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Does immunocontraception in feral horses (*Equus caballus*) extend reproductive cycling beyond the normal breeding season?

Cassandra M.V. Nuñez, *Virginia Polytechnic Institute and State University*

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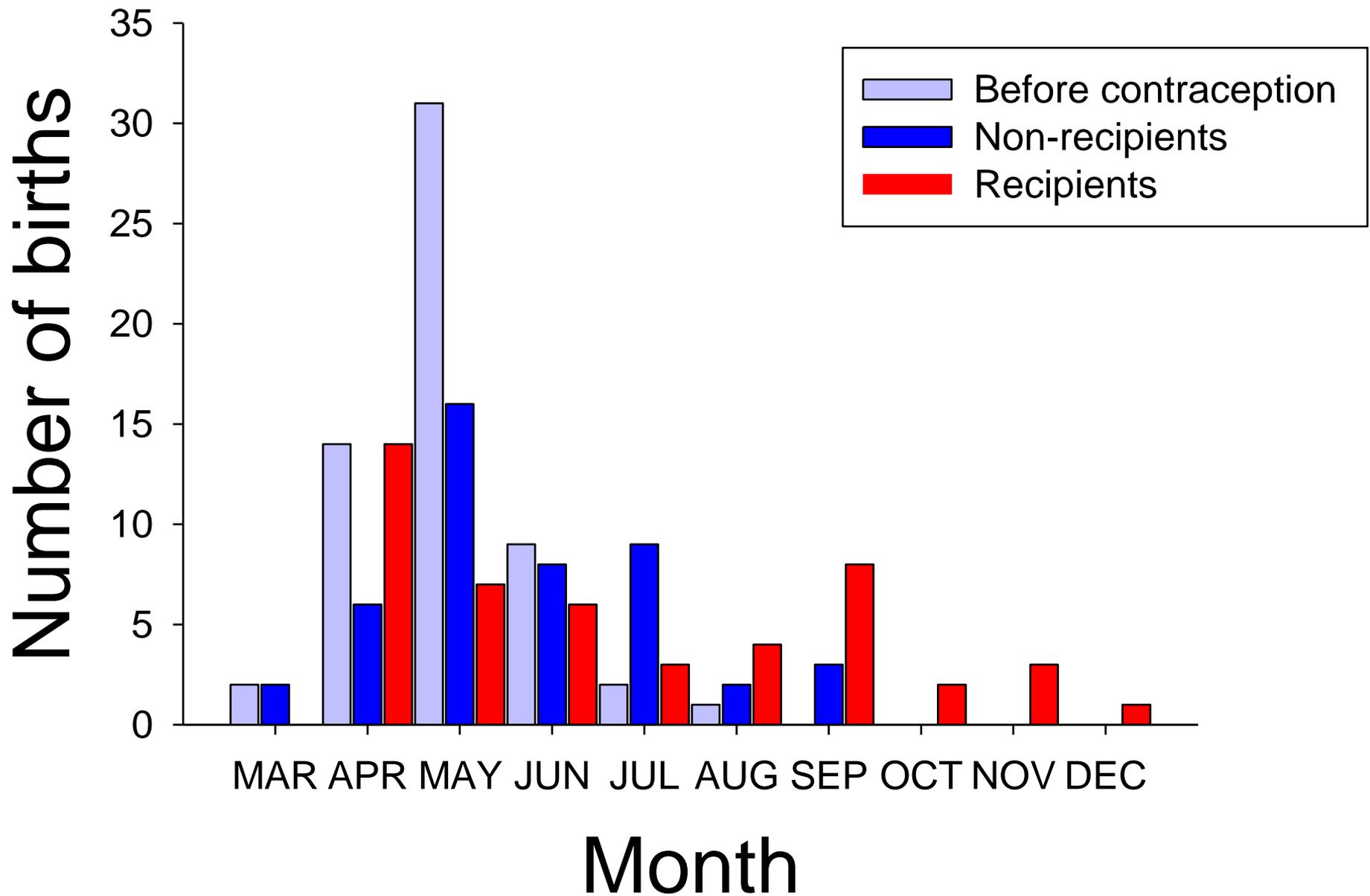
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Does immunocontraception in feral horses (*Equus caballus*) extend reproductive cycling beyond the normal breeding season?



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***Virginia Polytechnic Institute and State University**
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Photo by Sue Stuska

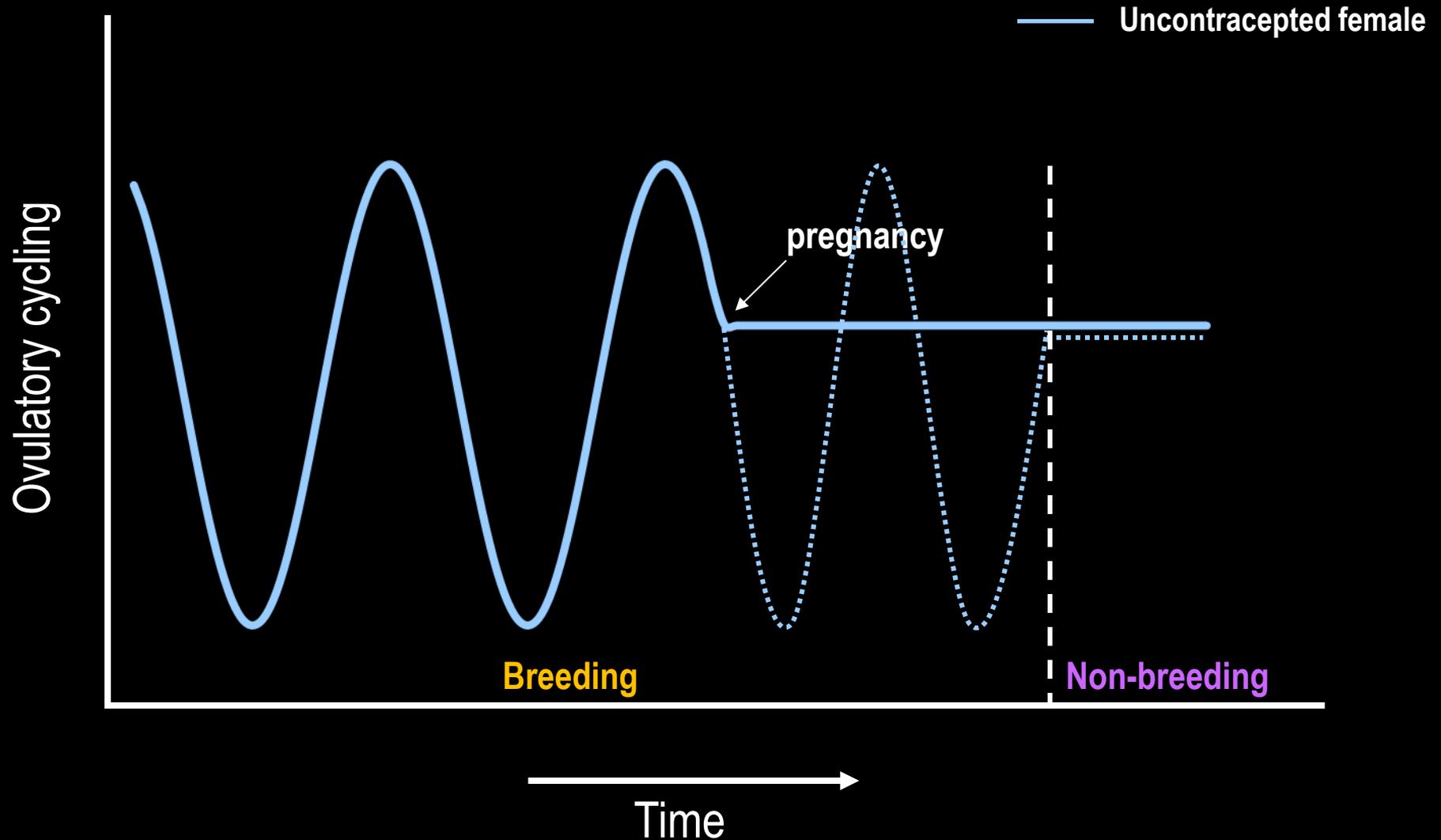




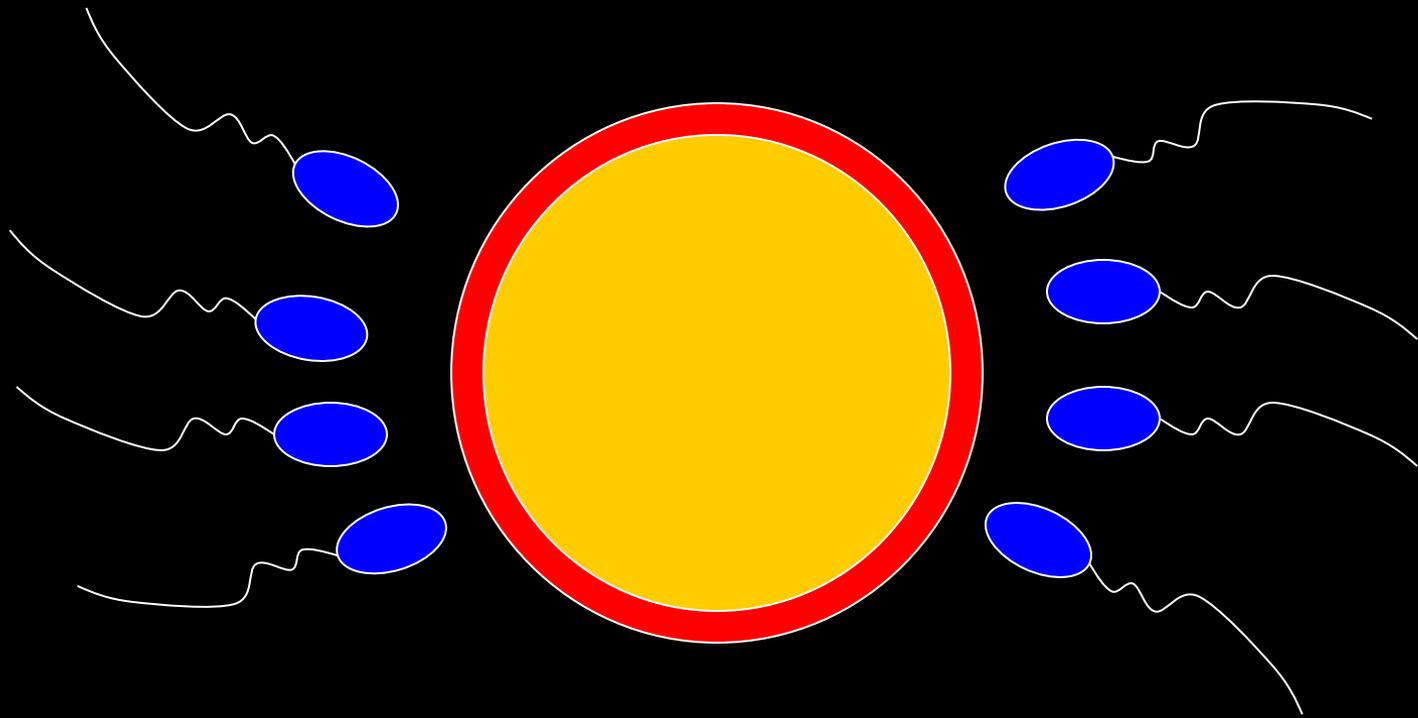




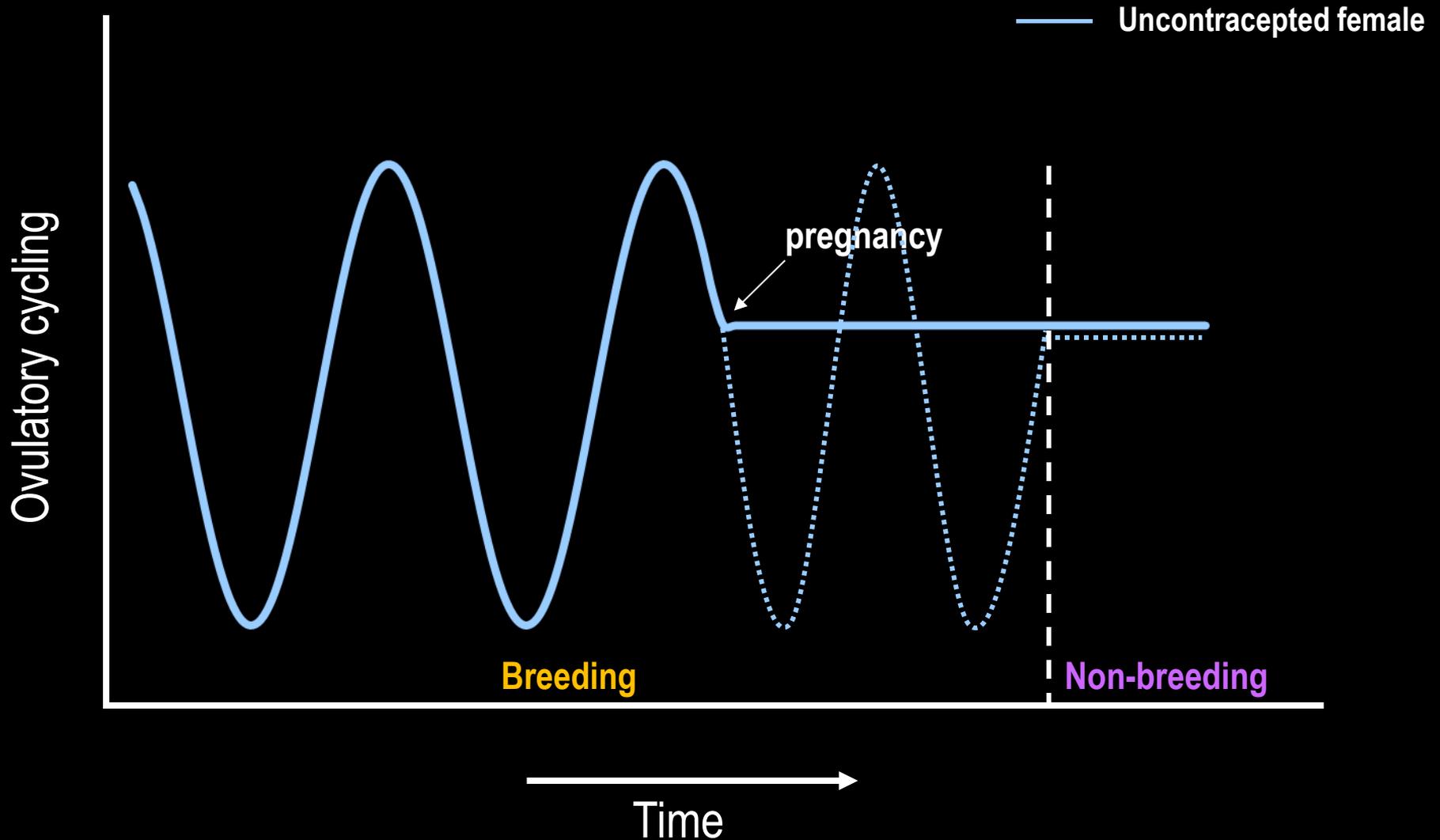
Reproductive cycling in mares



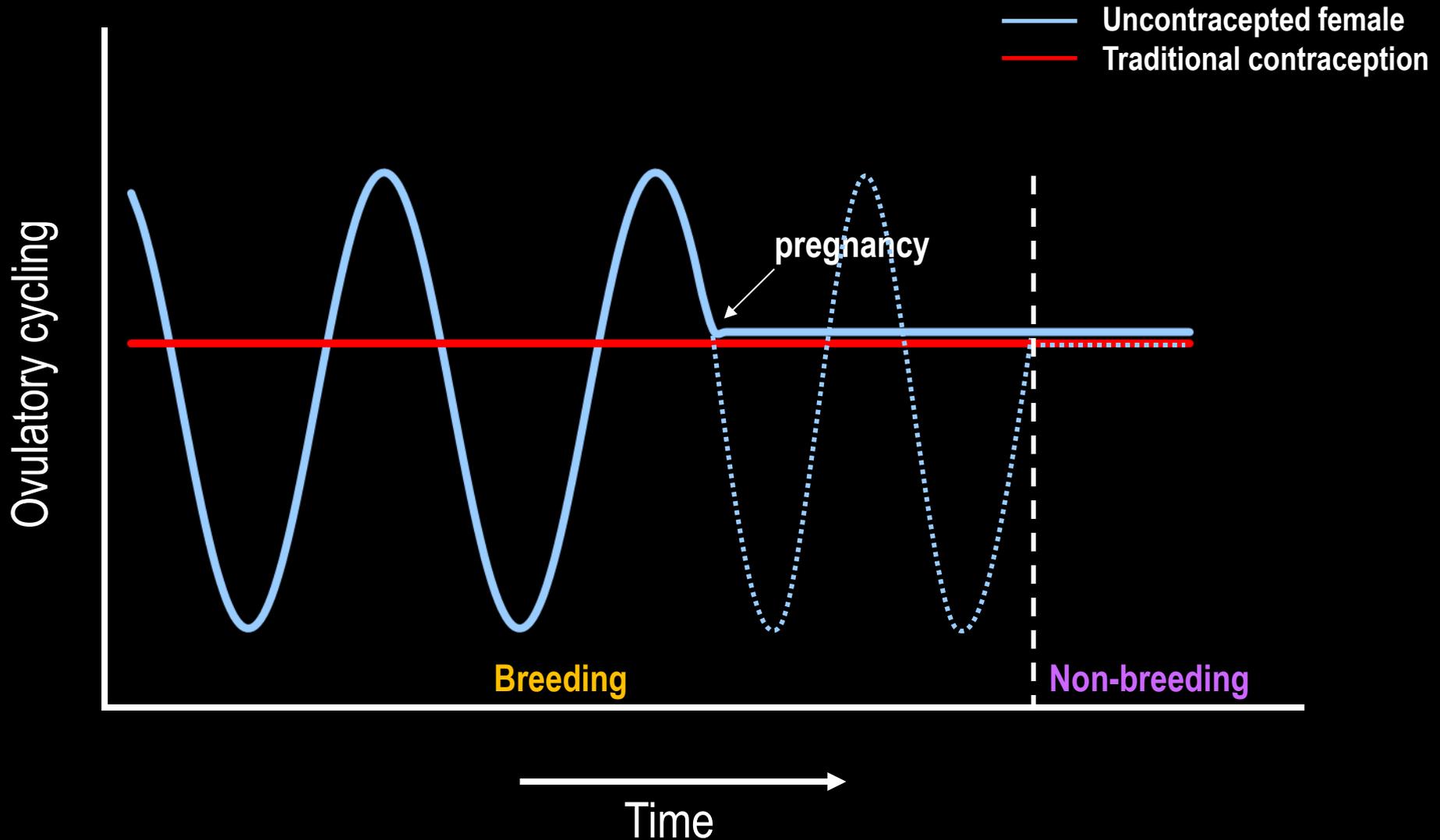
Traditional forms of contraception



Reproductive cycling in mares

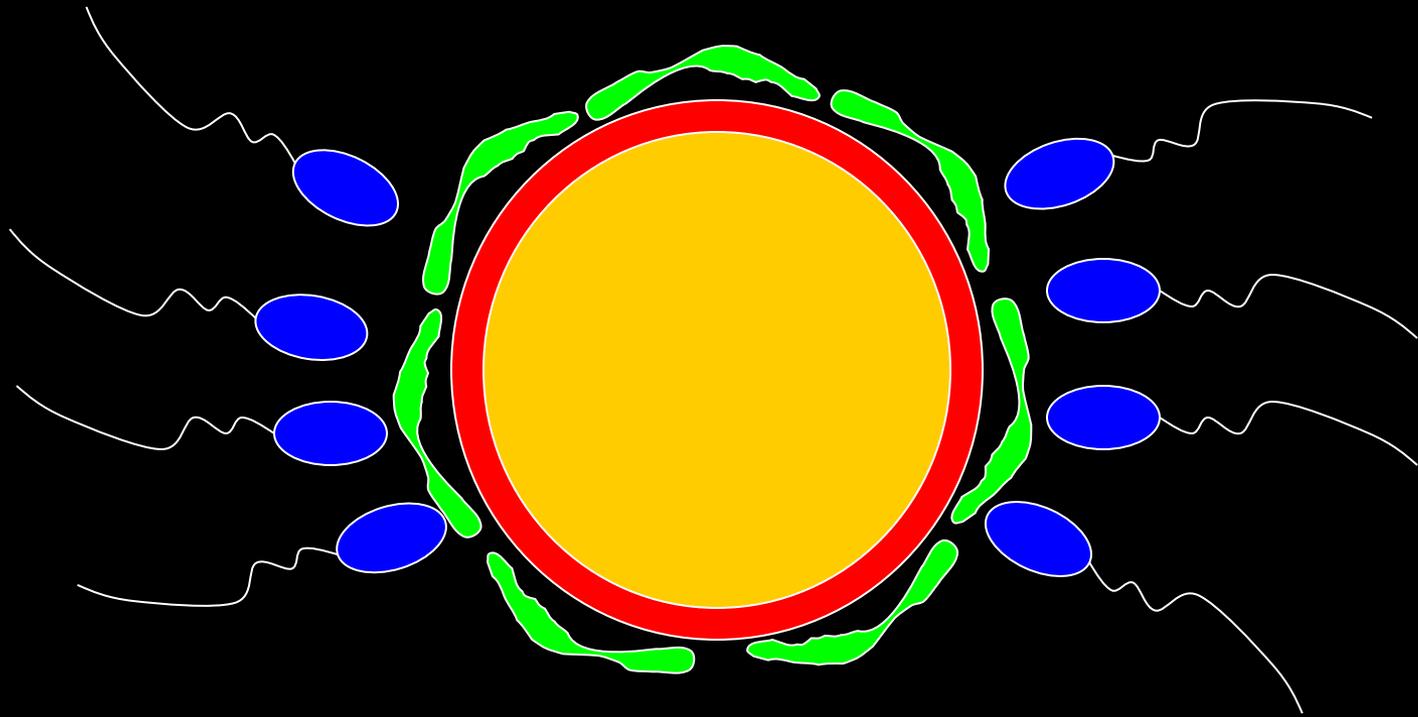


Reproductive cycling in mares

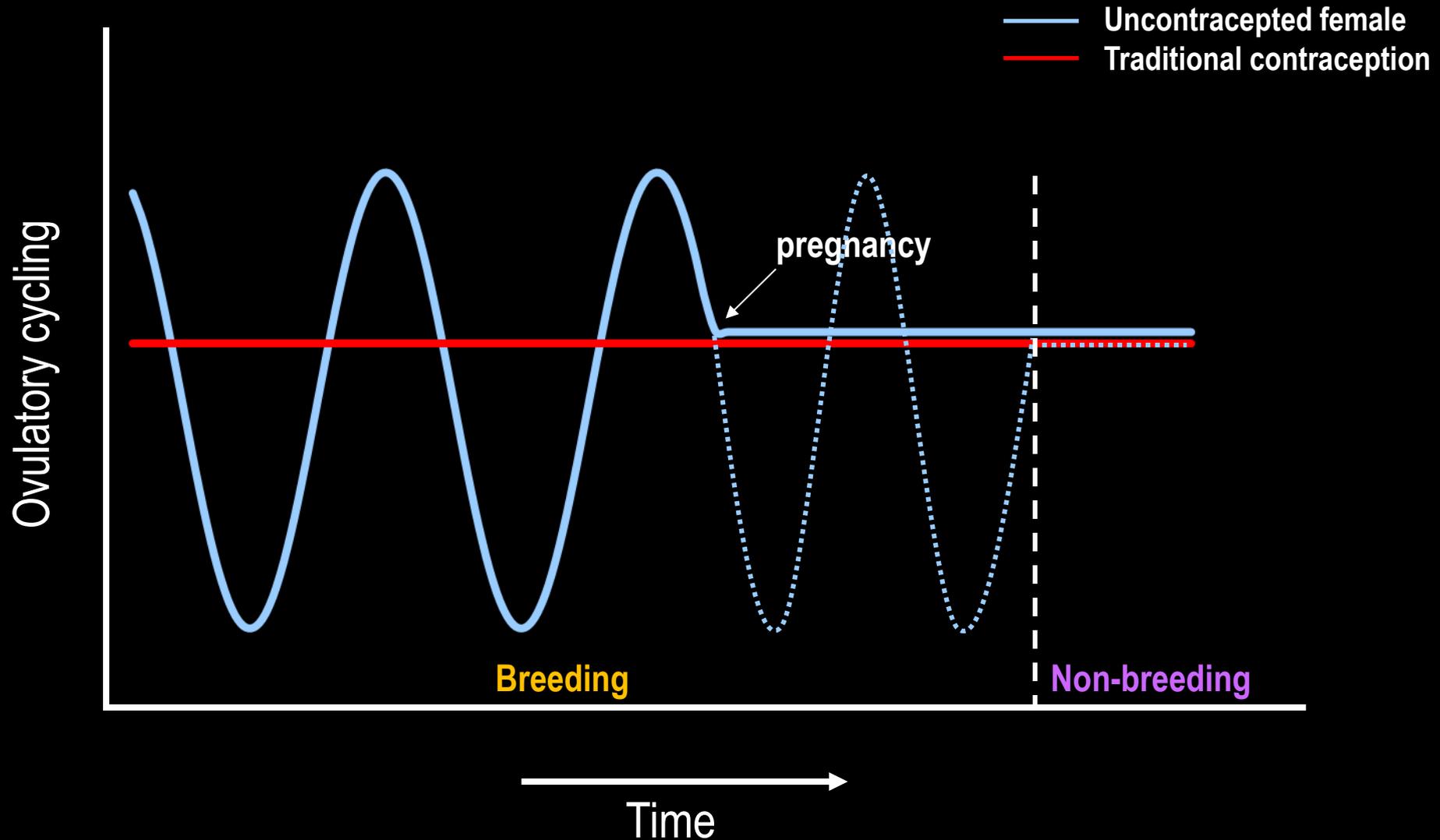


Immunocontraception

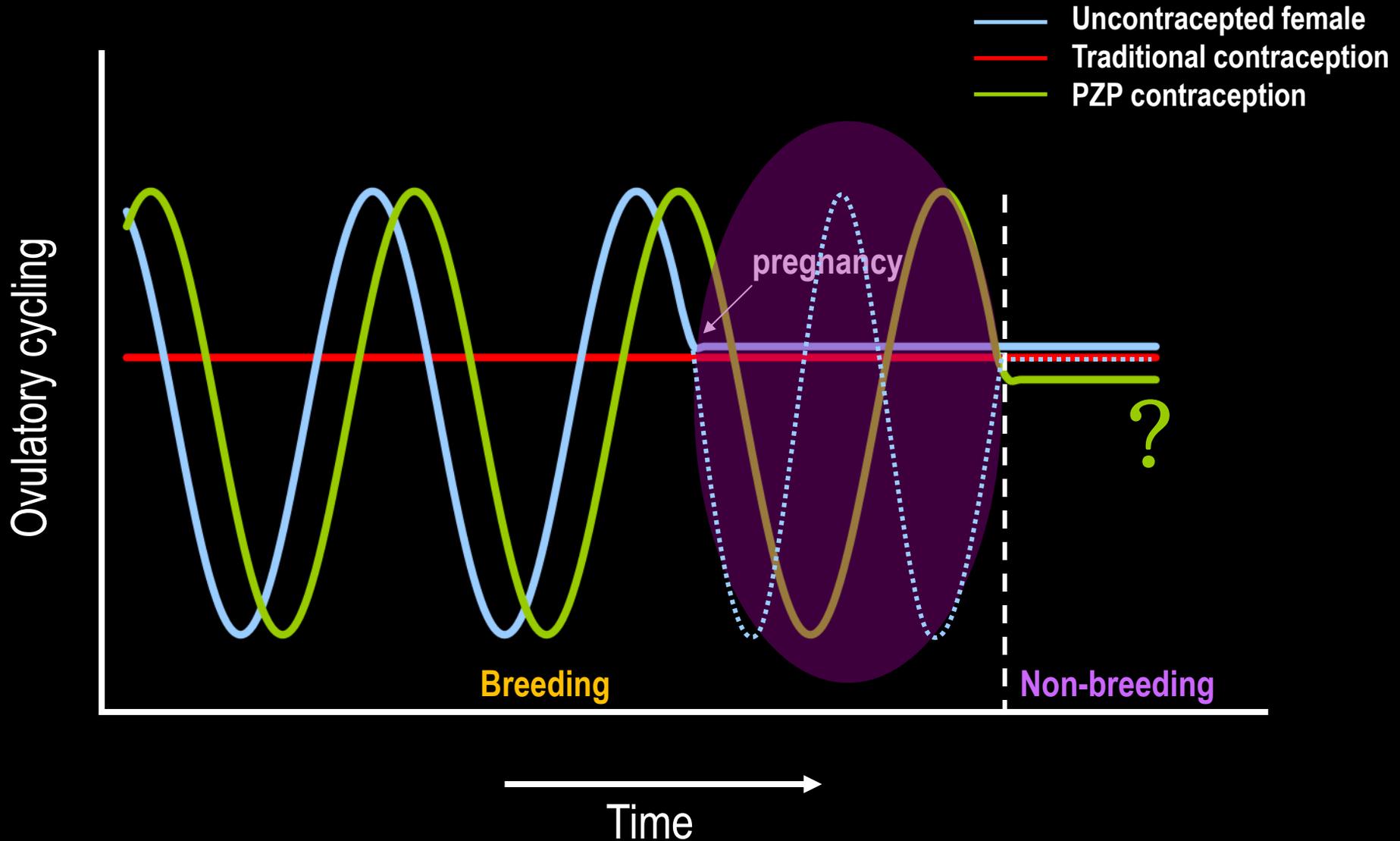
Porcine zona pellucida (PZP)



Reproductive cycling in mares

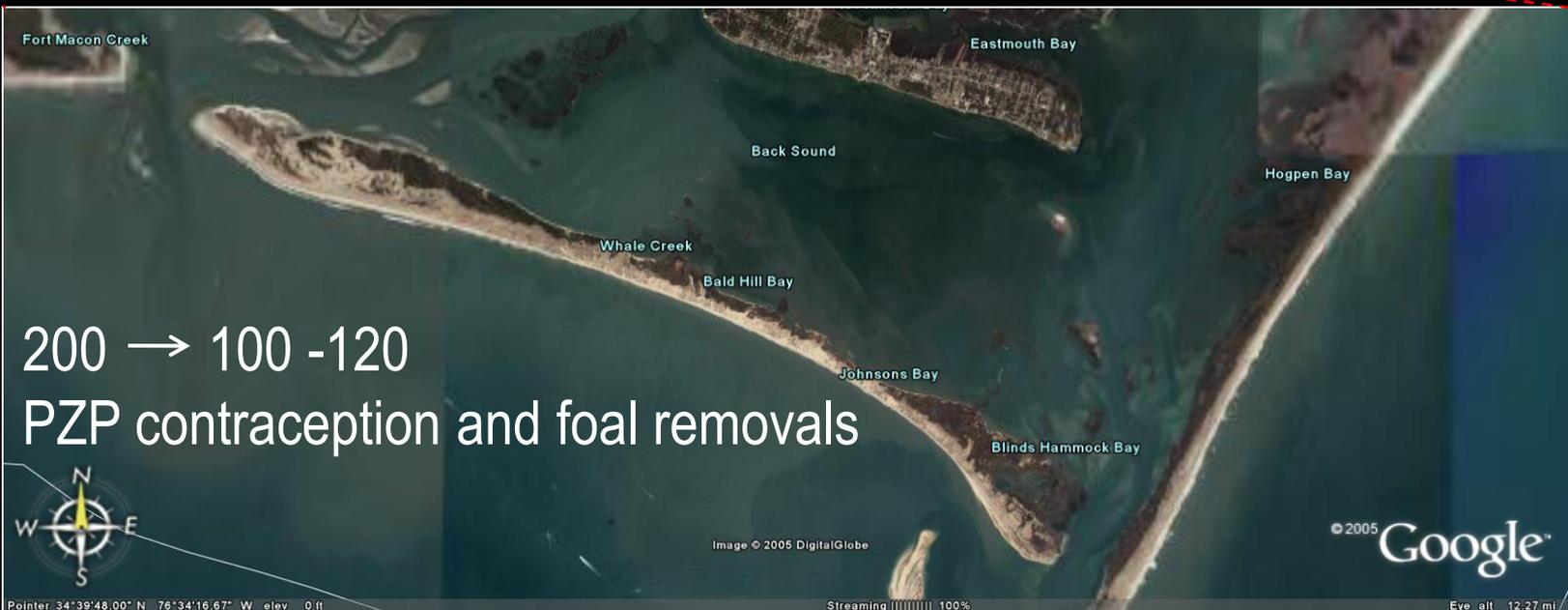
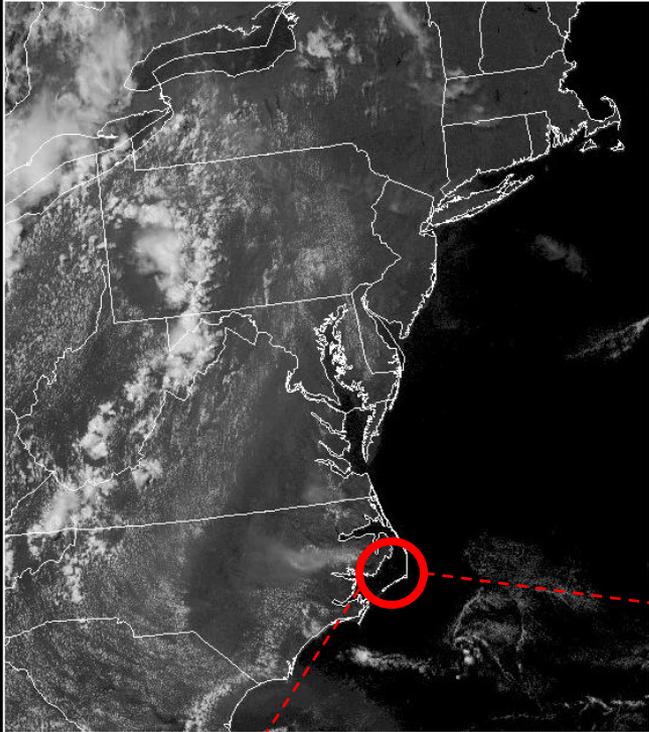


Reproductive cycling in mares



Shackleford Banks, North Carolina

Cape Lookout National Seashore,
National Park Service



200 → 100 -120

PZP contraception and foal removals

Wild horse behavior

- Harem groups
 - Harem male, females, offspring
 - Stable, long lasting
 - Bodily condition
 - Parasite load
 - Offspring mortality
- Non-territorial



PZP and behavior

- On few populations
- During the breeding season
- Without true controls



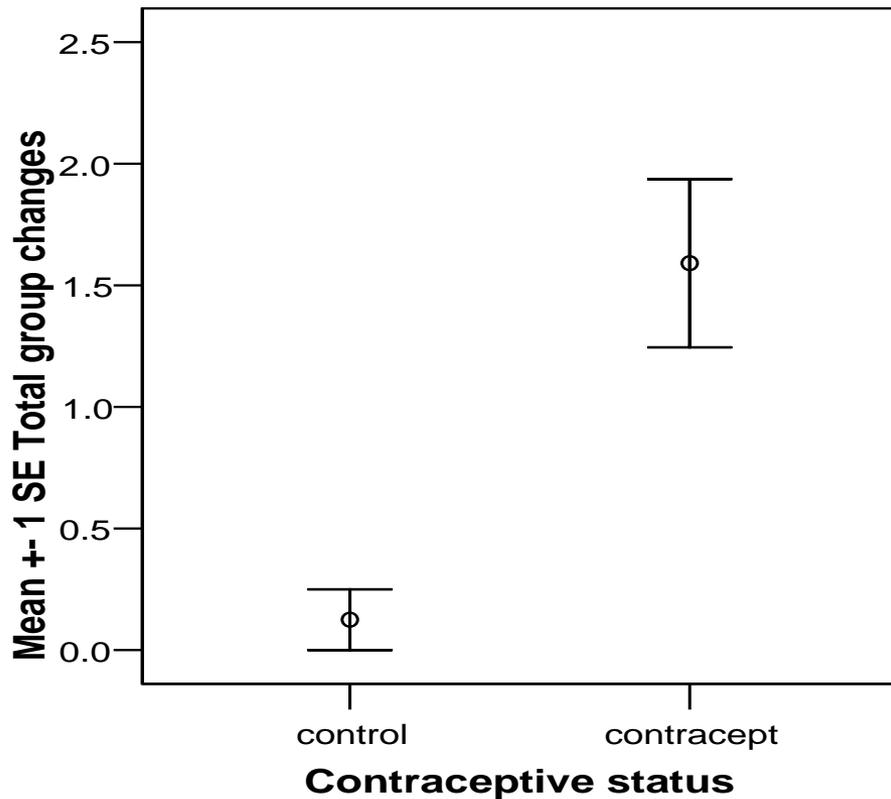
- Contracepted ♀ (n=22); Control ♀ (n=8)
- December 2005 - February 2006





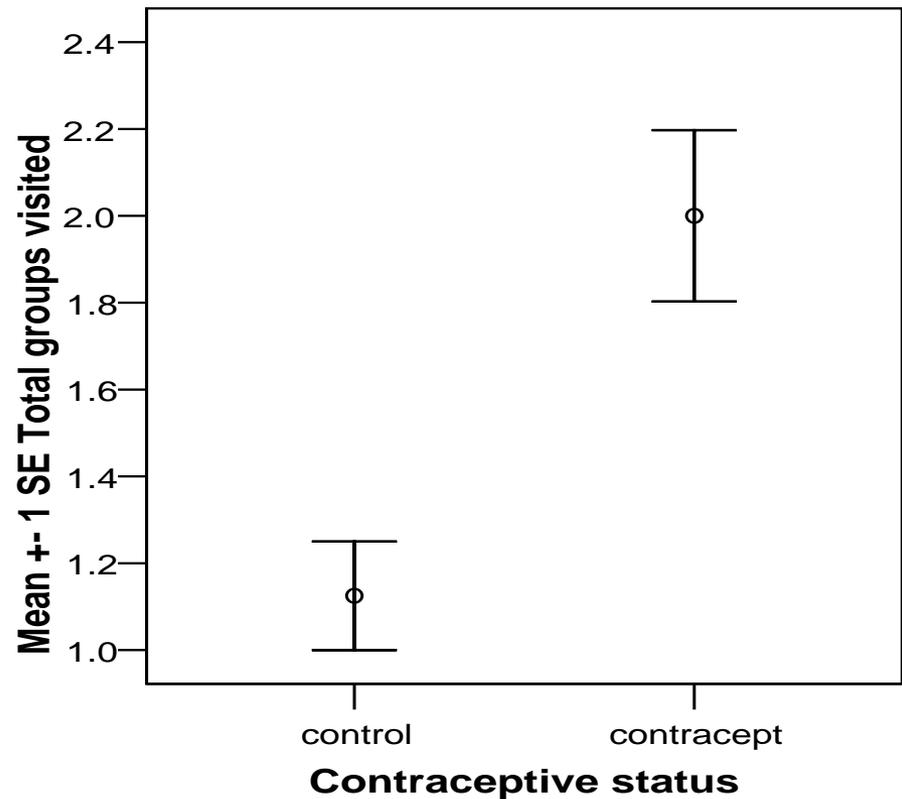
- Number of group changes
- Number of groups visited

Number of group changes



Generalized Linear Model; $F_{2,27} = 6.73$, $P = 0.004$
- PZP treatment, $t = 2.11$, $P = 0.04$

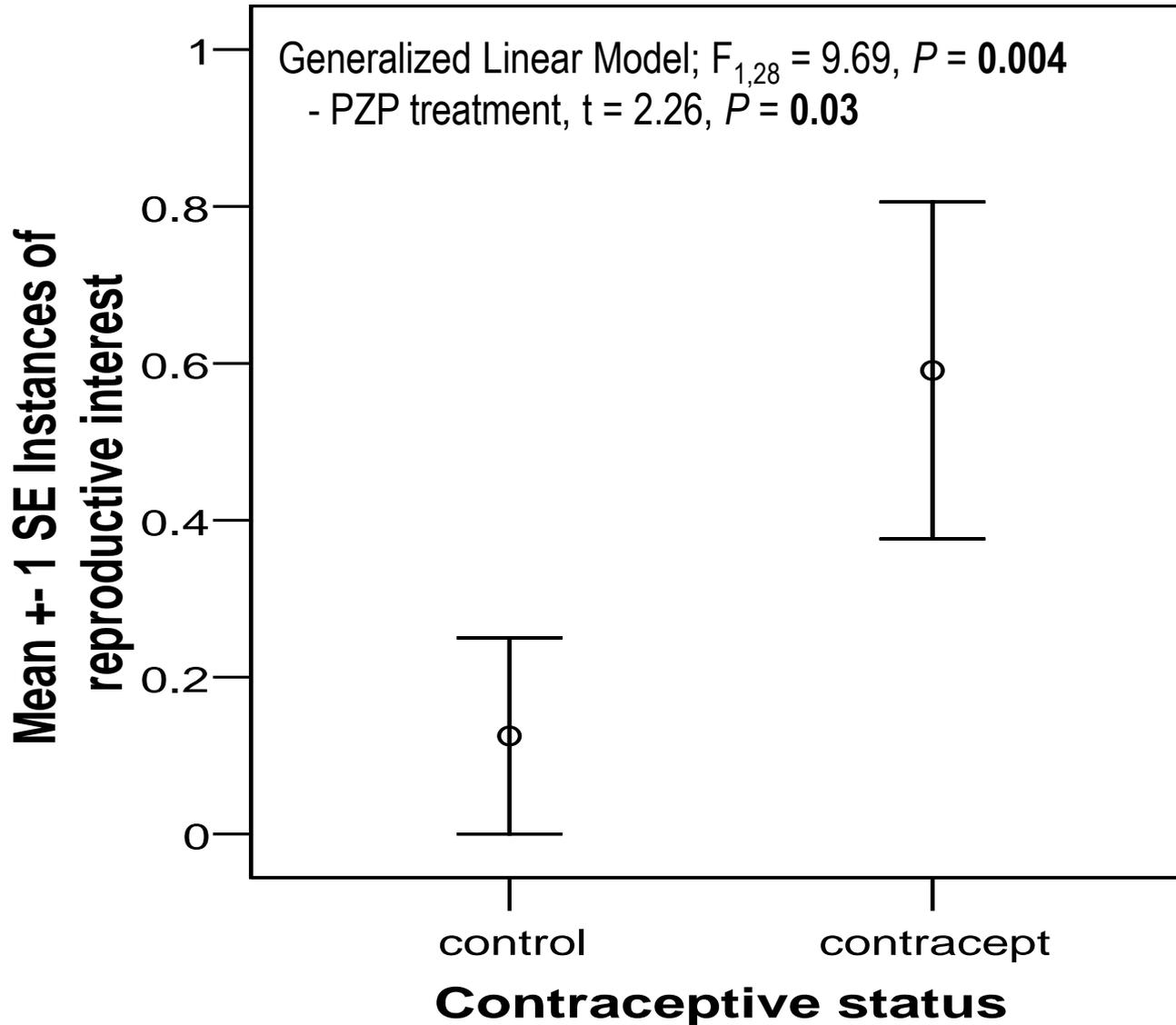
Number of groups visited



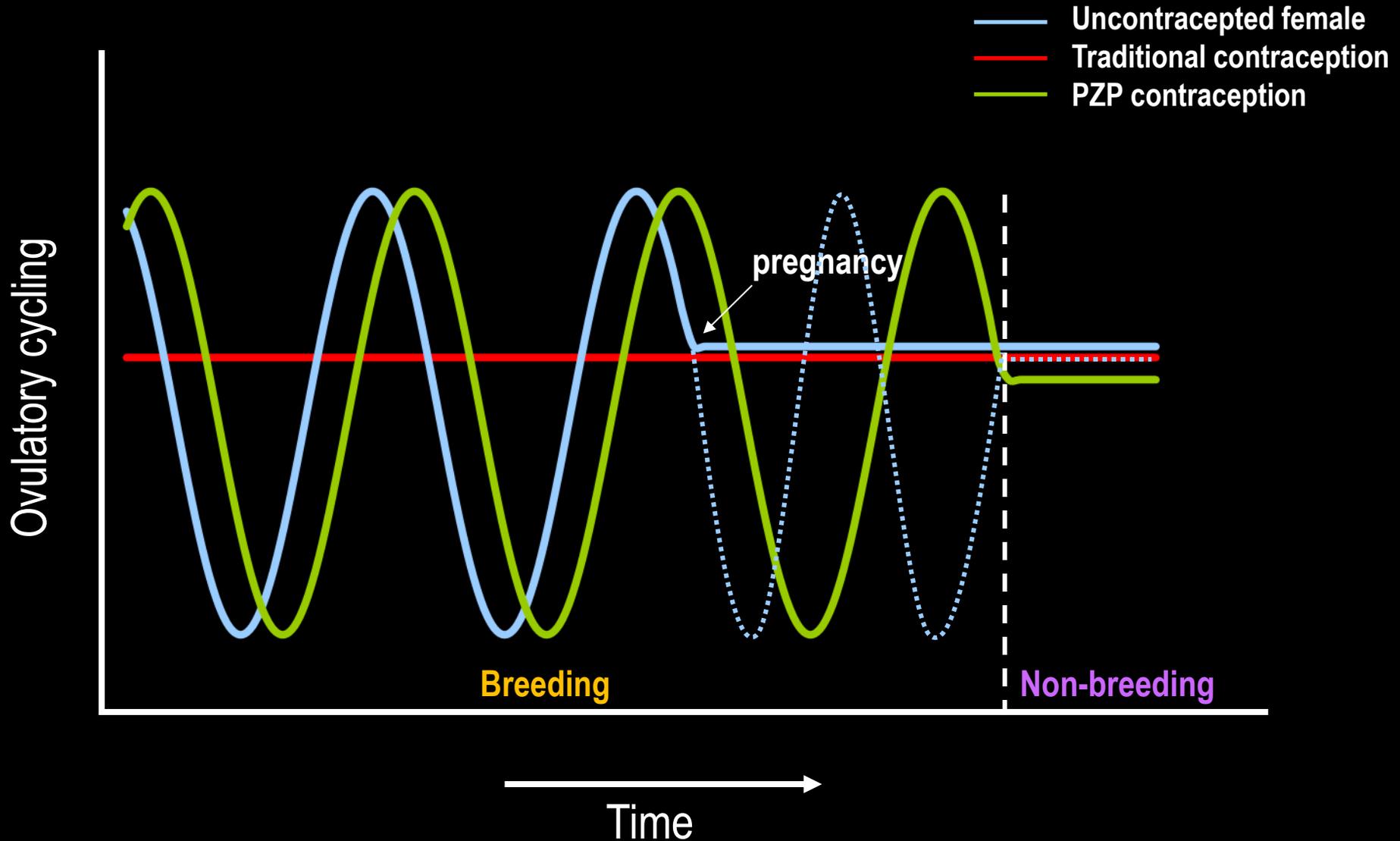
Generalized Linear Model; $F_{2,27} = 6.83$, $P = 0.004$
- PZP treatment, $t = 2.42$, $P = 0.02$



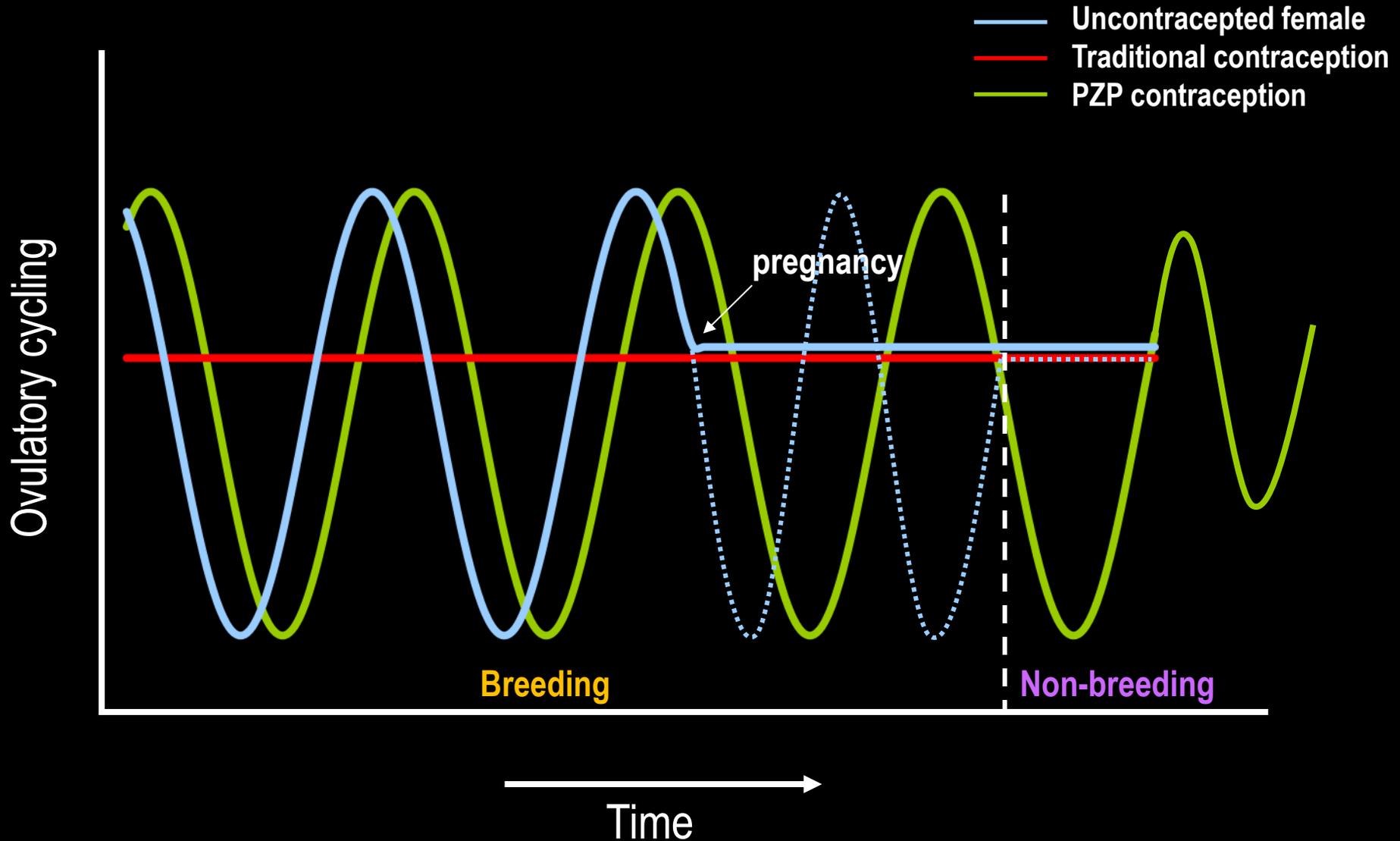
Reproductive interest



Reproductive cycling in mares



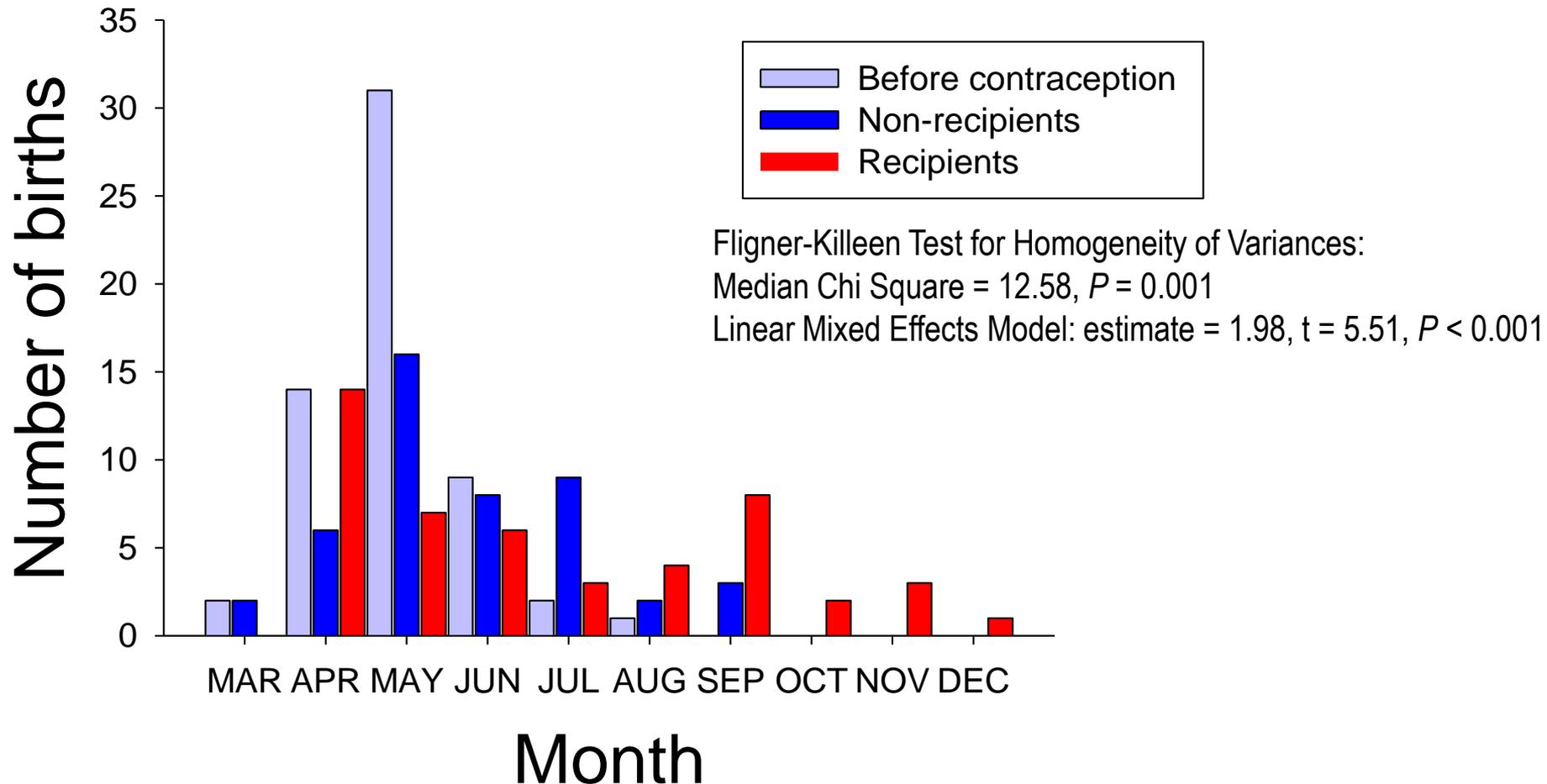
Extended reproductive cycling?



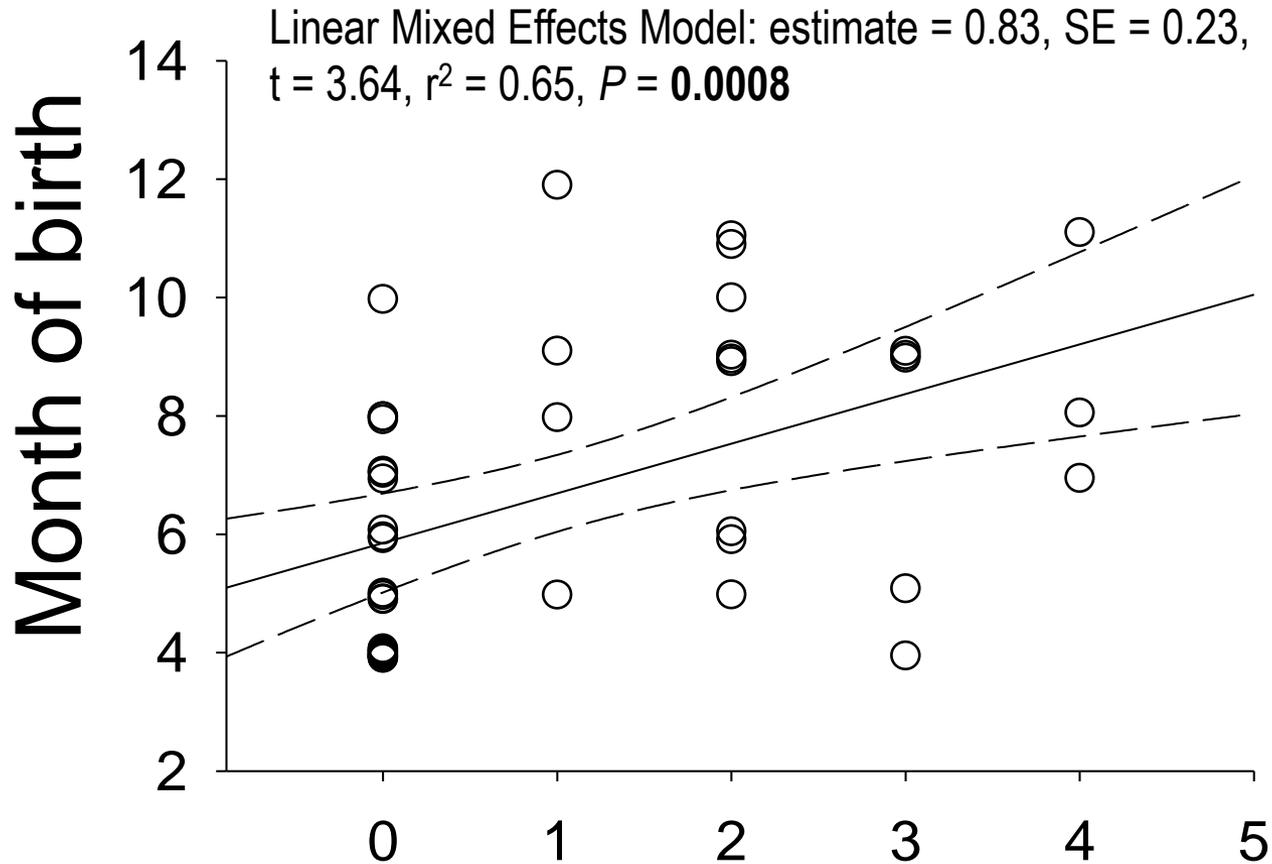
Foaling date as a proxy for reproductive cycling

Nuñez, C.M.V., J.S. Adelman, and D.I. Rubenstein. PLoS ONE, 2010

- Gestation lasts 11-12 months
- Conception can be reliably estimated from foals' birth date
- Birth dates of foals born before and after contraception management



Birth dates and PZP applications



Consecutive PZP applications

Potential consequences

Fall births



Potential consequences

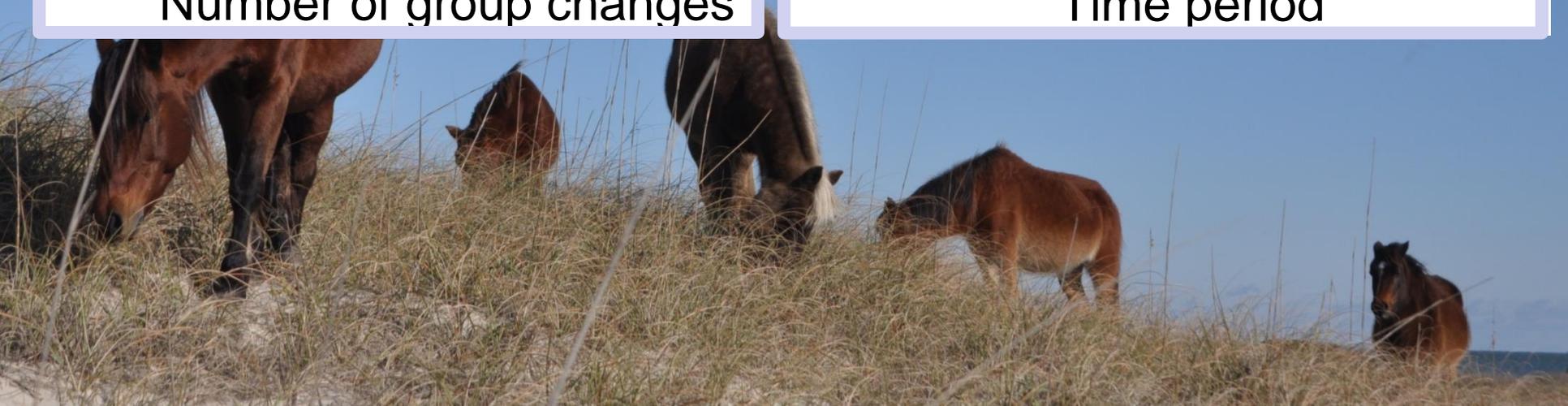
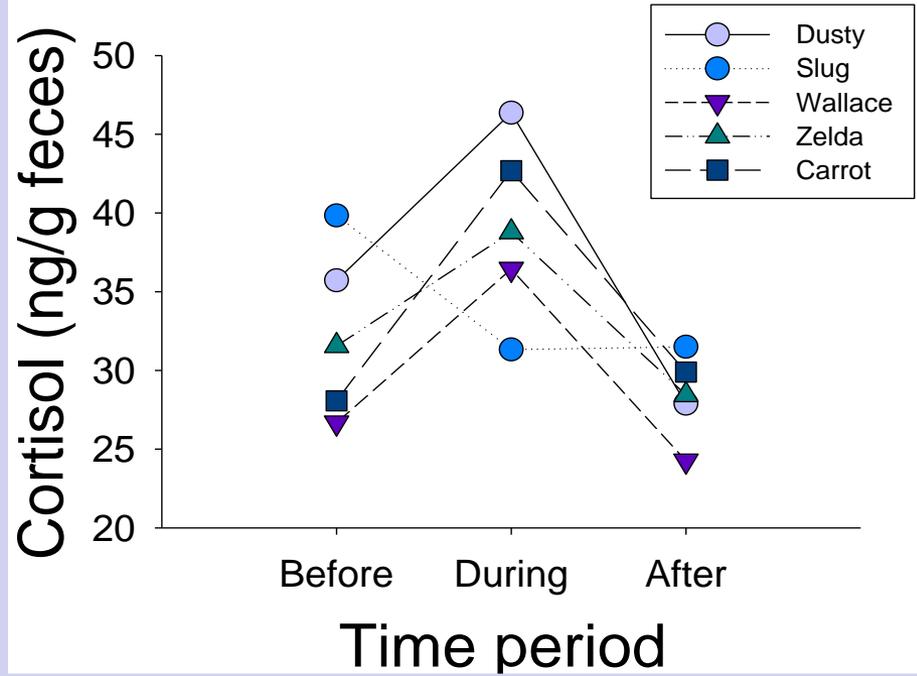
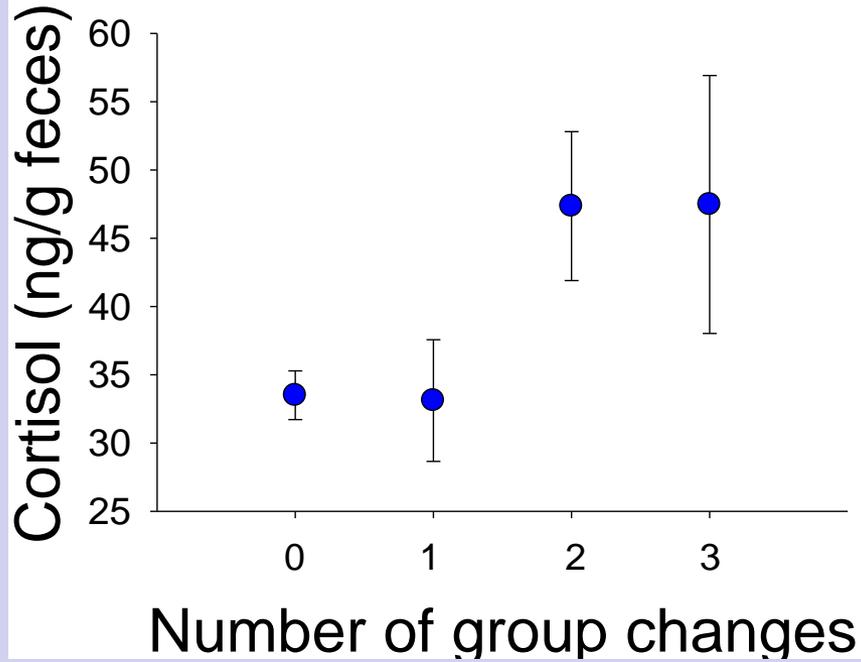
Male contests

- Behavioral change in **harem males** due to behavioral changes in **females**
- Physiological changes in harem males (↑cortisol and/or testosterone)



Potential consequences

Group changes



Thank you

**Carolyn Mason, Foundation for Shackleford Horses
Susan Stuska, National Park Service
Margaret Kearns
Jessica Smith
IWECE organizers**



Questions?

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