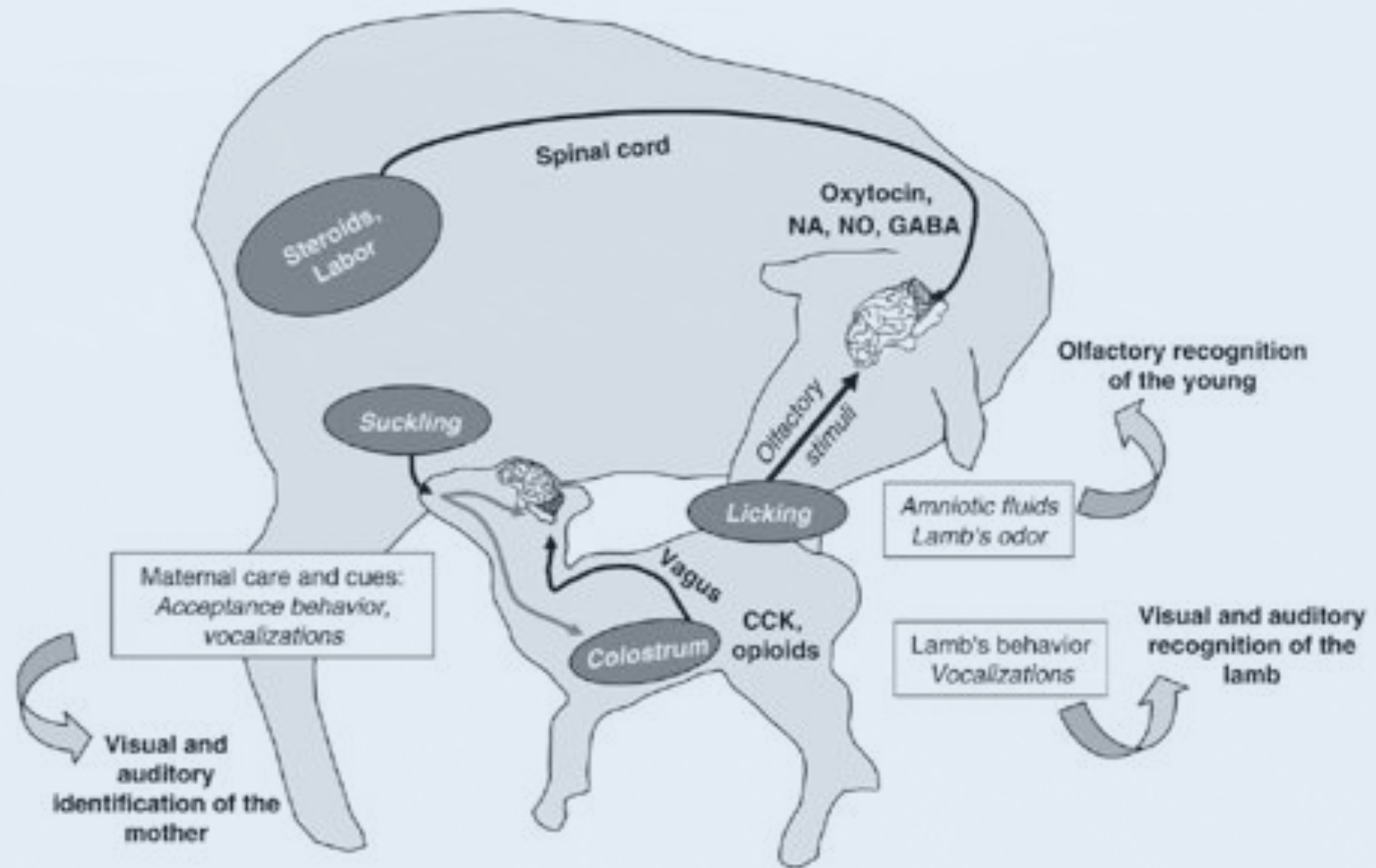
Others: brain regions & neurotransmitters



From Dwyer (2013)



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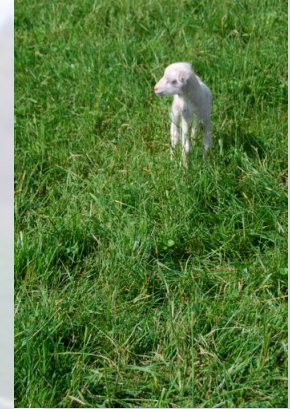


From R. Nowak, M. Keller, D. Val-Laillet, F. Lévy (2007)



# When does bonding fail?

- Ewe and lamb don't get enough time together
  - Separation shortly after birth
  - Lamb-stealing (“grannyng”)
- Inexperience (fear!)
  - First time mothers
- Genetics
- Poor nutrition during gestation
- Stress during gestation
- Difficult/prolonged delivery
- Ewe temperament?





# How can we encourage good bonding?

- Save your energy for the first-timers
  - Primiparas may benefit more from longer time at birth site.
  - Get rid of failures (after given proper chances to succeed)
- Allow ewes space and/or privacy
  - More crowded pens need checked more often
- Minimize stressors and disruption
  - from late gestation through bonding time
- Ram selection





# Happy Lambing!

