

The Total Balance

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F21C Animal Reproductive Biology

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New Record!
Bur-Wall Buckeye Gigi
Bur-Wall Holsteins, Brooklyn, WI



33,932 kg of milk*
(74,650 lb)

966 kg fat
(2126 lb)

974 kg protein
(2142 lb)

1,629 kg lactose
(3583 lb)

365 d lactation

***3-times average US
cow in 2015**

How much glucose per day does Bur-Wall Buckeye Gigi require?

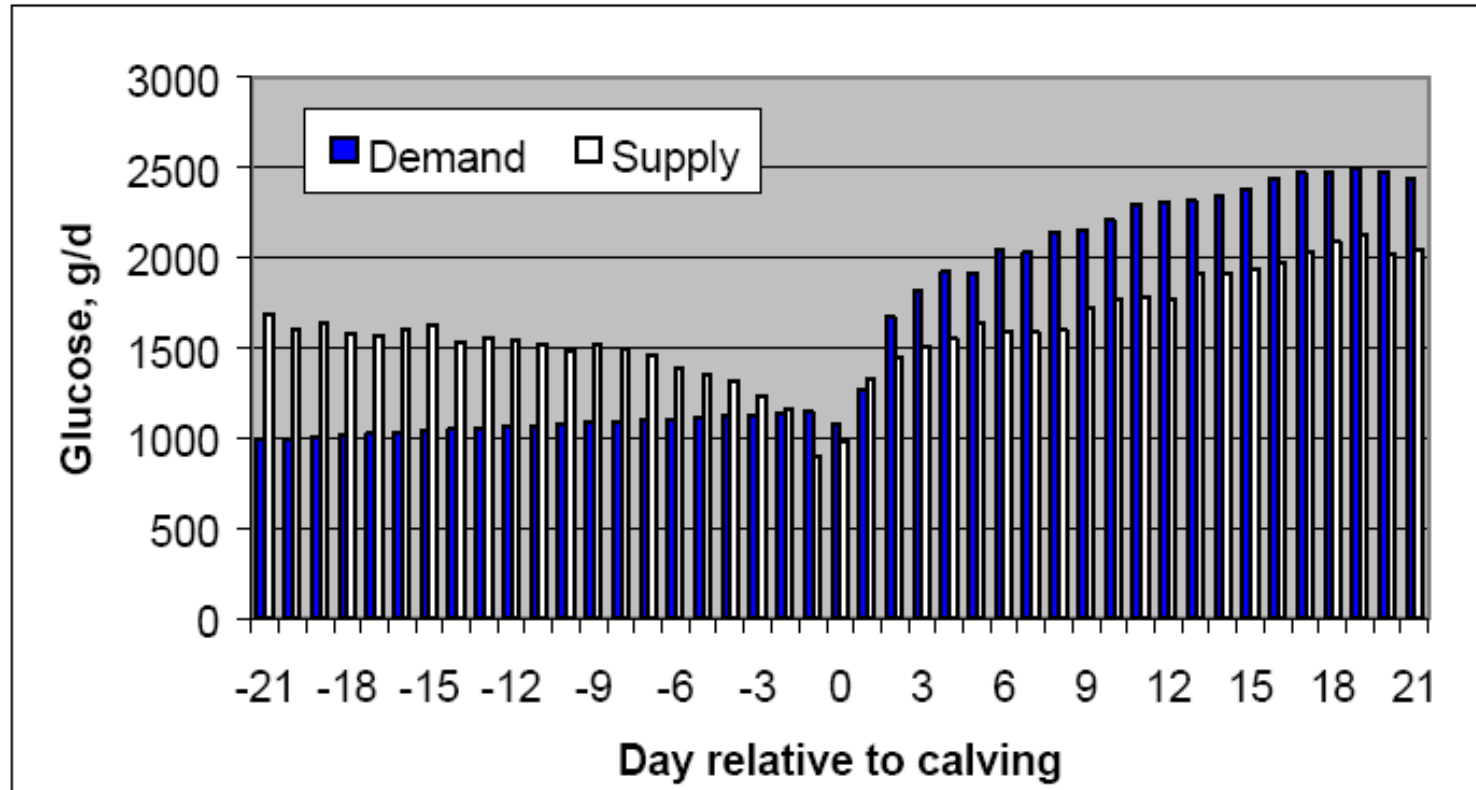
72 g of glucose to produce 1 kg milk
Approximately 115 kg milk per day at peak
8.3 kg glucose per day

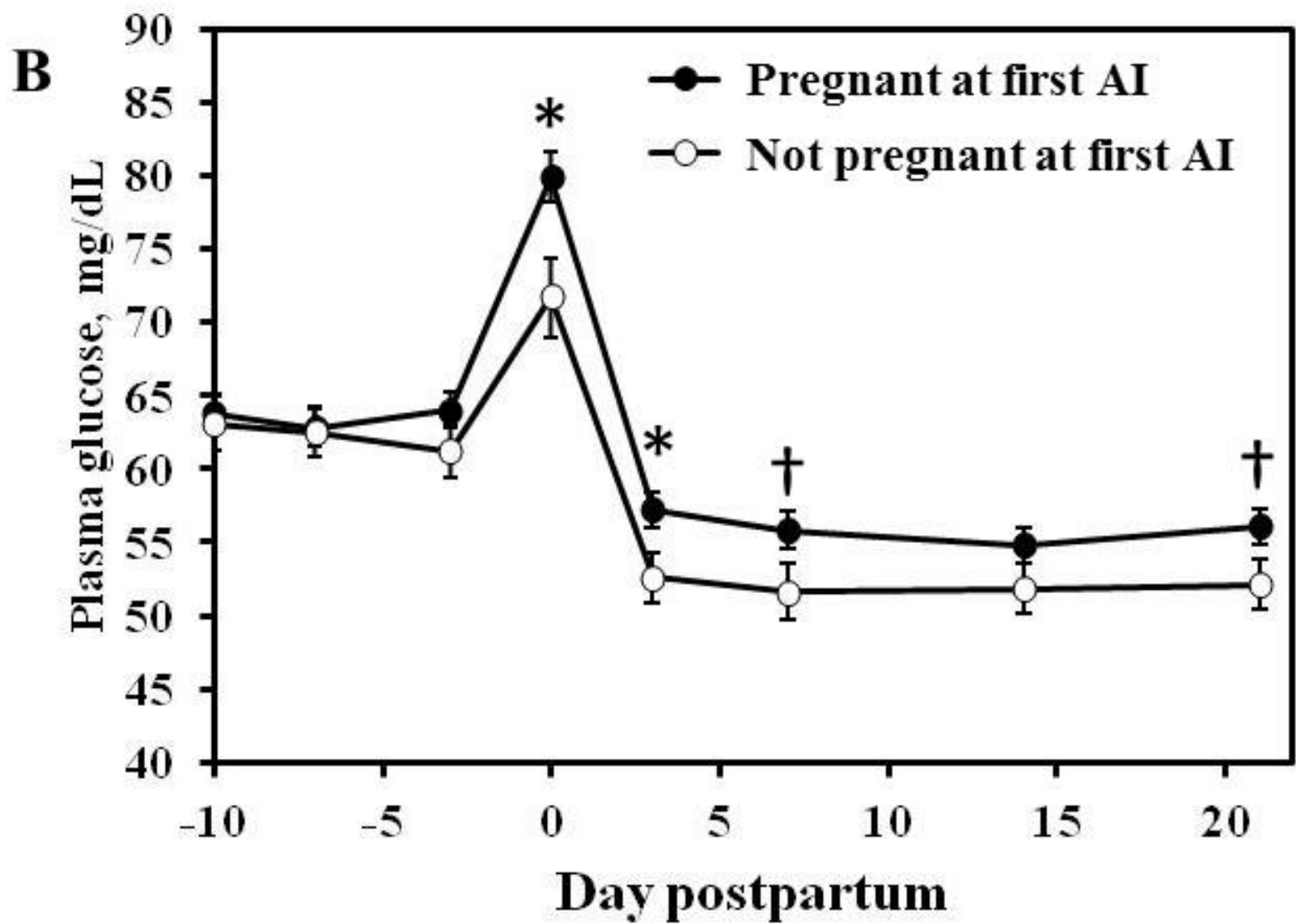


Type 1 diabetes in humans and the physiology of postpartum dairy cows

	Type 1 diabetes	Postpartum cow
Blood insulin	Low	Low
Insulin sensitivity	Low	Low
Blood glucose	High	Low
Blood GH	High	High
Blood IGF-I	Low	Low
Liver GHR	Low	Low

Glucose supply and demand: Prepartum and early lactation





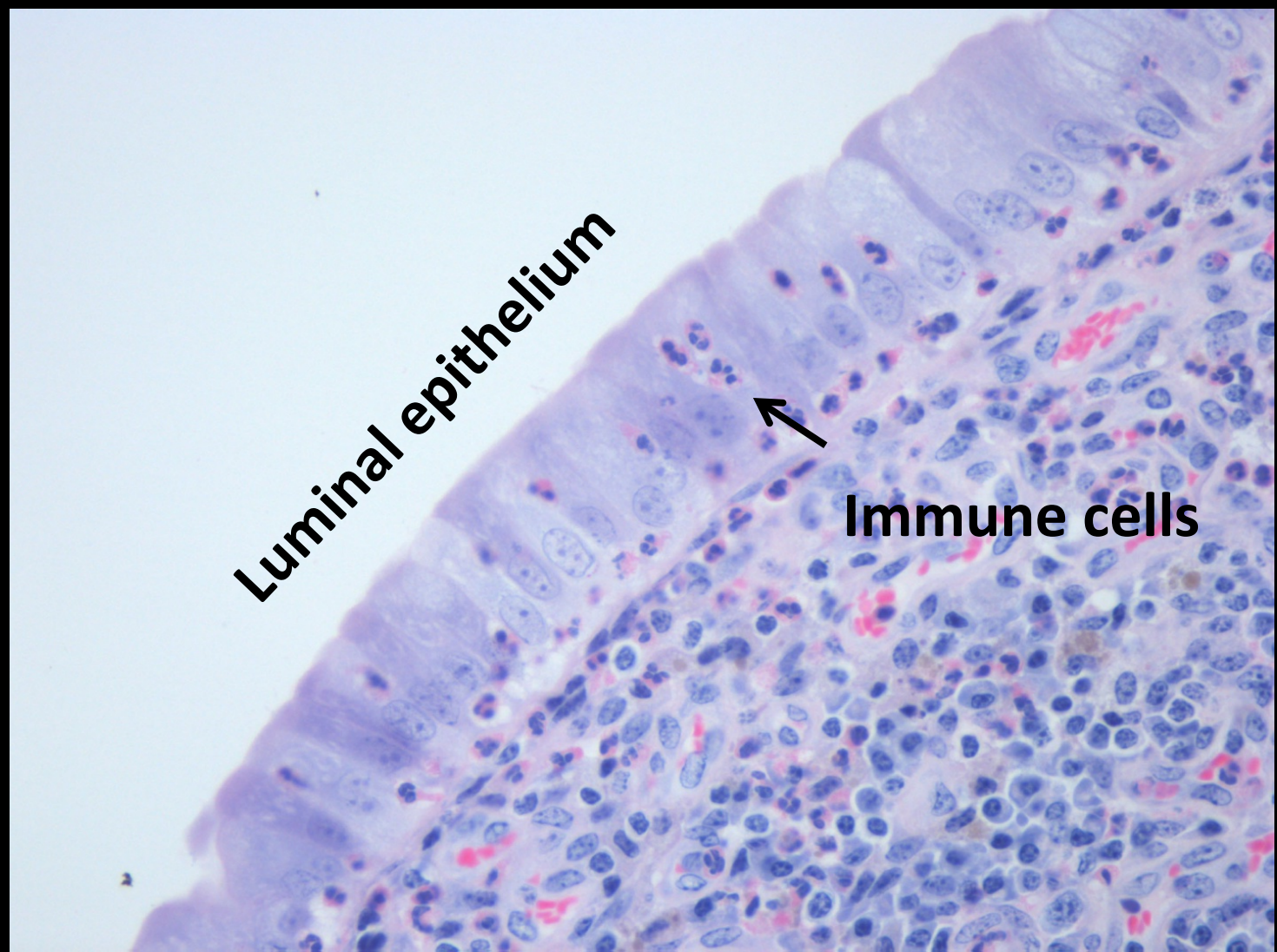


Day 3

Inflammation



Luminal Epithelium of the bovine uterus at 25 dpp



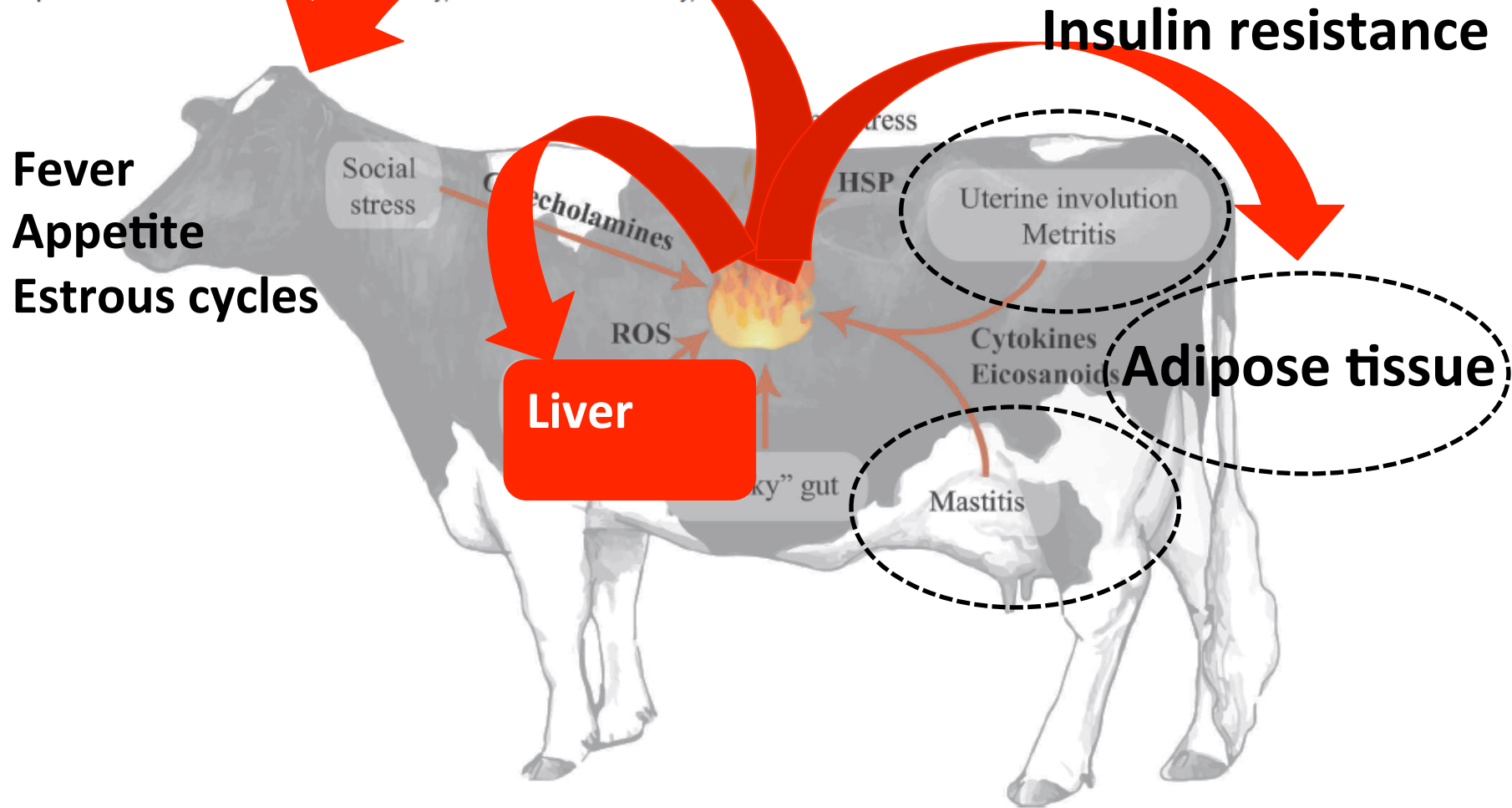
Luminal epithelium

Immune cells



Invited review: Inflammation during the transition to lactation: New adventures with an old flame

B. J. Bradford,¹ K. Yuan, J. [unclear], L. K. Mamedov, and A. J. Carpenter
Department of Animal Sciences, [unclear] Industry, Kansas State University, Manhattan 66506



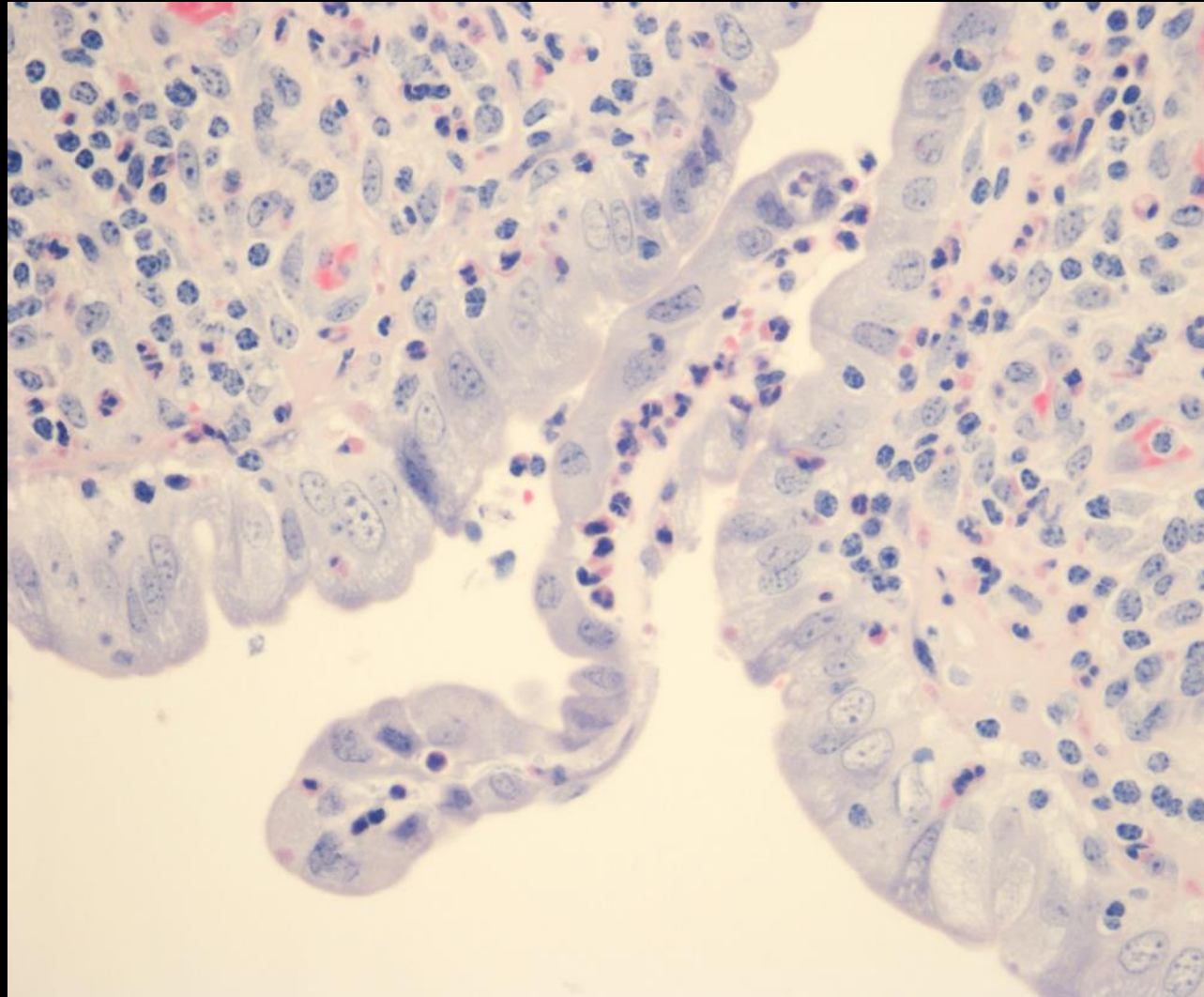
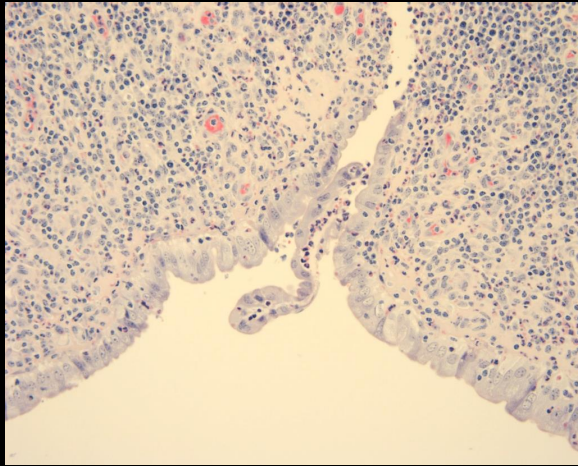


Day 25

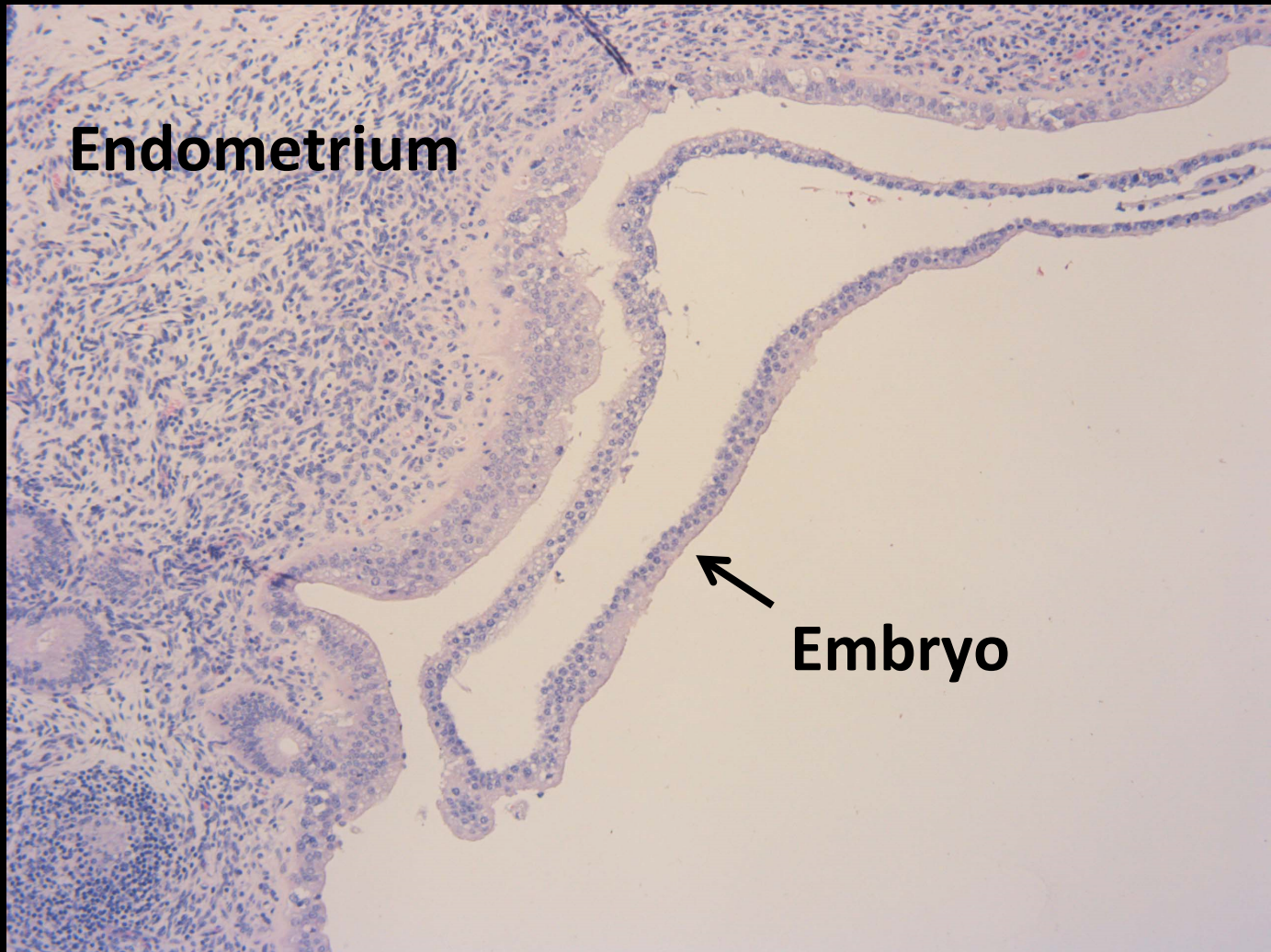


Day 25

Luminal Epithelium Bovine uterus 307 (25 dpp)

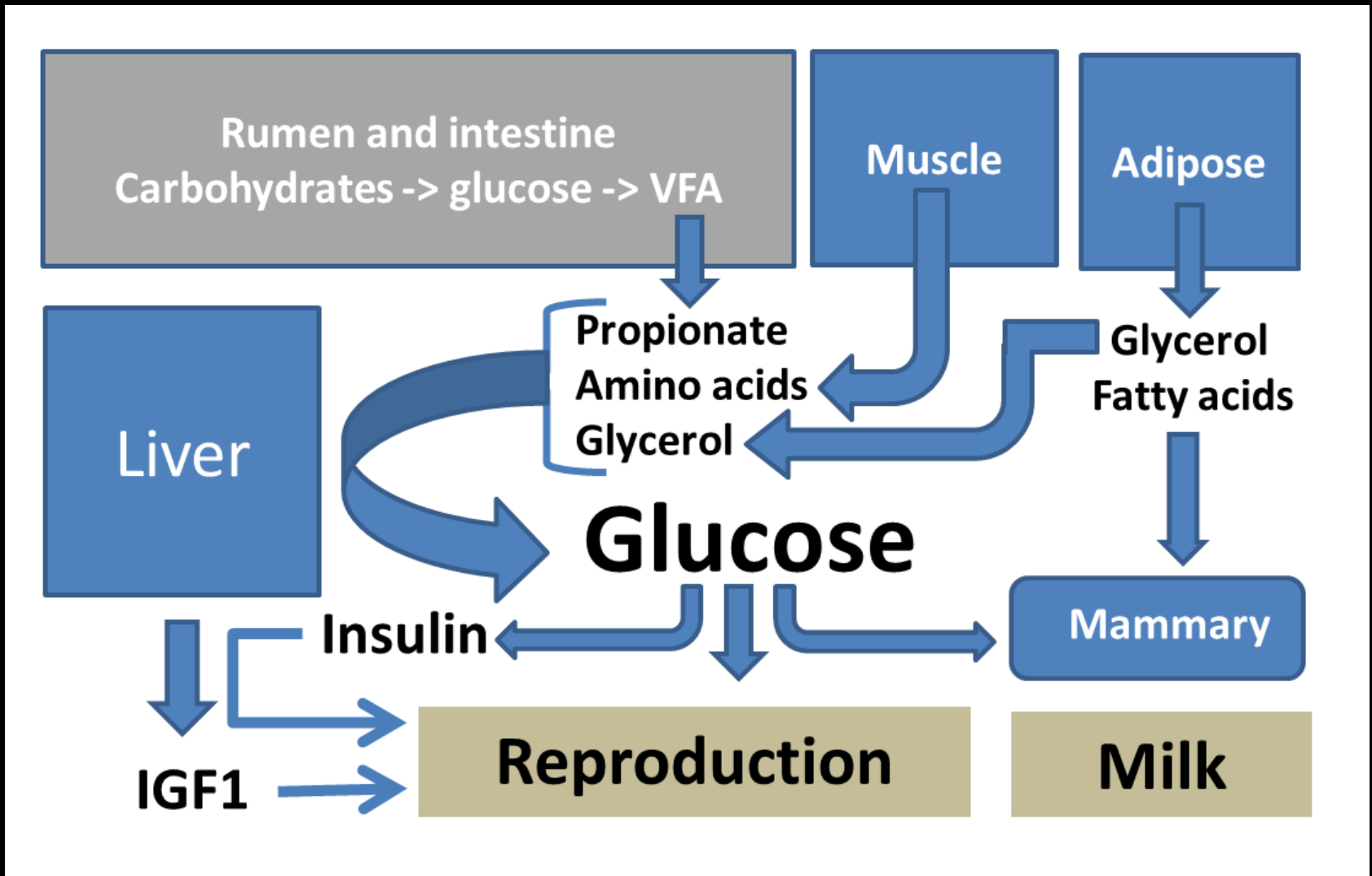


Bovine endometrium and embryo

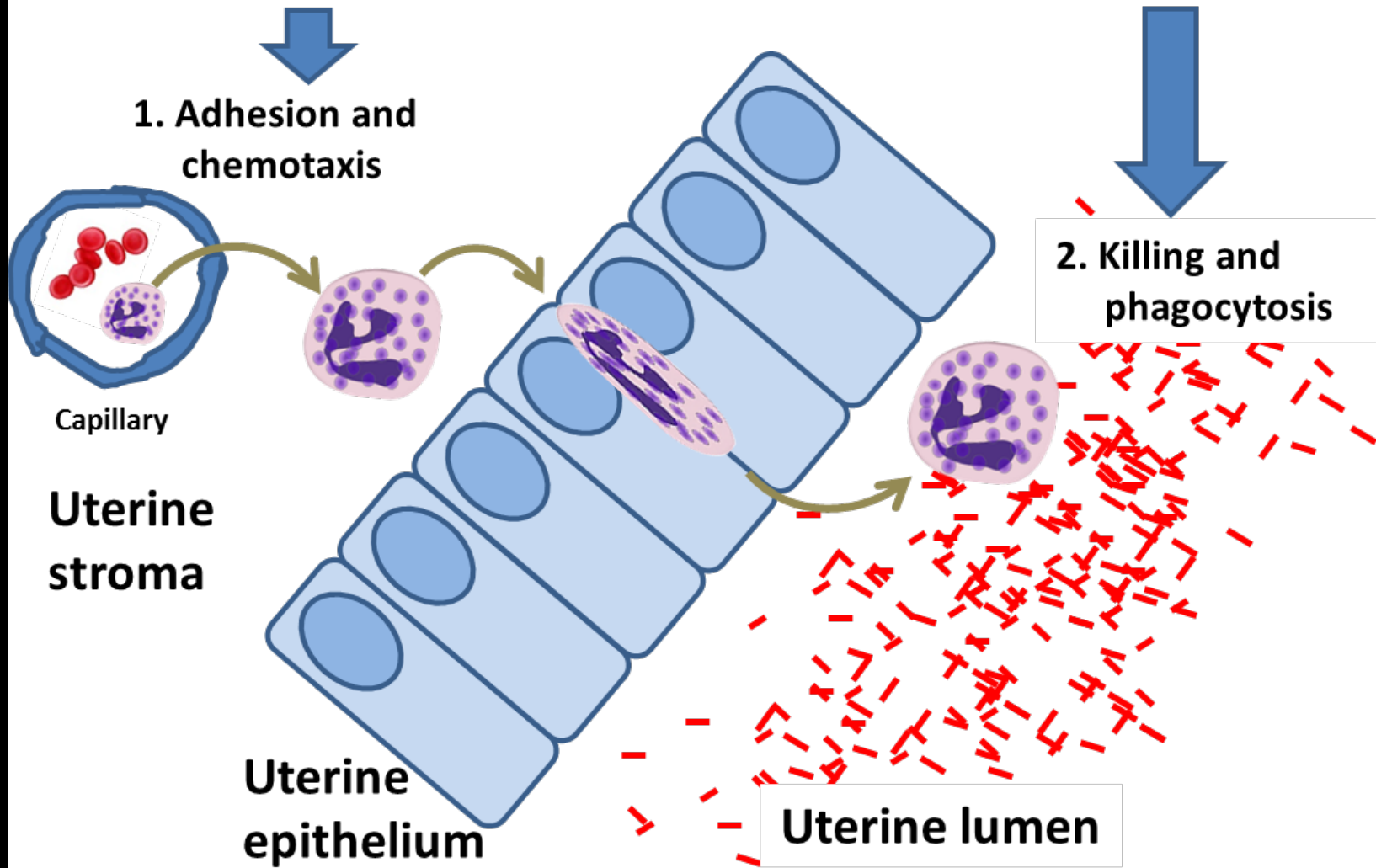


Endometrium

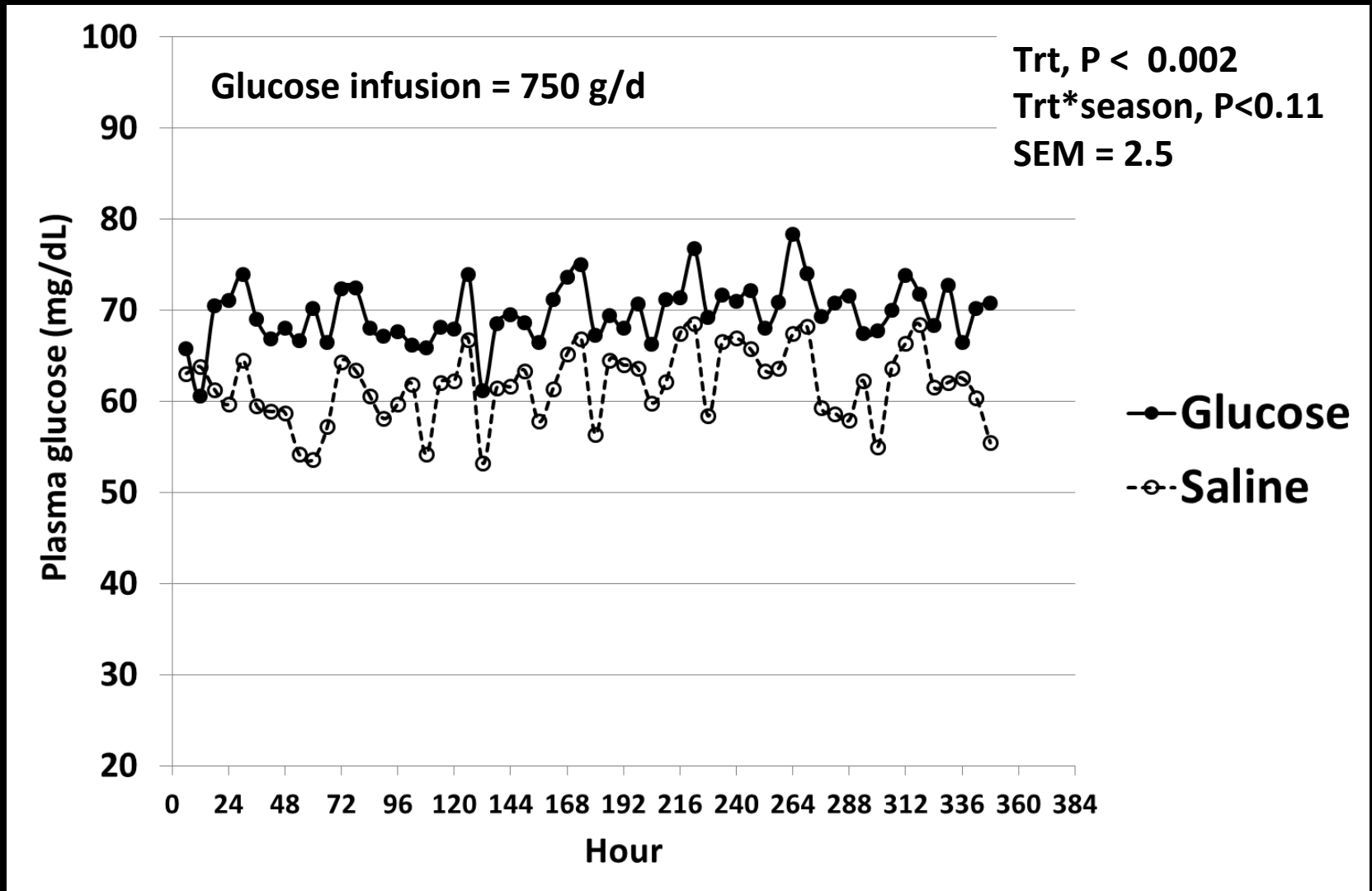
Embryo



Endocrine and metabolic environment of the postpartum cow



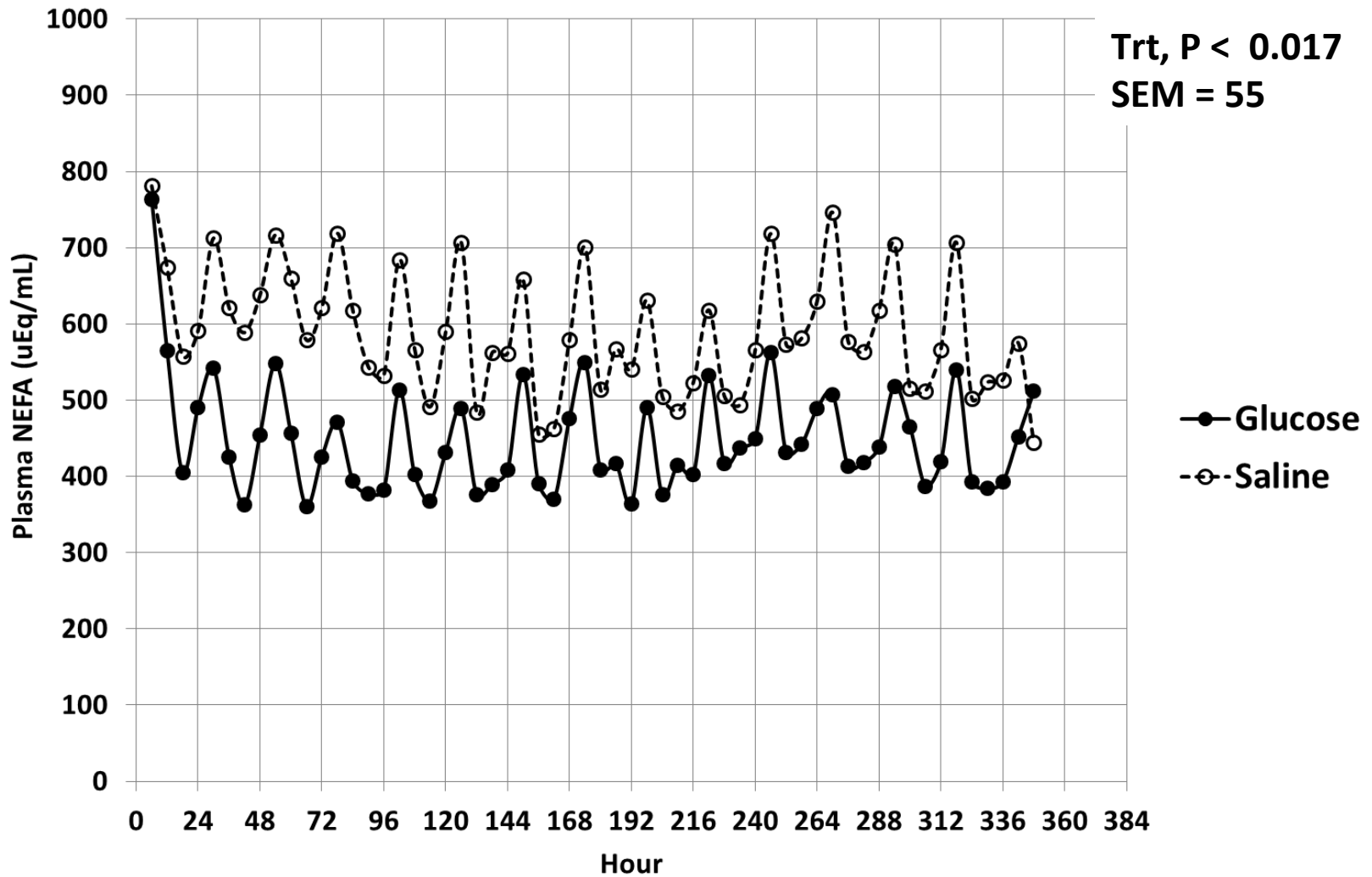
Plasma glucose concentrations



Glucose infusion = 750 g/d (approximately one-third requirement for milk production)

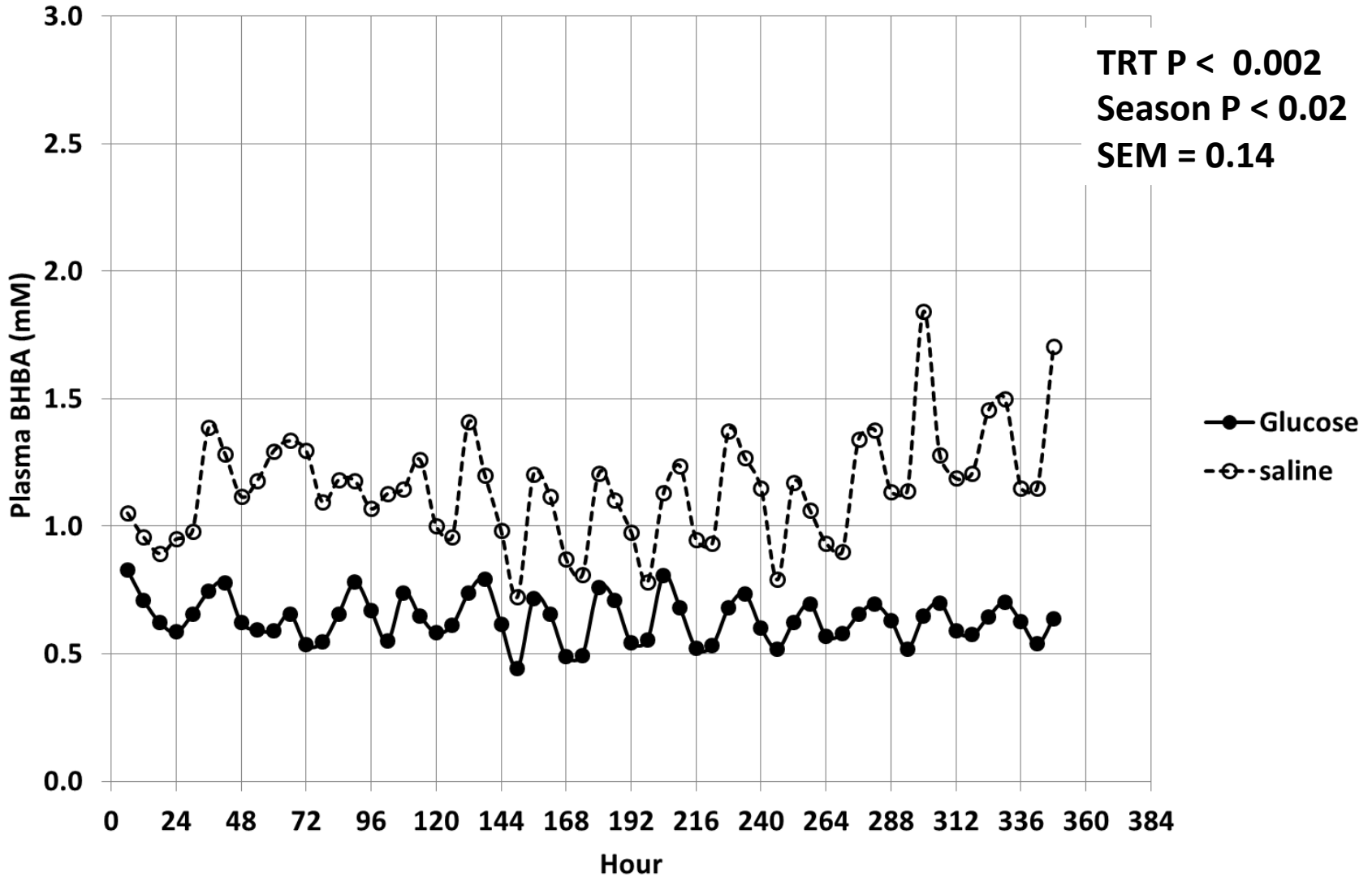
N = 11 cows per treatment

Plasma NEFA concentrations



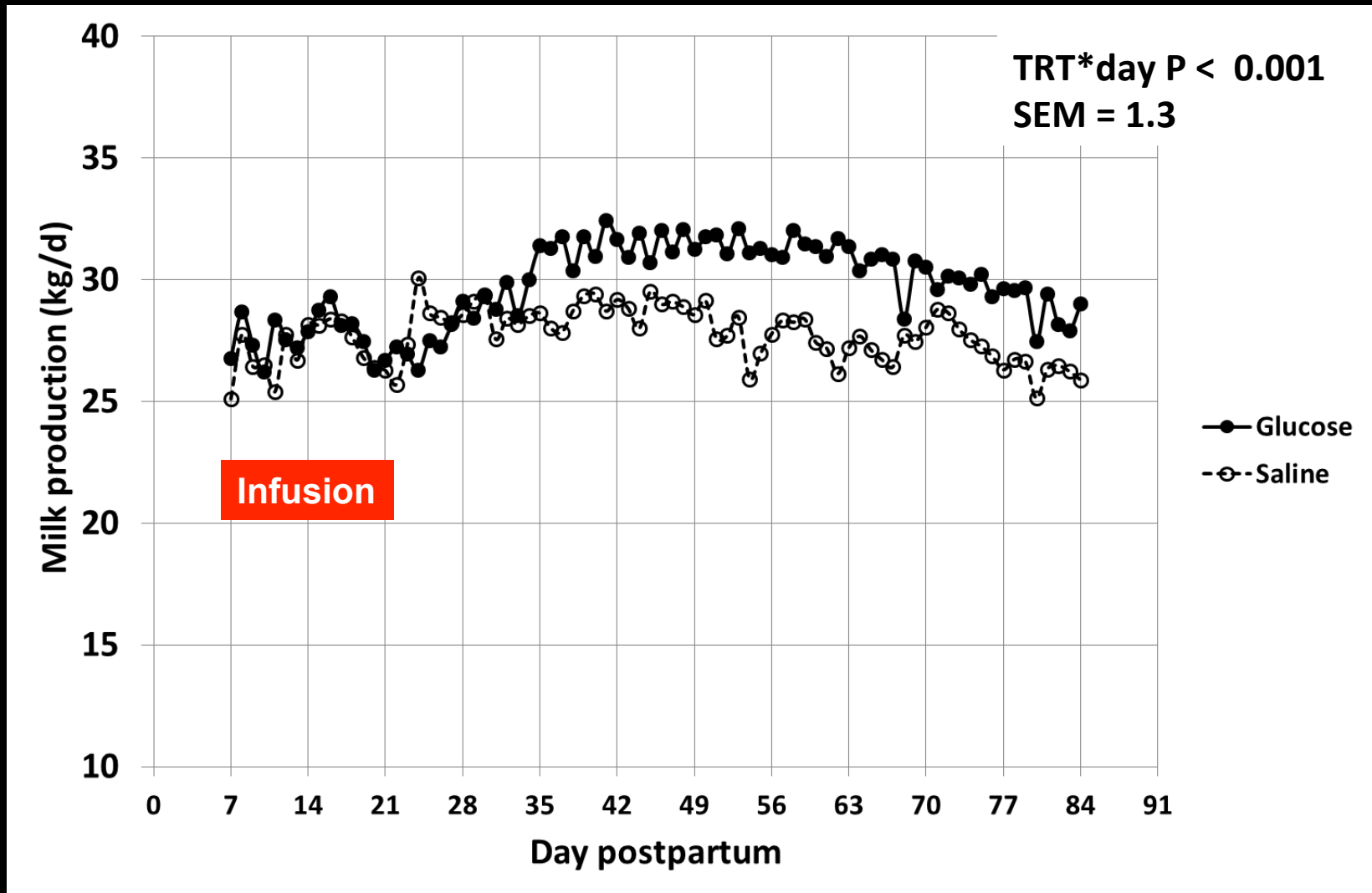
N = 11 cows per treatment

Plasma BHBA concentrations



N = 11 cows per treatment

Daily milk production per cow



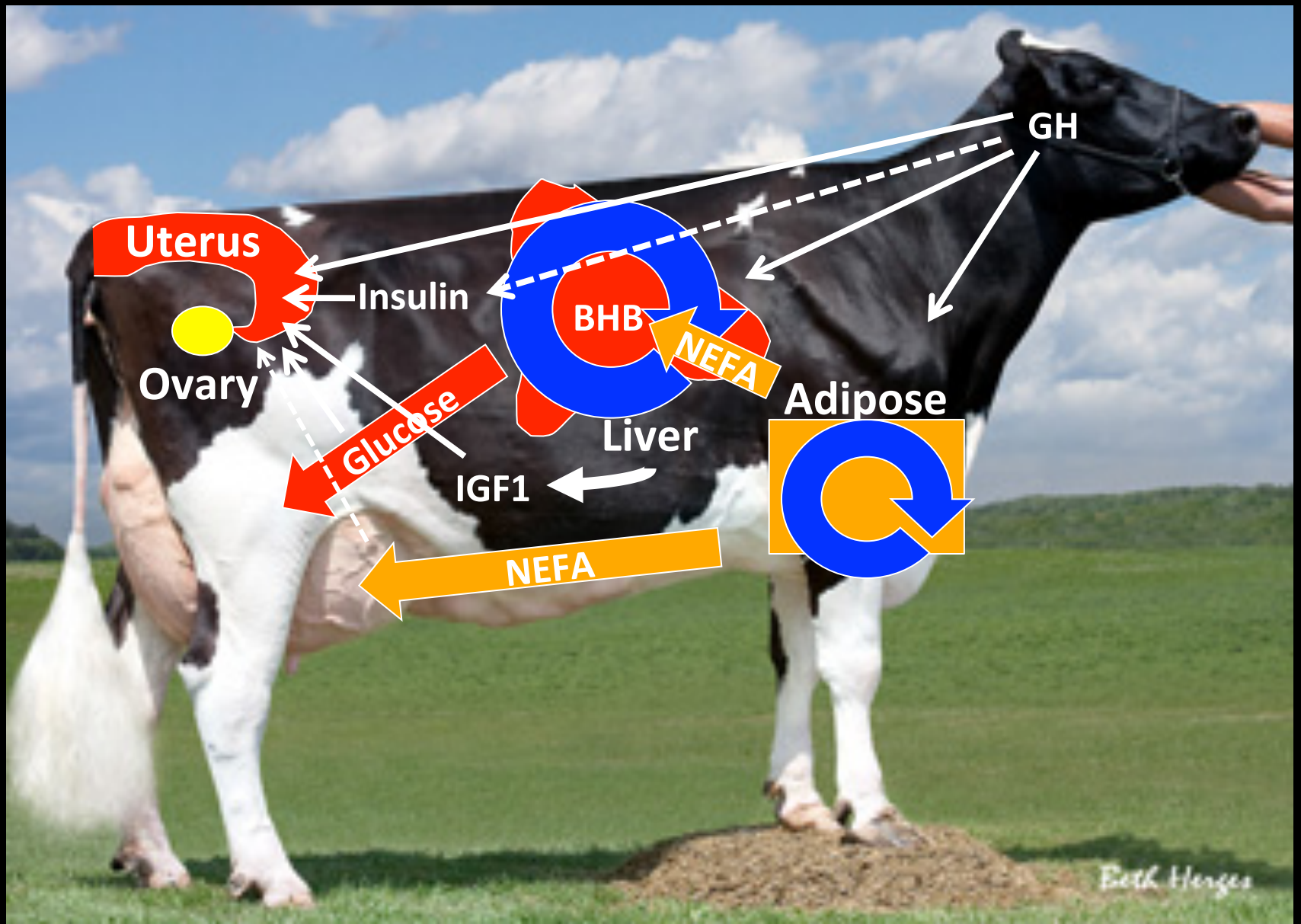
50 years of genetic selection



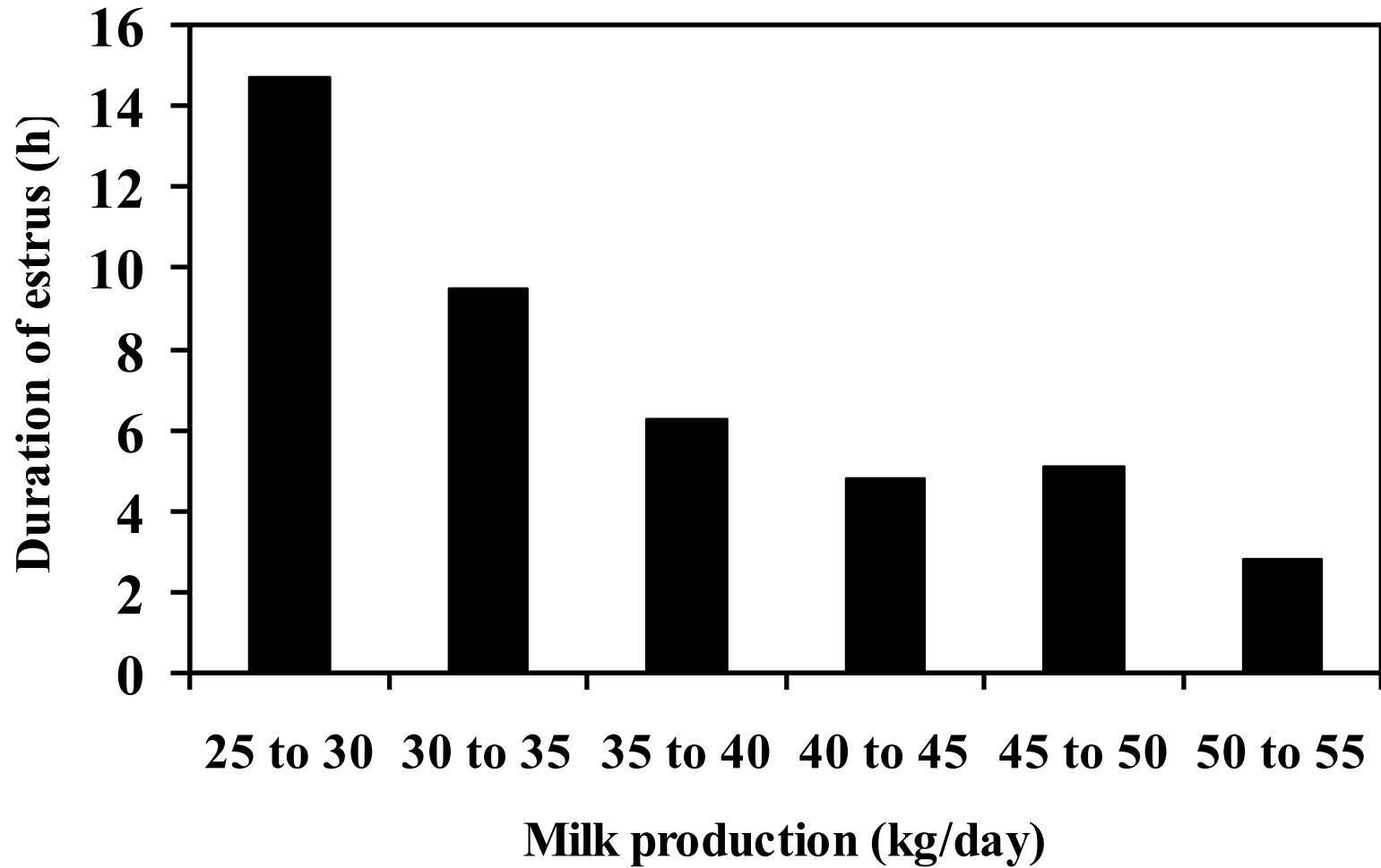
Linden Dictator Wimble Wimpy
EX-97 (USA)
Born: 10/09/50



Stone-Front Iron Pasta
EX-96-8Y (USA)
Born: 11/16/02

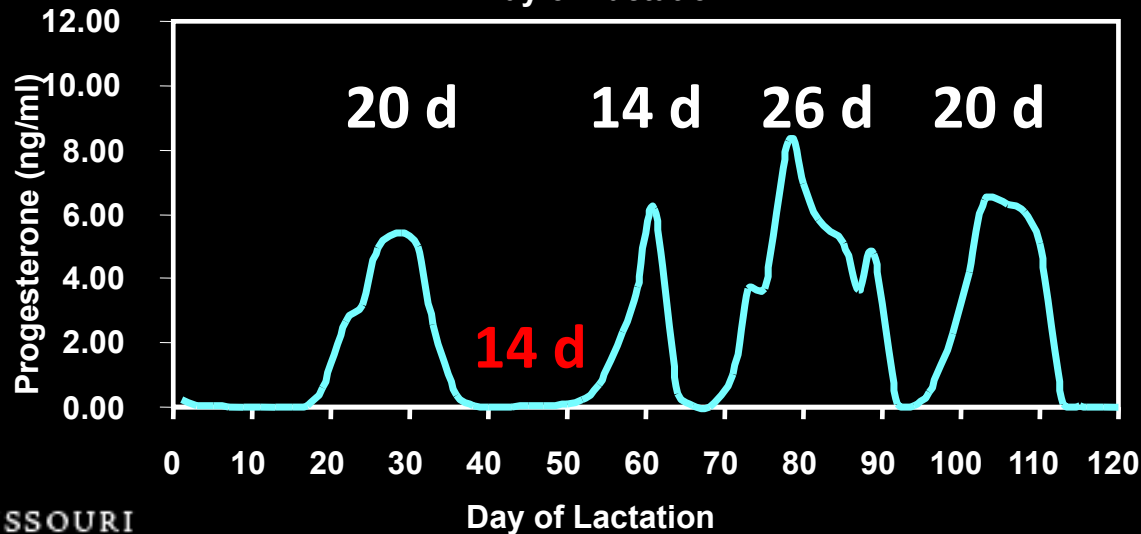
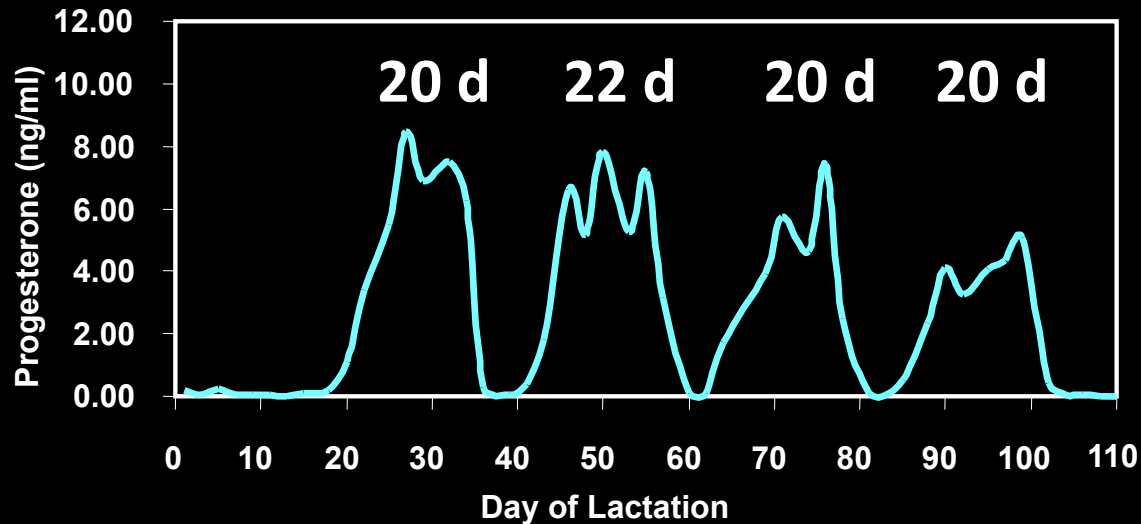


Milk production and duration of estrus

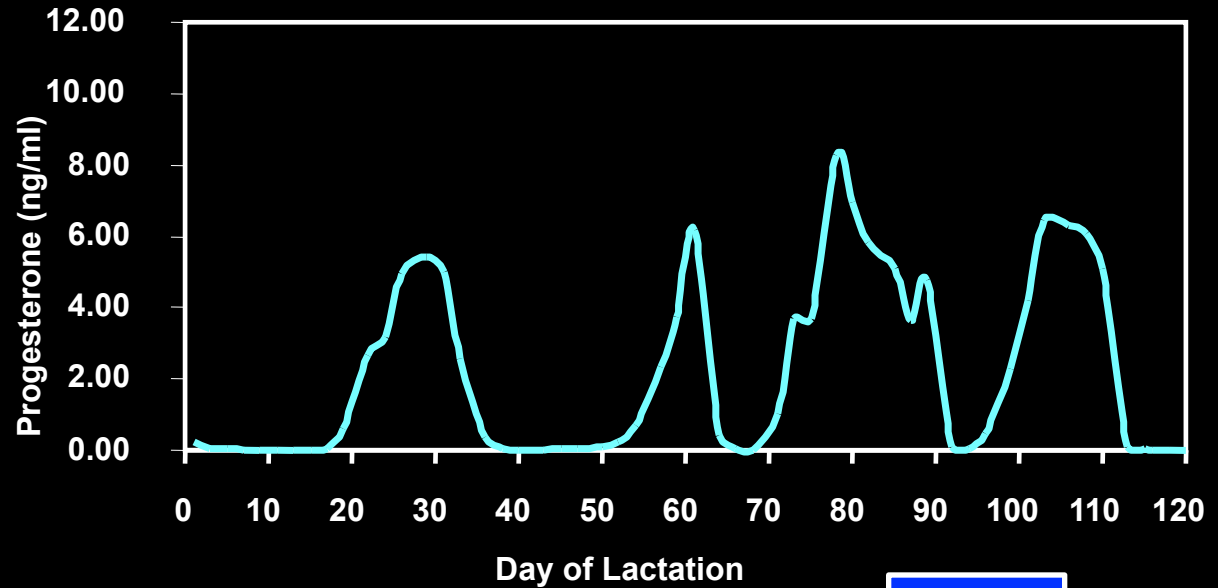


Regular and irregular estrous cyclicity

University of Minnesota selection project



Adapting to change



PD

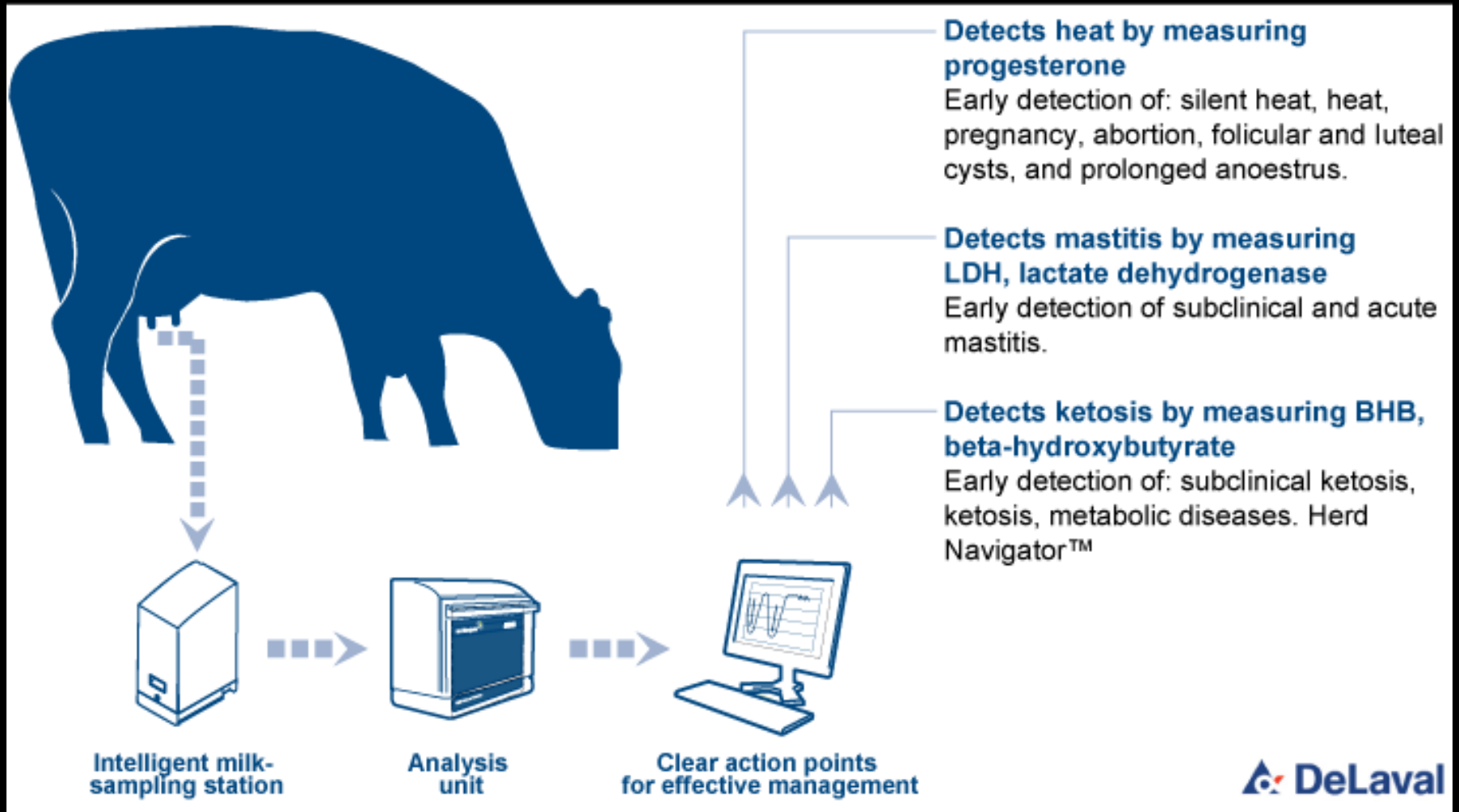


Presynch-Ovsynch-Resynch

Adapting to change: Improved systems for automated estrus detection



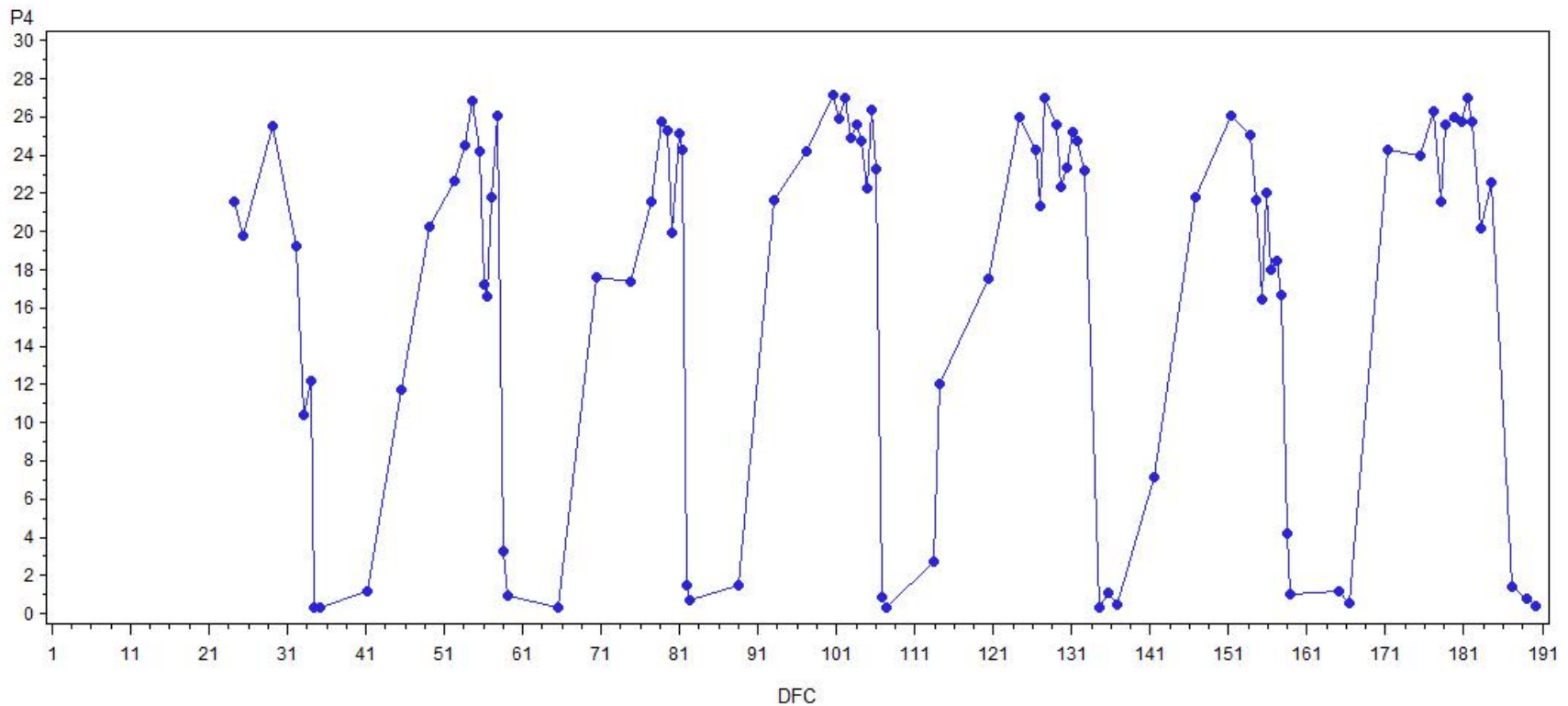
Herd Navigator System (DeLaval)



Herd Navigator System (DeLaval)

Milk progesterone - regular cycles

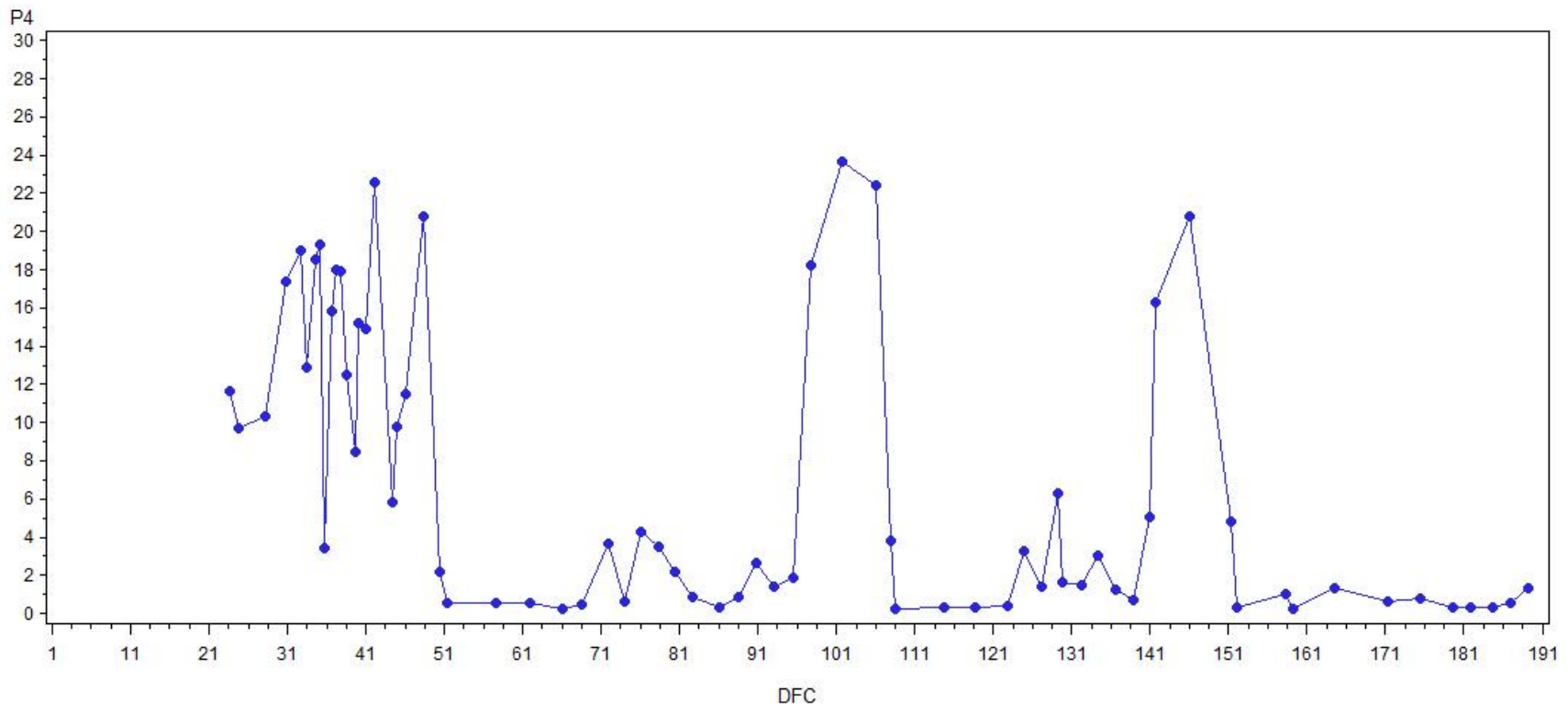
cow=380 parity=1



Herd Navigator System (DeLaval)

Milk progesterone - irregular cycles

cow=235 parity=3



Take home message

Listen to your
cow's ovaries . . .
they may be
trying to tell you
something!



Solutions – Diet and management

**Do not over-condition
dry cows**

Solutions – Diet and management

**Keep your cows clean,
comfortable and well-fed
(adequate starch) during
the transition period**

Solutions – Diet and management

**Rumen protected
carbohydrates**

Solutions – Diet and management

**Monitor glucose and BHB
concentrations**

NovaVet and Precision Xtra for measuring blood glucose and ketone cow side



Solutions

**Increase the number
of circulating neutrophils (PMN)
during the transition period**

Research Brief

Elanco

Imrestor

Imrestor™ (pegbovigrastim) effects on neutrophils in periparturient dairy cows

Background

Periparturient immune suppression contributes significantly to the economic losses of the dairy industry. High incidence of disease during this time period is at least partially due to decreased function of both neutrophils and lymphocytes. The functions of both cell types decrease gradually—beginning about 3 weeks before calving, reaching a low point at calving—and then gradually recover 3 or 4 weeks after calving.^{1,2} All cows undergo periparturient immune suppression to a certain degree, which has been associated with a higher incidence of mastitis, retained placenta, and metritis.^{3,4}

Neutrophils are the first line of defense against invading pathogens. Improving their function and numbers is critical to reducing the economic impact of immune suppression and improving animal well-being.

To assess the effects of pegbovigrastim on neutrophil function and numbers, studies were conducted at the Iowa State University (ISU) College of Veterinary Medicine. The hypothesis tested was that injection of pegbovigrastim at approximately 7 days before parturition and on the day of calving would help reverse the periparturient suppression of neutrophil function in dairy cows.

Trial Objectives

To assess the effects of pegbovigrastim on neutrophil function and numbers in periparturient dairy cows

Pegbovigrastim Mode of Action

Pegbovigrastim is the PEGylated form of the cytokine bovine granulocyte colony stimulating factor. Cytokines are protein messenger molecules that regulate the intensity and duration of the innate and acquired immune responses. Cytokine bovine granulocyte colony stimulating factor is a cytokine that regulates the growth and differentiation of the precursor cell in the bone marrow committed to forming neutrophils. The PEGylation increases the half-life of the protein messenger molecule from hours to days.

Solutions – Diet and management

Anti-inflammatory diets

WHY STRATA WORKS

STRATA™
WITH EPA/DHA OMEGA-3S



IT'S ABOUT BALANCE.

Adding EPA/ DHA omega-3s in early lactating lowers the omega ratio, supports a healthy immune status, and frees up energy to be redirected toward milk and reproduction.

Solutions

**Improve the genetics for
health and disease resistance**

CLARIFIDE® PLUS



WELLNESS IS NOW A PROFITABLE CHOICE

**FOR THE FIRST TIME, DAIRY PRODUCERS CAN GENETICALLY
SELECT HEIFERS TO BUILD A HEALTHIER HERD**

Now with CLARIFIDE® Plus, there is a way to improve health genetically with direct predictions of disease risks and selection indexes that balance selection emphasis based on the cost of disease. This single genetic test provides U.S. Holstein producers with unparalleled visibility into genetic potential for production, health, fertility, longevity and profitability.

zoetis®

Thank you!

