AGVANCE
Success. Together.

WEBINAR:

Setting the Cow Up for Success:

Tools for Cow Recovery Post-Calving

Presented by SHAUN BALEMI

OVERVIEW

1. Why put energy and resource into our close-up and colostrum cows?

2. Key things that are important to be over in our close-up and colostrum cows?

3. What feed, supplement & management levers can we pull to help with cow recovery post-calving?

QUESTION 1: WHY PUT ENERGY & RESOURCE INTO OUR COLOSTRUM COWS?

- ✓ Better cow health, lower staff stress, lower costs, stronger business
- ✓ Strong appetite
- ✓ Earlier and higher peak milk
- ✓ Better overall milk production
- ✓ Less days to first reproductive cycle
- ✓ Better six-week in-calf rate
- ✓ Less bad inflammation upsetting immune function
- ✓ Less metritis/endometritis, lower SCC
- ✓ Minimum condition loss post-calving
- ✓ Setting up for less lameness

RESEARCH OVERVIEW: OVERVIEW IMMUNE & METABOLIC DYSFUNCTION

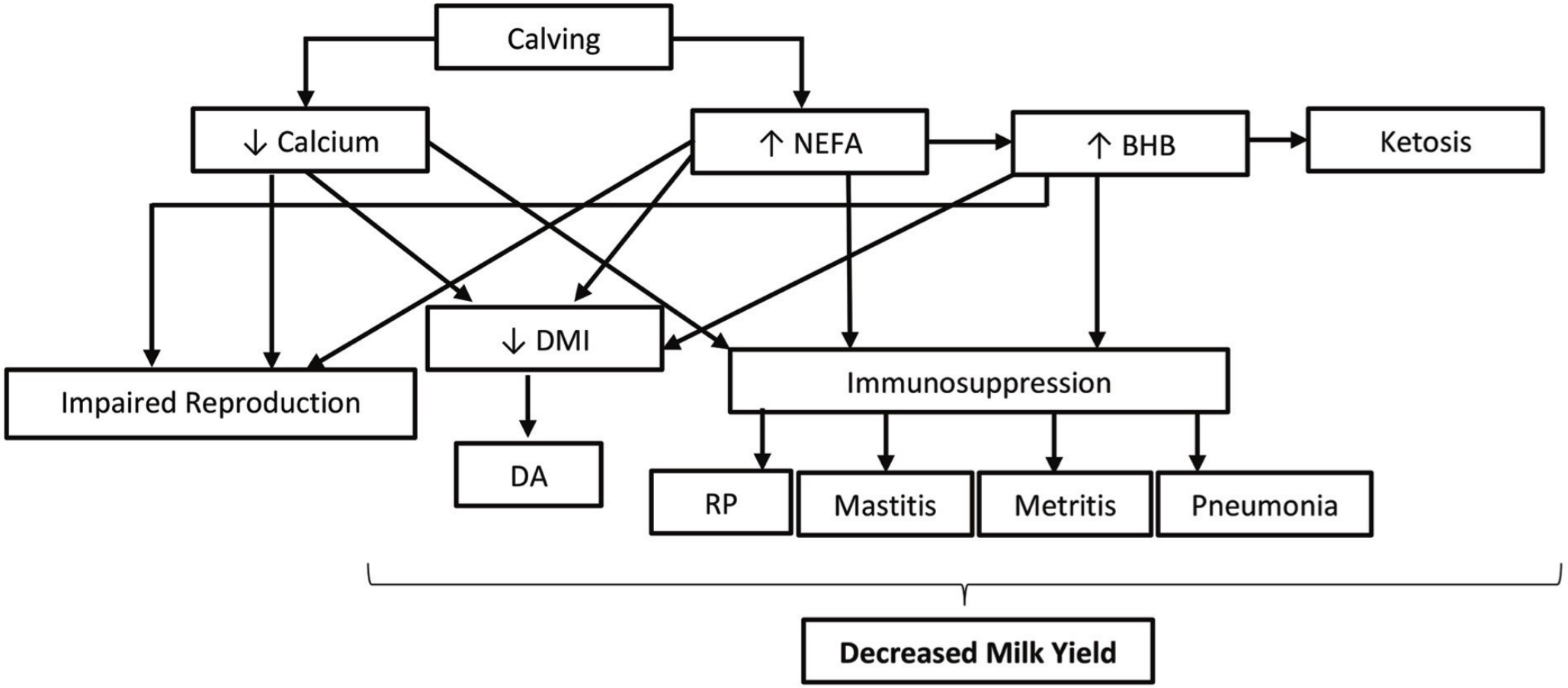
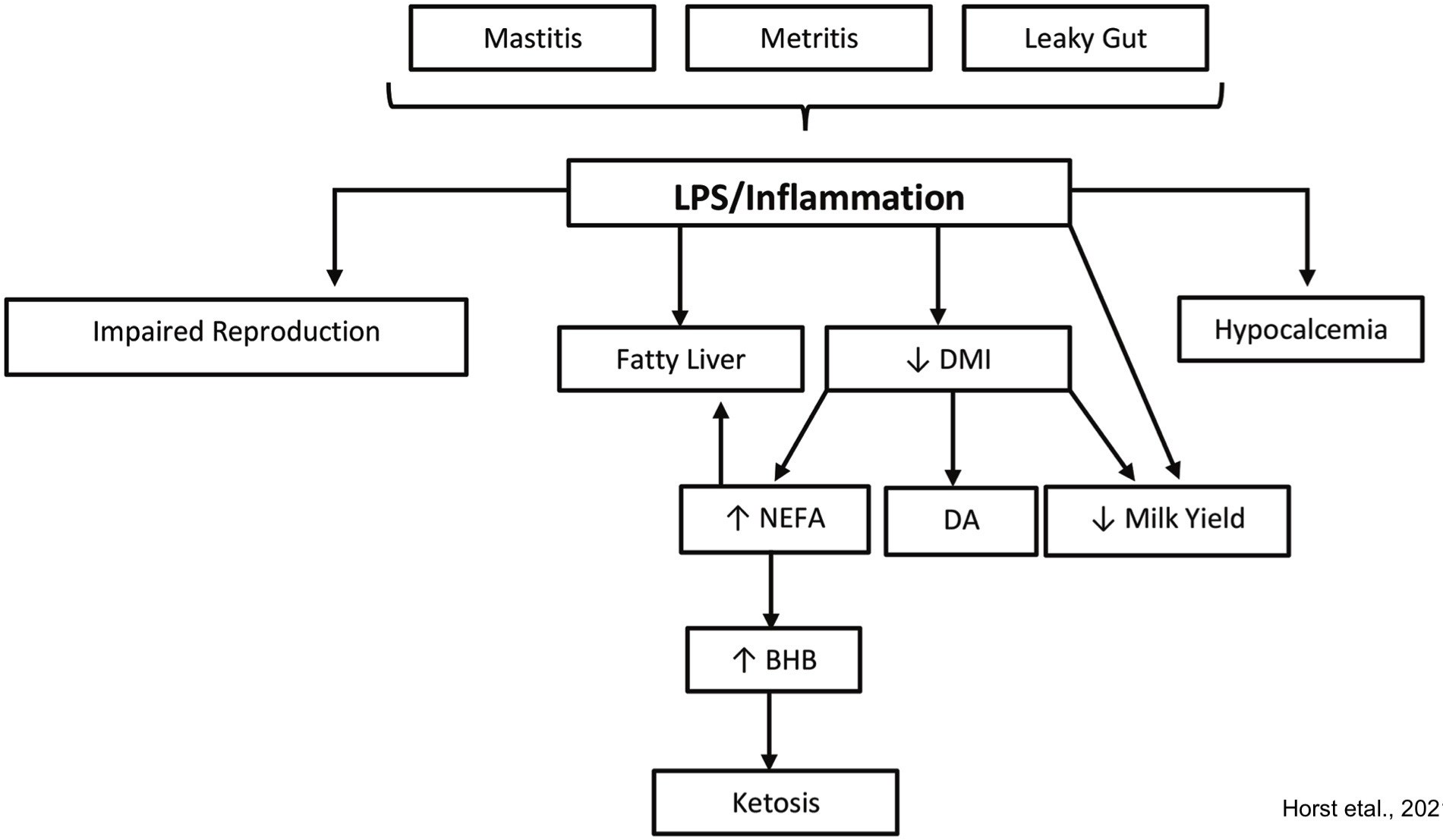


Figure 1. Traditional mechanisms by which hypocalcemia and increased nonesterified fatty acids (NEFA) and hyperketonemia are thought to cause poor transition cow health and performance. DA = displaced abomasum; RP = retained placenta. Horst et al., 2021

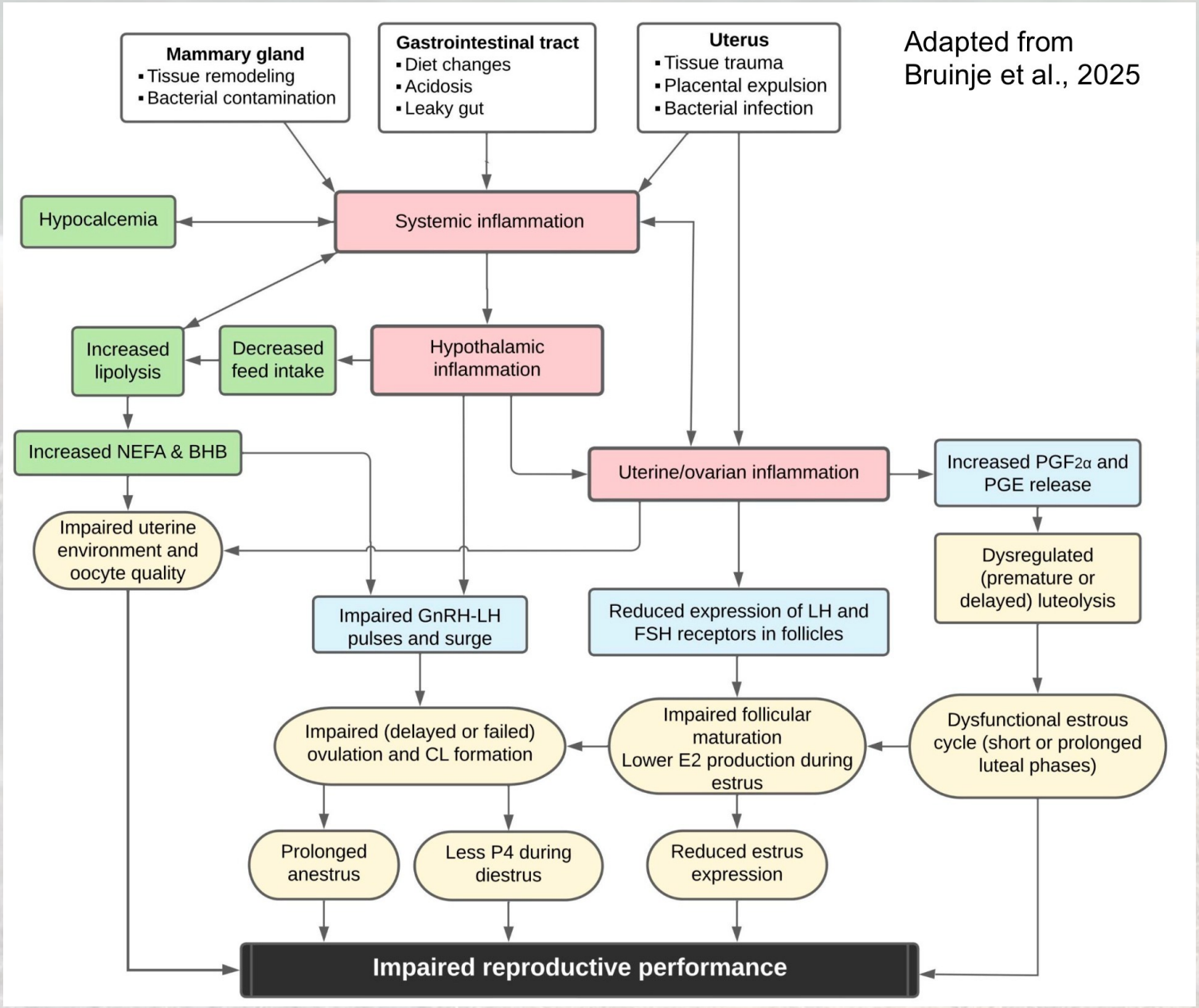
RESEARCH OVERVIEW: OVERVIEW INFLAMMATION

Horst et al.: INVITED REVIEW: IMMUNE ACTIVATION AND TRANSITION COW DISORDERS 8387

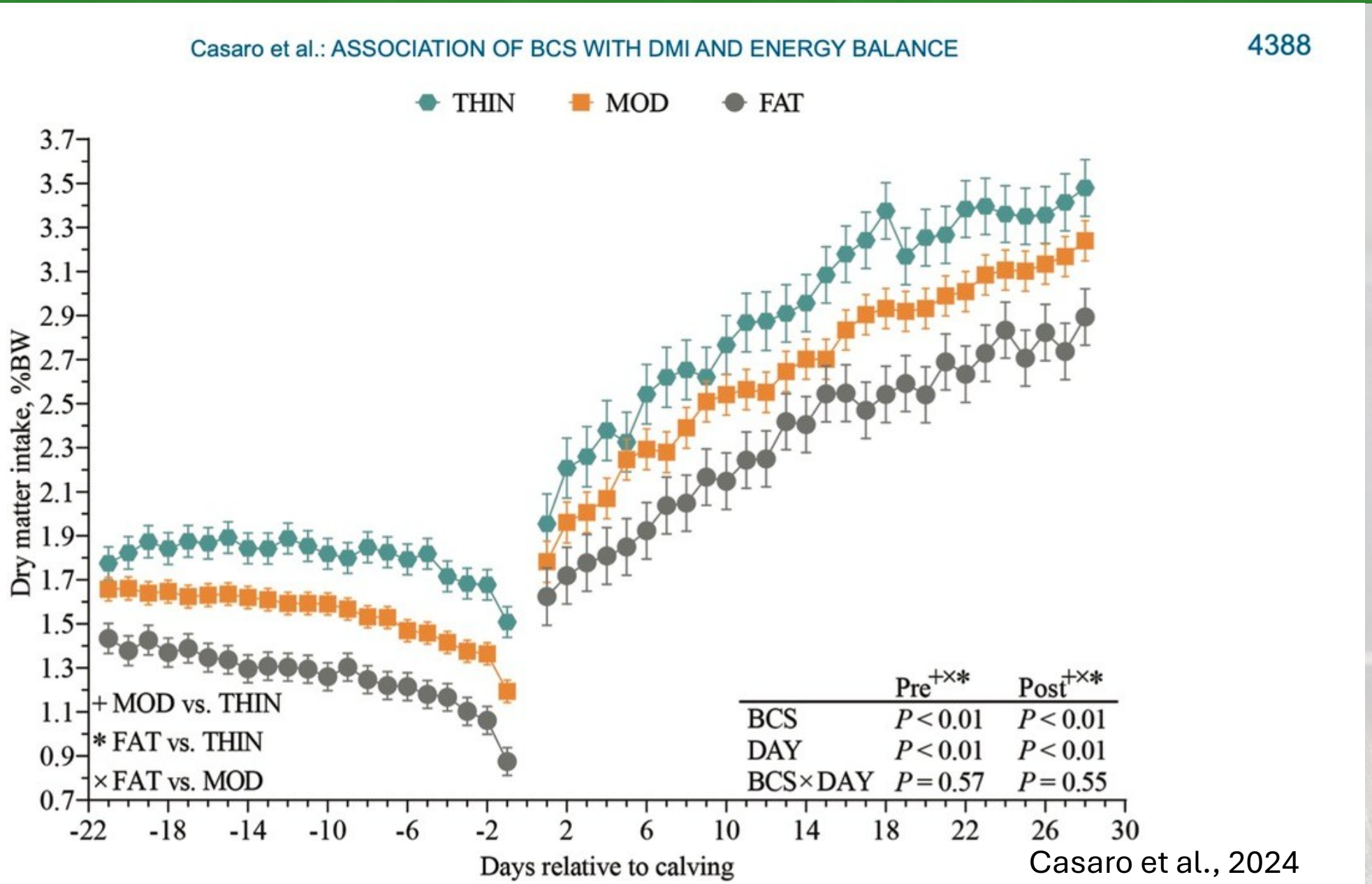


Horst etal., 2021

RESEARCH OVERVIEW: INFLAMMATION & REPRODUCTION



RESEARCH OVERVIEW: BCS & DMI POSTPARTUM



Casaro et al., 2024

THIN = <4.8

MOD = 4.8-5.2

FAT = >5.2

Table 5. Effects of prepartum skeletal muscle reserves and BCVFA supplementation on pre- and postpartum DMI, feed efficiency, milk yield, ECM, and milk components[1]

	High muscle		Low muscle			*P*-value[2]		
Item	CON	BCVFA	CON	BCVFA	SEM[3]	Group	Treatment	Group × Treatment
Prepartum DMI, kg/d	13.4	14.0	13.0	13.8	0.18	0.07	<0.01	0.45
Postpartum DMI, kg/d	19.8	20.2	18.7	20.3	0.32	0.08	<0.01	0.05
Milk yield, kg/d	37.6	39.5	35.5	36.9	2.03	0.23	0.39	0.90
ECM,[4] kg/d	45.4	47.0	39.1	40.1	1.90	<0.01	0.50	0.86
NE_L milk,[5] Mcal/d	33.7	32.8	29.0	28.2	1.38	<0.01	0.53	0.94
Fat, kg	1.83	1.81	1.57	1.55	8.0	<0.01	0.88	0.67
Protein, kg	1.27	1.31	1.13	1.17	6.0	0.02	0.49	0.95
Lactose, kg	1.88	1.94	1.54	1.72	9.0	<0.01	0.17	0.50
Solids, kg	5.36	5.38	4.44	4.73	2.6	<0.01	0.55	0.62
MUN, mg/dL	12.3	11.3	12.3	11.3	0.46	0.98	0.03	0.97
Fat, %	4.88	4.71	5.05	4.46	0.16	0.84	0.02	0.20
Protein, %	3.38	3.33	3.72	3.39	0.11	0.07	0.09	0.21
Lactose, %	4.88	4.80	4.69	4.81	0.05	0.07	0.69	0.05
Solids, %	14.05	13.38	13.81	13.35	0.34	0.68	0.11	0.76
FE,[6] kg/kg	2.58	2.64	2.53	2.32	0.14	0.17	0.59	0.32

[1]Cows were assigned to muscle group based on longissimus dorsi depth (LDD) −42 d before expected calving. High muscle LDD was >4.6 cm. Low muscle LDD was ≤4.6 cm. There were 4 combinations of group × treatment, which include HM-BCVFA, HM-CON, LM-BCVFA, and LM-CON, with the following numbers of cows in each group, respectively: n = 13, n = 13, n = 11, n = 11.

[2]*P*-values associated with group effects (HM vs. LM), treatment effects (BCVFA vs. CON), and the interaction between group and treatment.

[3]SEM determined by the largest group × treatment standard error of the mean.

[4]Energy-corrected milk = (0.327 × kg of milk) + (12.95 × kg of milk fat) + (7.20 × kg of milk protein); Tyrrell and Reid, 1965.

[5]Net energy for milk (Mcal/d) = (9.29 × milk fat concentration + 5.85 × milk protein concentration + 3.95 × milk lactose concentration) × milk yield; NASEM, 2021.

[6]FE = feed efficiency as ECM/DMI.

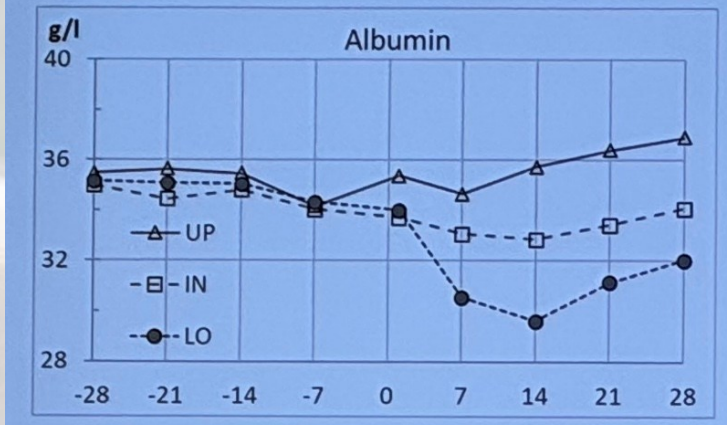
Gouveia et al., 2024

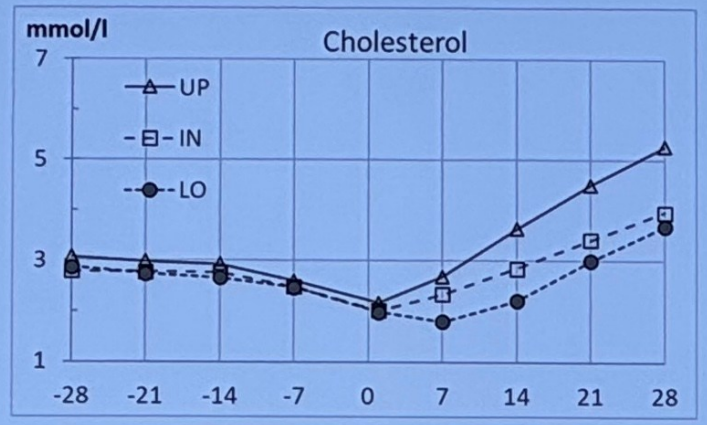
High muscle >4.6cm

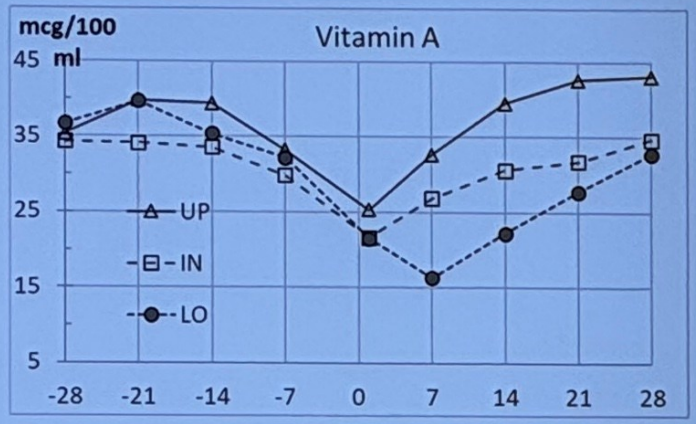
Low muscle <4.6cm

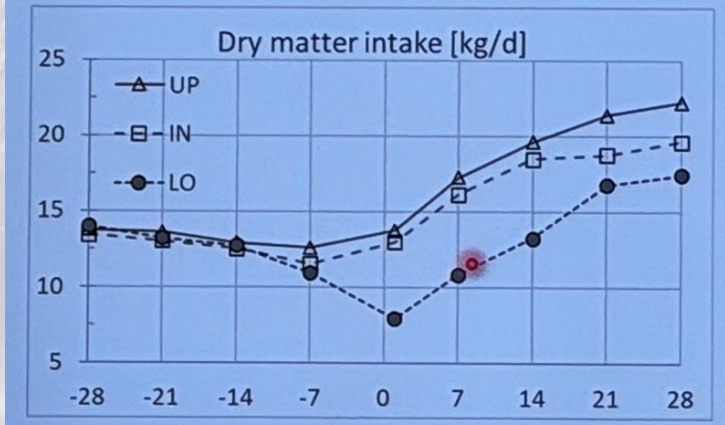
NEW RESEARCH: LIVER ACTIVITY INDEX & DMI, EB & PRODUCTION

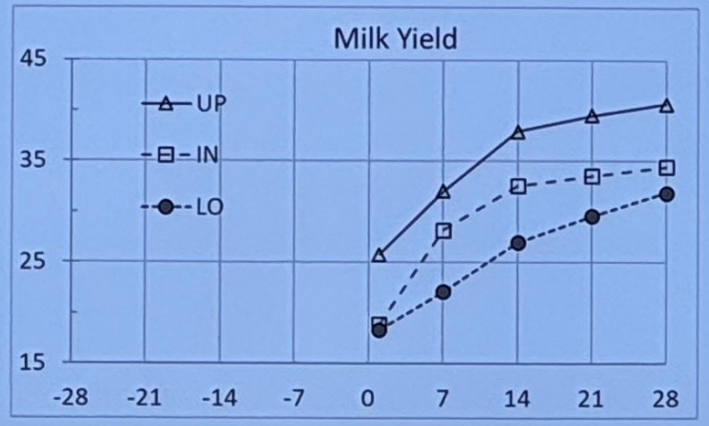
Effects of liver activity index on DMI and energy balance

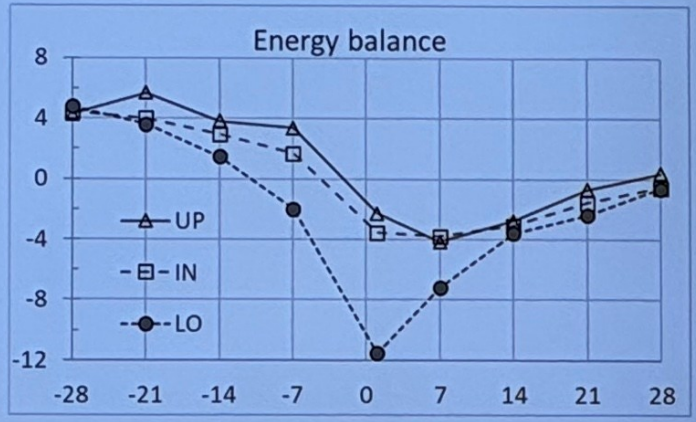








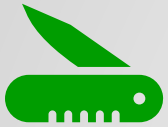




Drackley et al., 2024

Bertoni & Trevisi 2013 & Drackley et al., 2024

QUESTION 2: WHAT'S IMPORTANT TO BE OVER IN OUR COLOSTRUMS



- Feed and water
- Rumination and appetite
- Blood indicators
- Postpartum disease
- Cow condition
- Cow comfort/stress

FEED & WATER

WATER

- Clean
- Easy access
- More water = More feed

FEED

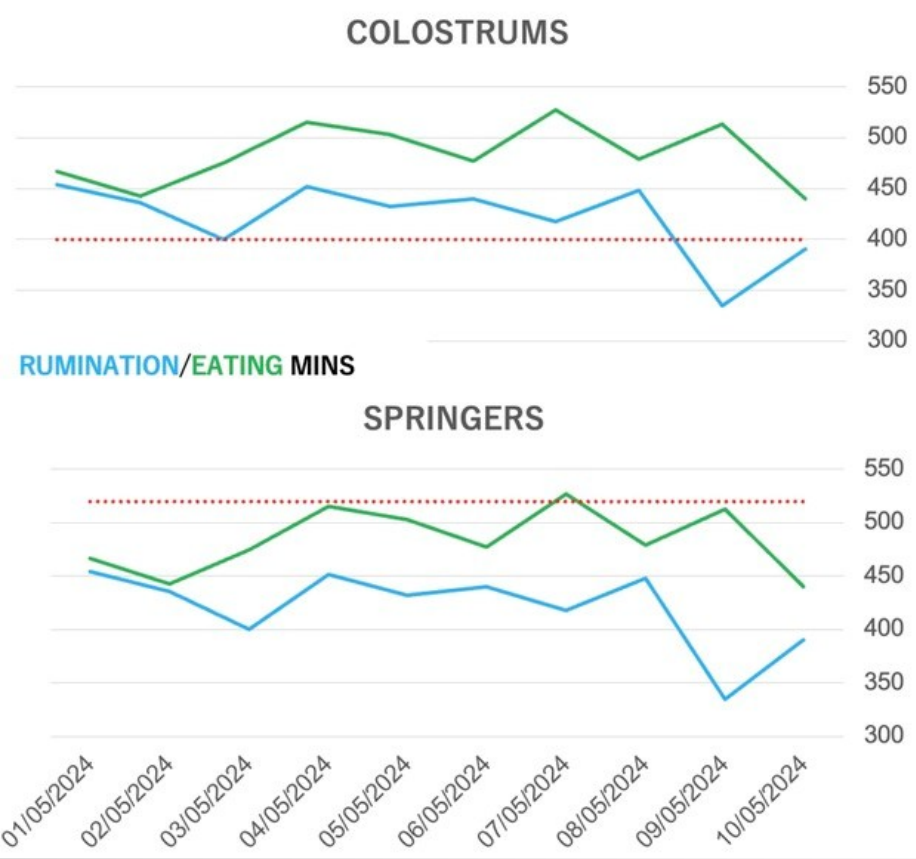
- Correct balance of NDF, ME & CP
- Match transition feeds
- Ad-lib highly palatable fibre - hay is best!
- Quality is king!
- Minimal/Zero soil important
- Use palatable forms of calcium on feed

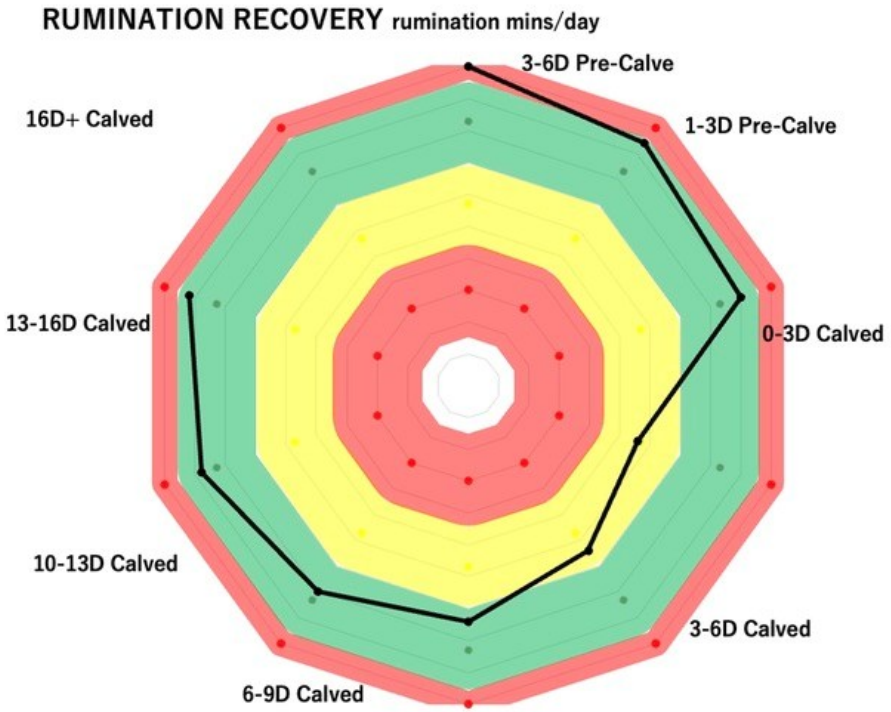
RUMINATION & APPETITE

RUMINATION = >70% of pre-calving mins

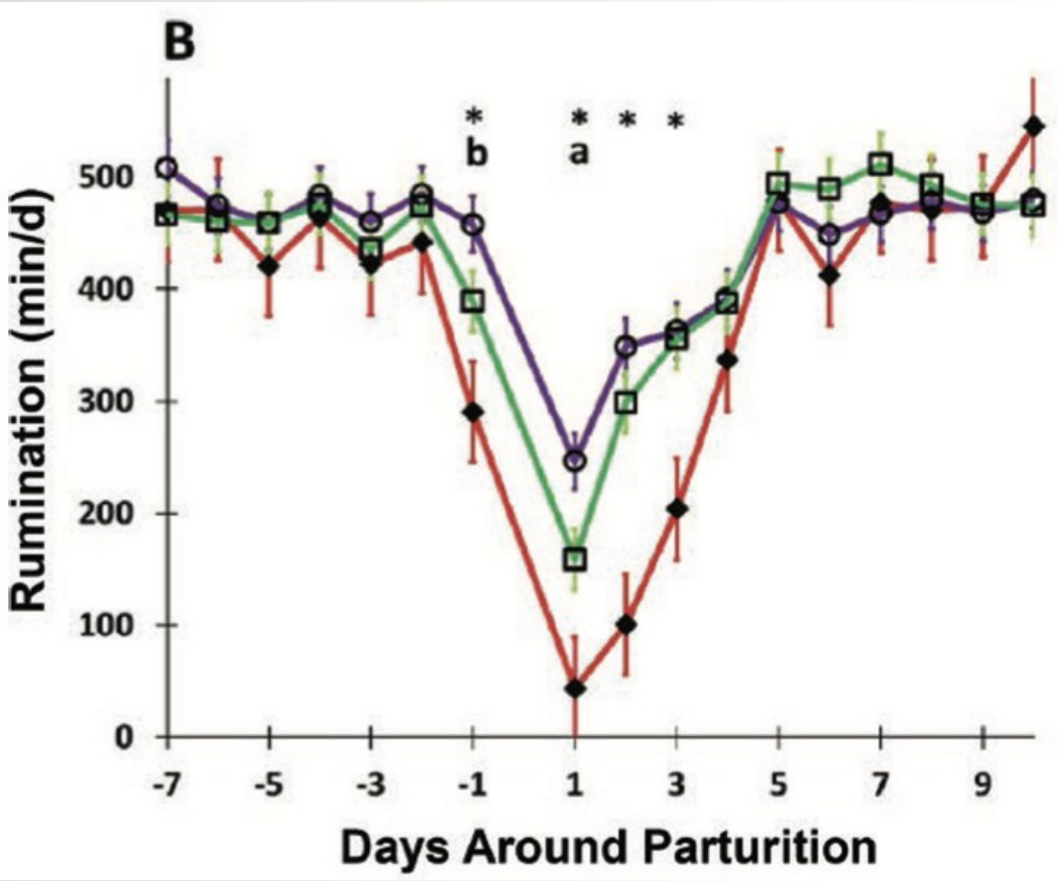
ACTIVITY/EATING = Track with rumination

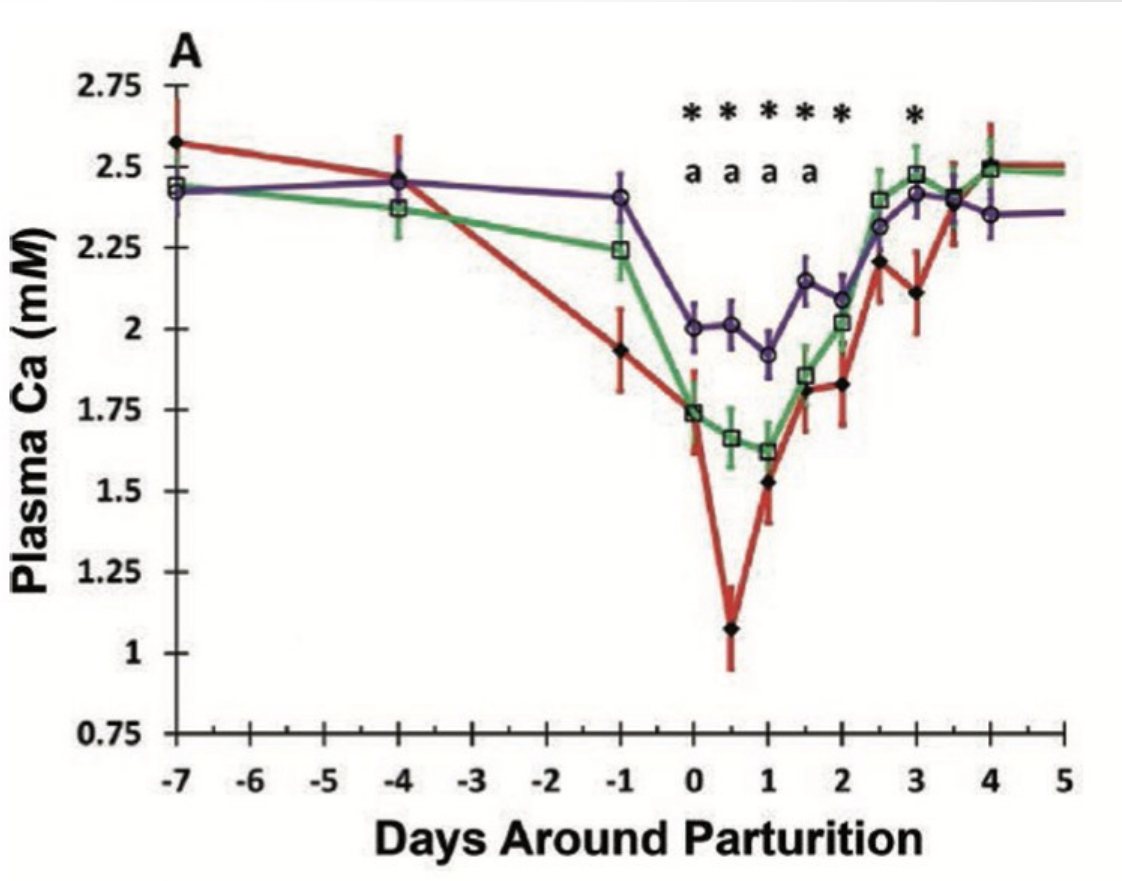
<u>Keep on OAD until rumination above target</u>





RUMINATION & APPETITE





Goff et al., 2020

BLOOD INDICATORS

TESTING = 5 x transition, close-up, colostrum, milkers

1. Calcium

2. Phosphorus

3. Magnesium

4. Selenium & zinc

5. NEFA & BOHB

Liver health index: Albumin, cholesterol & vitamin A

Inflammation: Haptoglobin & bilirubin

Oxidative status: Glutathione peroxidase (GPx) & aspartate transaminase (AST)

BLOOD INDICATORS

- **NEFA** = Non-esterified fatty acids & **BOHB** = Beta hydroxy butyrate
  - NEFA = Amount of fat the cows are mobilising
  - BOHB = How much fat the liver is processing and how efficiently

- **Albumin**
  - Indicates how well the liver is functioning and if there is a potential protein deficiency in the diet

- **Glucose**
  - Glucogenesis and gluconeogenesis performance/capacity of the liver

- **Cholesterol**
  - Useful indicator of energy status and productive capacity

- **Urea** or **BUN** = Blood urea nitrogen
  - Gives an indication of urea utilisation efficiency, alongside telling us if protein and energy are in balance

- **AST** = Aspartate transaminase & **GGT** = Gama glutamyl transferase
  - Tells us if the liver is damaged and is not functioning well, can be used alongside haptoglobin levels

- **GPx** = Glutathione peroxidase – antioxidative capacity in the cow

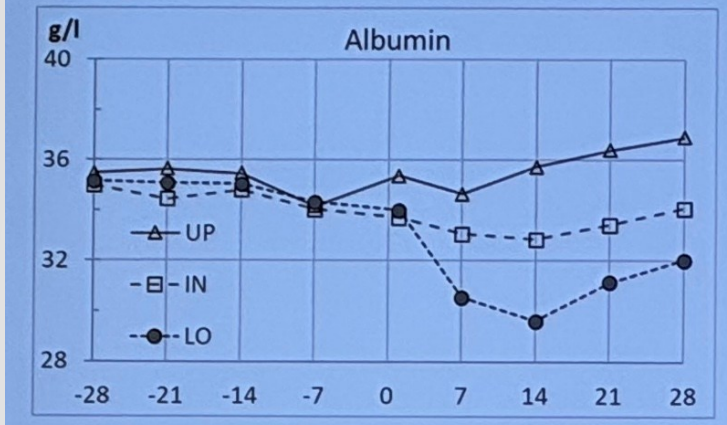
BLOOD INDICATORS

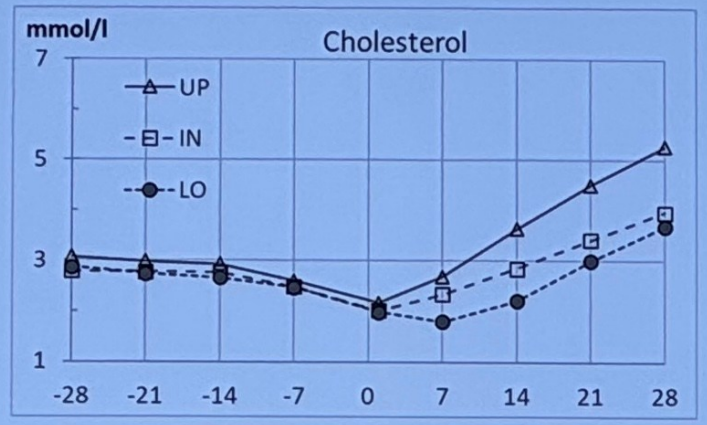
Plasma parameter	Dry cow	Milker
NEFA (mmol/L)	0-0.3	0.2-0.6
BOHB (mmol/L)	0-0.2	0.2-0.8
T Cholesterol (mmol/L)	1.5-3	3-6
Albumin (mmol/L)	32-34	34-38
Vitamin A (mcg/100)	30-35	35-45
Glucose (mmol/L)	>800	>800
Creatinine (umol/L)	120	110
Urea (mmol/L	5.07	6.71
AST (IU/L)	<70	<80
GGT (IU/L)	<38	<45

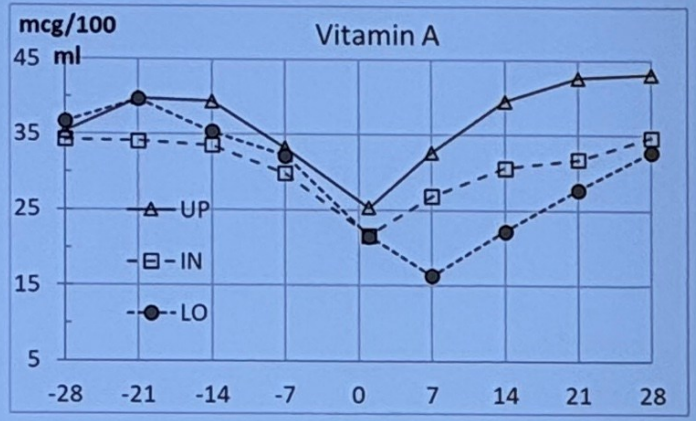
Plasma parameter	Dry cow	Milker
Calcium (mmol/L)	2.33-2.71	2.28-2.69
In phosphorous (mmol/L)	1.8-2.83	1.8-2.46
Magnesium (mmol/L)	0.84-0.98	0.85-0.98
Zinc (umol/L)	12-20	12-20
GPx selenium (U/L)	>800	>800

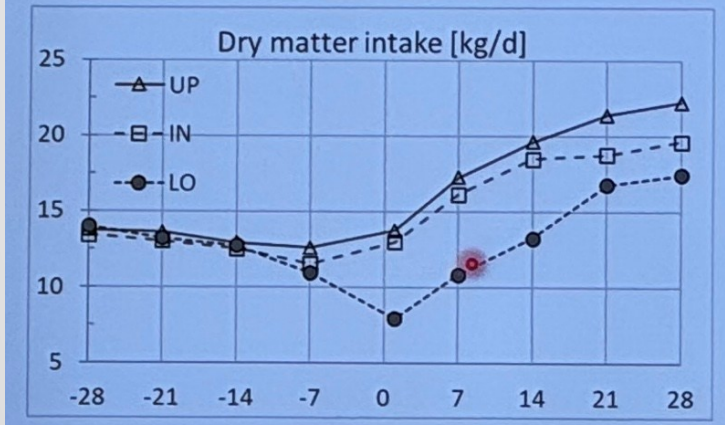
Bertoni & Trevisi 2013, Zhang et al., 2023, Veshkini et al., 2023 & Drackley et al., 2024

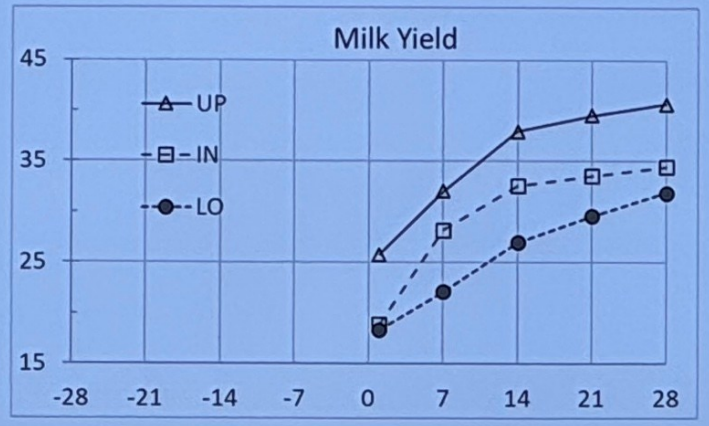
Effects of liver activity index on DMI and energy balance

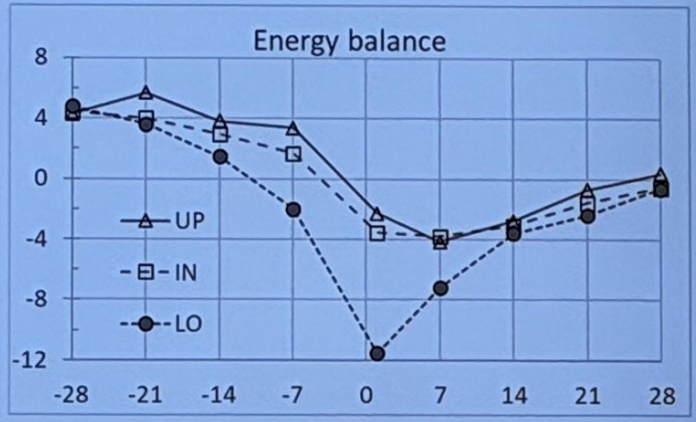






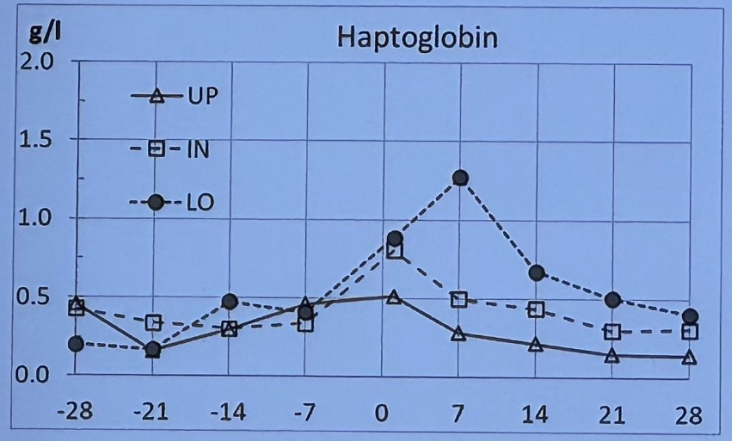


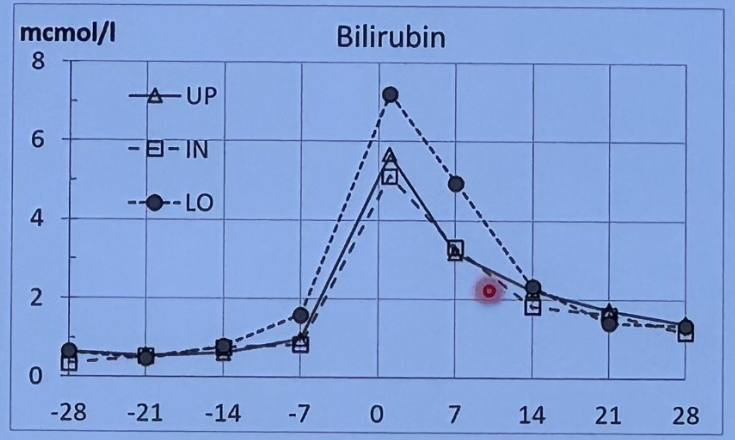


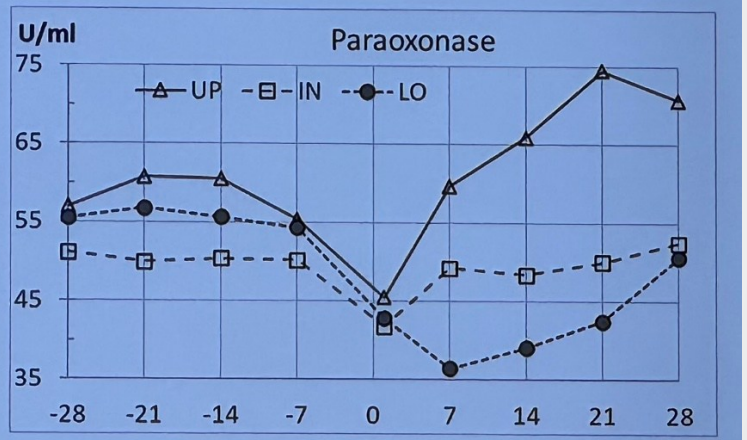


Drackley et al., 2024

Liver activity index is associated with inflammation







Drackley et al., 2024

Table 2. Pattern of changes (average and SEM) of negative (paraoxonase) and positive acute phase proteins (haptoglobin and ceruloplasmin), and some related parameters in lower (LO), lower intermediate (INLO), upper intermediate (INUP), and upper (UP) quartiles of liver activity index (LAI)[1]

		LAI quartile					*P*-value		
Item	DIM	LO	INLO	INUP	UP	SEM	Model	LAI	LAI × DIM
Vitamin E (μg/mL)	7	0.72	0.94	1.50*	1.14	0.3078	0.008	0.002	0.218
	14	0.60	0.99	1.92**	1.14				
	35	1.64	2.47*	2.69**	2.57**				
Total bilirubin (μmol/L)	7	15.7	7.7*	6.6**	8.1**	1.7145	0.075	0.057	0.241
	14	7.9	4.9	4.5	5.0				
	35	1.6	3.0	1.4	1.7				
Paraoxonase (U/mL)	7	51.1	64.4	75.6**	74.3**	8.3050	0.001	0.013	0.052
	14	61.3	74.4	90.8**	92.3**				
	35	86.8	83.7	100.1	83.5				
Haptoglobin (g/L)	7	0.94	0.82	0.44**	0.56*	0.1690	0.052	0.090	0.469
	14	0.48	0.42	0.24	0.37				
	35	0.20	0.31	0.13	0.28				
Ceruloplasmin (μmol/L)	7	3.96	3.64	4.48	3.65	0.4321	0.001	0.309	0.419
	14	3.98	3.76	4.25	3.34				
	35	3.74	3.70	3.66	3.32				
Total plasma-reactive oxygen metabolites (mg of H_2O_2/100 mL)	7	14.3	11.0**	14.0	10.2**	1.1604	0.015	0.015	0.165
	14	12.5	11.3	13.0	11.1				
	35	13.1	13.1	13.2	11.6				
Nitric oxide metabolites (μmol/L)	7	18.0	13.6*	14.6	13.5*	1.9647	0.976	0.055	0.343
	14	13.3	13.5	15.4	13.6				
	35	19.8	16.2	16.7	14.5*				

[1]The statistical evaluation was carried out comparing INLO, INUP, and UP against LO quartile.
*$P < 0.05$; **$P < 0.01$.

Trevisi et al., 2013

POSTPARTUM DISEASE

Hypocalcemia
- Blood levels
- Treatments

Retained fetal membranes (RFMs)
- Treatments

Ketosis
- Blood levels
- Treatments

Mastitis
- SCC
- Treatments

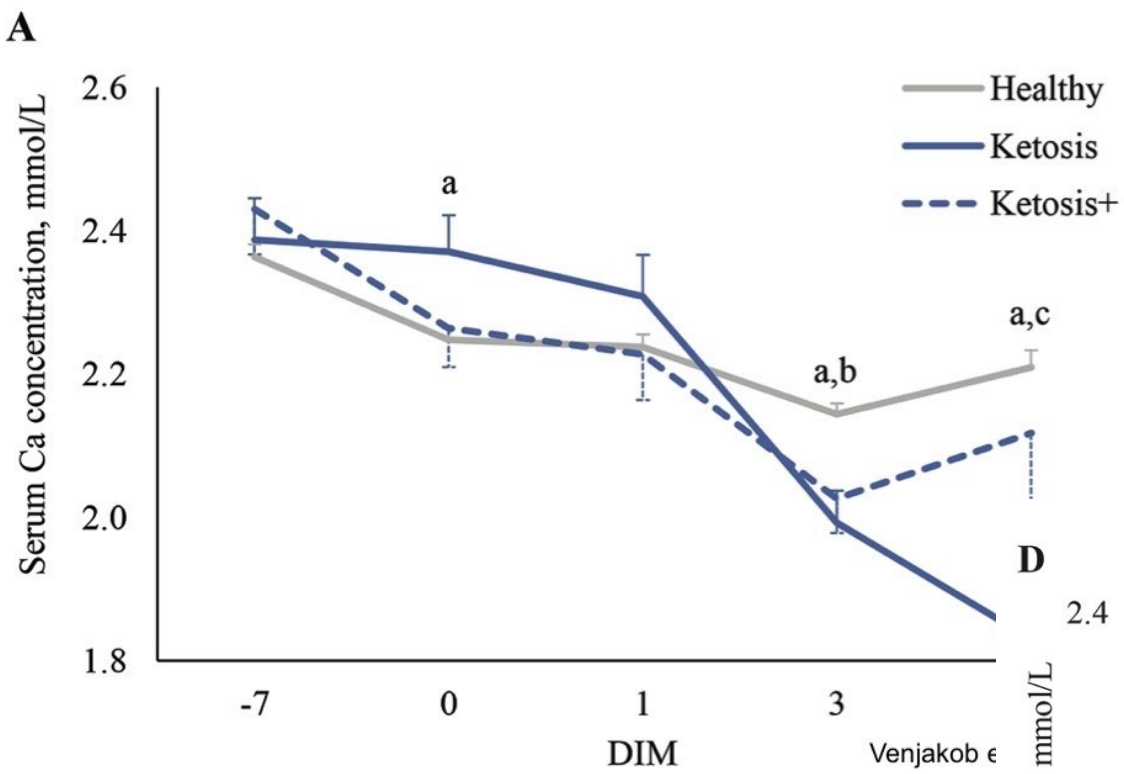
Metritis/Endometritis
- Treatment numbers
- Number have been climbing with early intervention

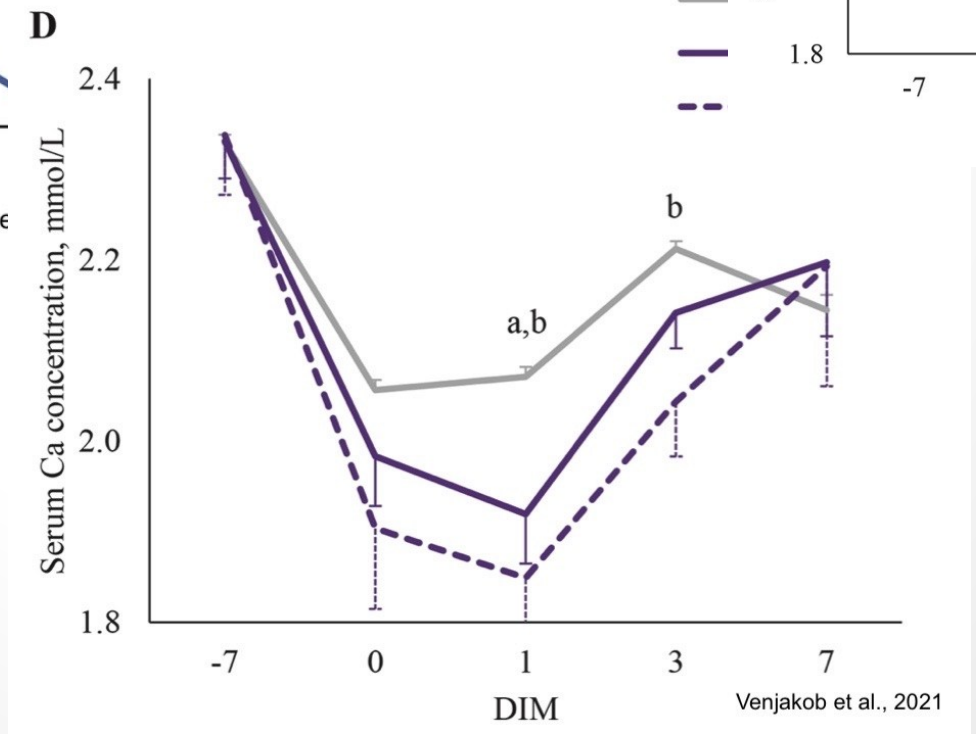
Lameness
- Treatments

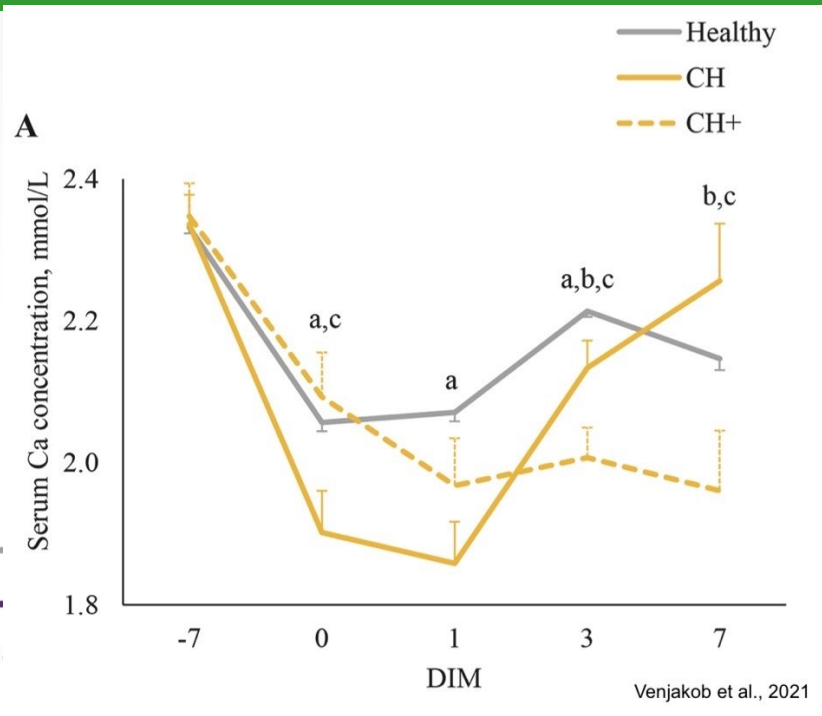
Ketosis = Compromised immune capacity (Neutrophils) = **Low blood calcium**

Venjakob et al., 2021, LeBlanc (2019), Shariff et al., 2010, Martinez et al., 2012

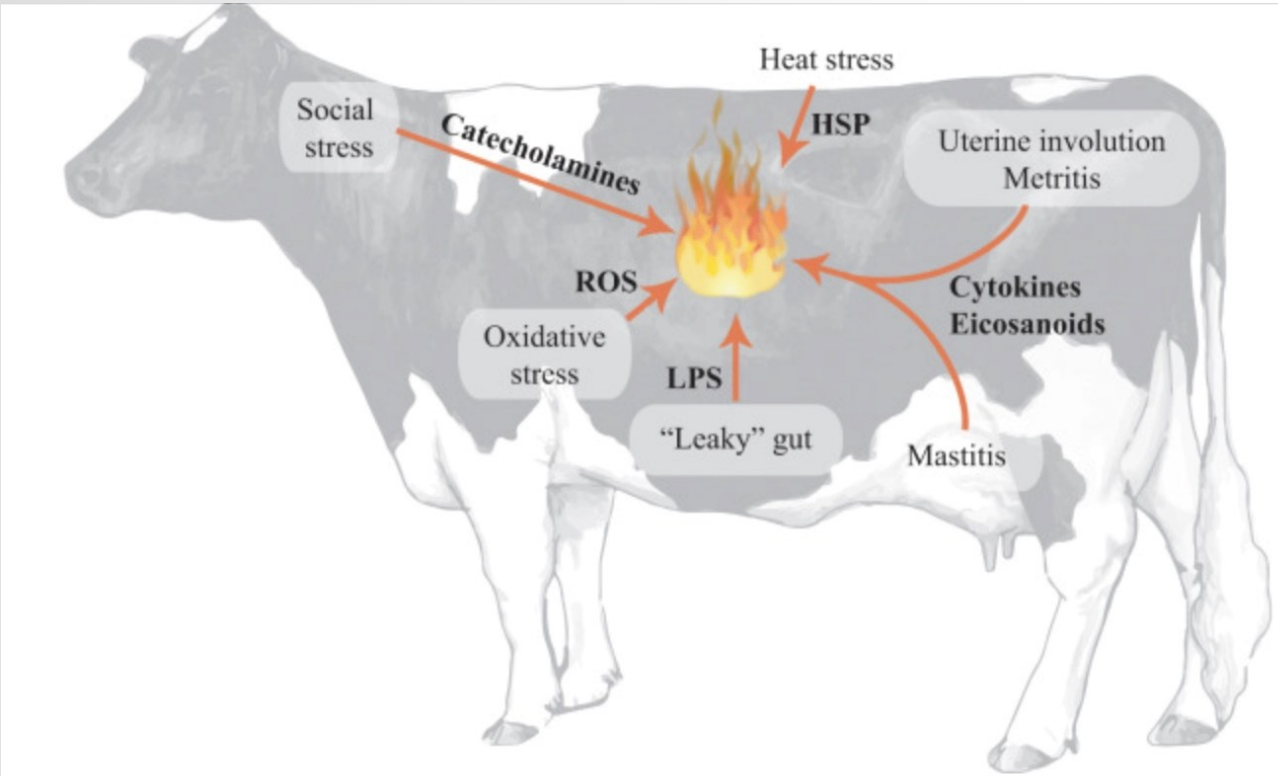
POSTPARTUM DISEASE: CALCIUM & METABOLIC DISEASE

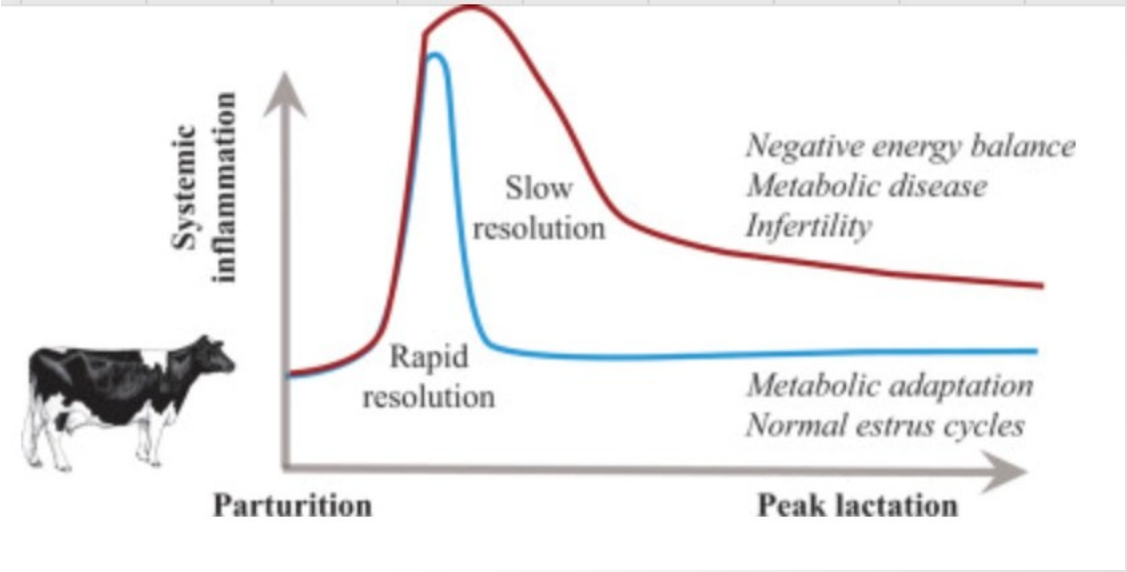






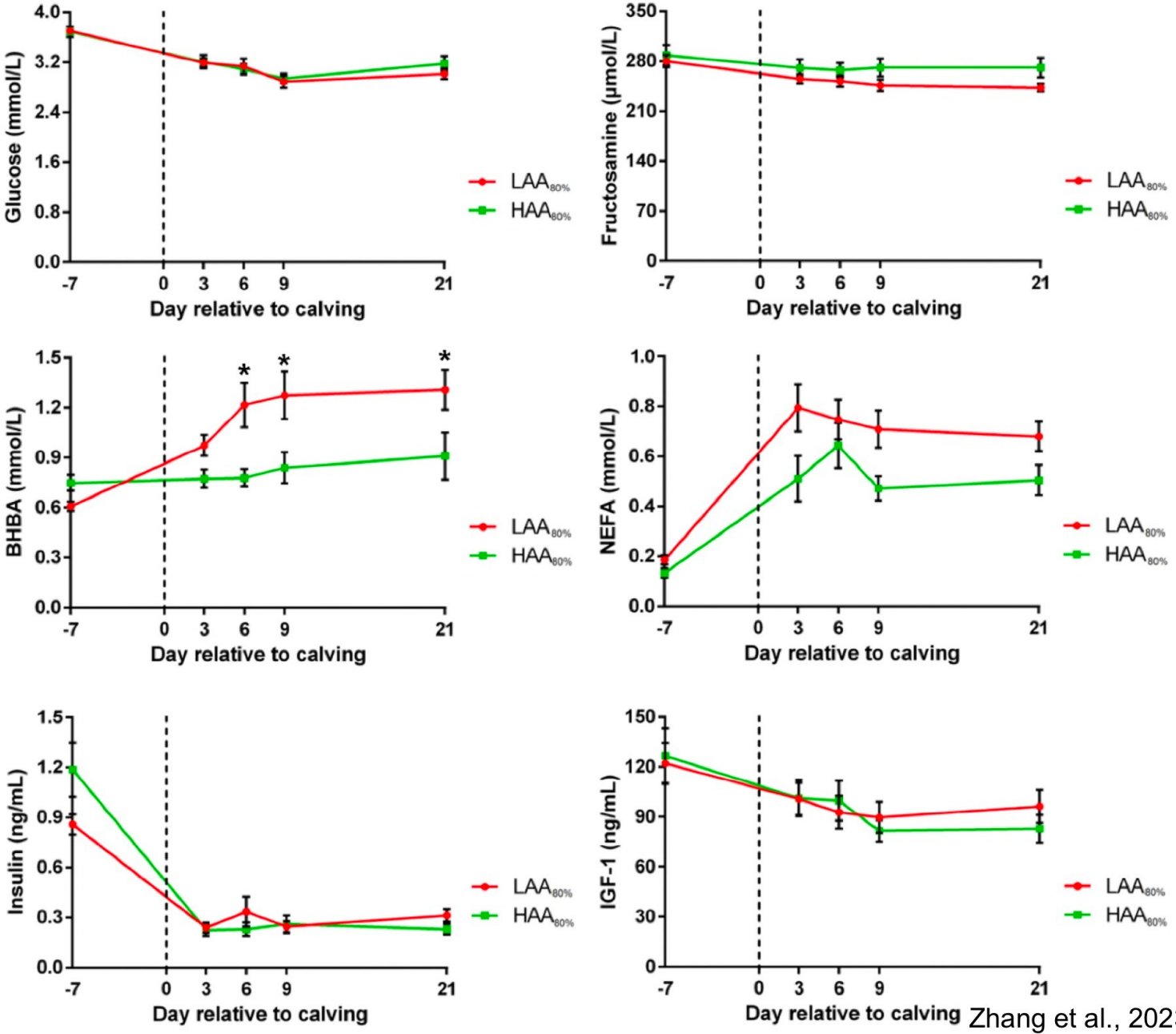
POSTPARTUM DISEASE: INFLAMMATION





Bradford et al., 2015, Horst et al., 2021, Sun et al., 2020

BLOOD INDICATORS: OXIDATIVE CAPACITY



LAA = Low antioxidant ability

HAA = High antioxidant ability

Based % of SOD, GPx, MDA & GSH activity

Zhang et al., 2023

BLOOD INDICATORS: OXIDATIVE CAPACITY

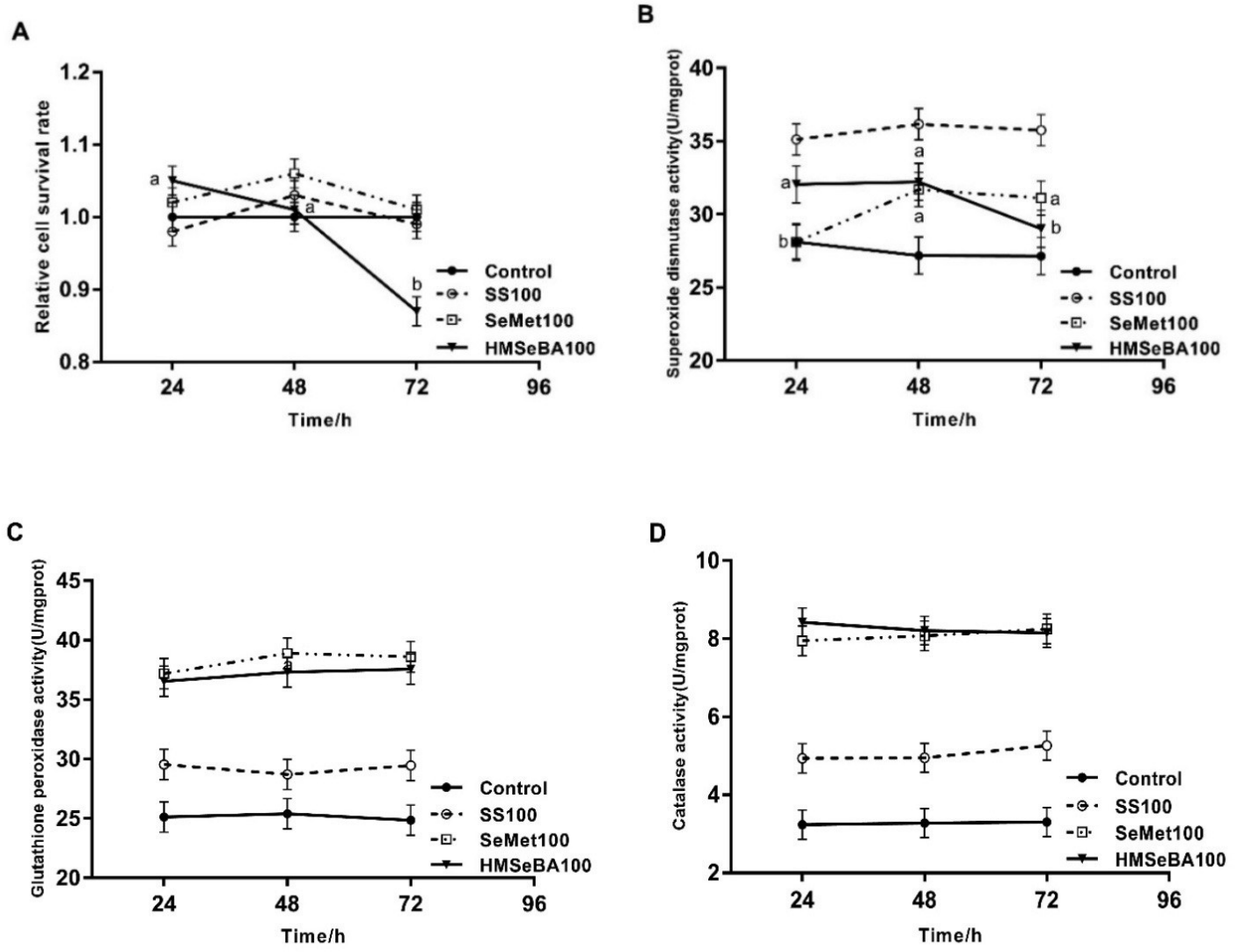


Figure 1. Effect of culture time with different Se sources on cell survival rate (**A**), SOD activity (**B**), GSH-Px activity (**C**) and CAT activity (**D**) of BMEC. All values shown are mean ± SEM from three independent experiments. Different letters in the same Se treatment denote significant differences among culture time.

Sun etal., 2020

Control

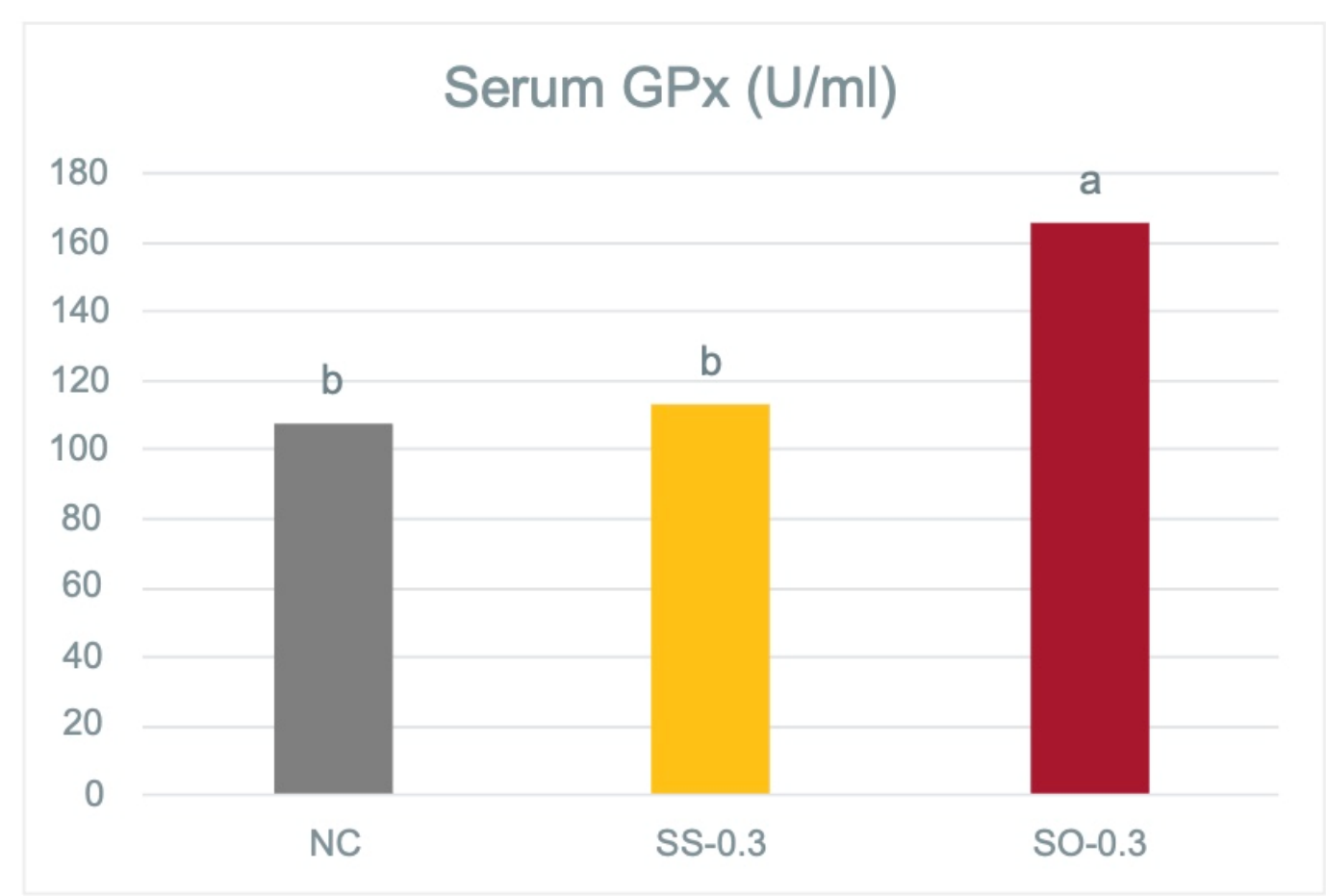
SS100 – Sodium selenate

SeMet100 - Selenomethionine

HMSe100 – Hydroxy selenomethionine

In-vitro experiment

BLOOD INDICATORS: OXIDATIVE CAPACITY



NC = Control

SS 0.3 = Sodium selenate 5mg dose

SO 0.3 = Selenomethionine 5mg dose

Experiment done in freshly calved cows

Sun et al., 2017

QUESTION 3: WHAT FEED, SUPPLEMENT & MANAGEMENT LEVERS CAN WE PULL TO HELP WITH COW RECOVERY?

AGVANCE
Success. Together.

- For specific metabolic solutions, check out the previous webinar
- Managing to minimise stress
- Managing to maximise feed intake
- ME balance & intake (sugar, starch & CC)
- Protein quality & quantity (soya/canola, single-cell protein, methionine)
- Calcium, phosphorus & magnesium (lime, calsea, gypsum, MCP)
- Selenium, copper, zinc, manganese, cobalt, iodine, boron and chromium
- Betaine, choline and RPMet
- B-Group vitamins, MecoVit, vit E and vit D

QUESTION 3: WHAT FEED, SUPPLEMENT & MANAGEMENT LEVERS CAN WE PULL TO HELP WITH COW RECOVERY?

AGVANCE
Success. Together.

- Metabolic disease is a problem?
- Blood NEFA or BOHB levels are high?
- Blood Ca, P or Mg levels are out of balance?
- Appetite/DMI is low postpartum?
- Rumination and appetite mins are low and variable
- Cows start well, but after 20 days begin losing weight and crashing?
- Cows are too fat going into calving/liver alb, glu levels low?
- Getting too much metritis, RFMs or mastitis postpartum?

METABOLIC DISEASE IS A PROBLEM?

PROBLEM:

- Ca, Mg or P levels out of balance
- K level too high/DCAD too high during transition
- ME, NDF & CP out of balance
- Check metabolic symptoms and how they are responding

SOLUTIONS:

- Check bloods
- Look at transition diet, reduce K/reduce pasture?
- Make sure transition diet: ME (90-120MJ), 14% CP & 45% NDF ad-lib
- If metabolics >24hrs after calving look at colostrum diet and supplementation

BLOOD NEFA OR BOHB LEVELS ARE HIGH?

PROBLEM:

- Liver is not functioning efficiently or
- Transition and/or colostrum diet not balanced properly
- Cows are under too much stress

SOLUTIONS:

- Work on the balance of NDF, energy and protein
- Check feed palatability and access
- Betaine @ 15gm/cow/day
- Check bloods for Ca, P, Mg and low GPx
- Increase calcium to colostrums - limeflour, gypsum or Calsea
- Check trace mineral supplementation, particularly selenium
- Check diet for vit E or vit A deficiency (if silage is >40% diet)
- Extreme case use methyl donor & B-Group vitamins (MecoVit)

BLOOD CA, P OR MG LEVELS ARE OUT OF BALANCE?

PROBLEM:

- Bloods show imbalance of Ca, Mg or P
- Poor cow recovery overall
- Subclinical metabolic disease

SOLUTIONS:

- Look at DCAD and K level in transition diet
- Adjust the Ca, Mg or P as needed in transition supplement
- Adjust Ca, Mg or P supplement going to the colostrums
- Check bloods for high NEFA or BOHB
- Check bloods for low GPx

APPETITE/DMI IS LOW POSTPARTUM?

PROBLEM:

- Liver is not functioning efficiently or
- Transition and/or colostrum diet not balanced properly
- Rumen fill scores are low/rumination/eating mins are low
- Stress?

SOLUTIONS:

- Work on the balance of NDF, energy and protein (transition and colostrum)
- Check feed palatability and access
- Better energy supply balance
- Better quality protein
- Check bloods for Ca, P and Mg, NEFA and BOHB
- Betaine @ 15gm/cow/day if NEFA/BOHB levels are high
- Increase calcium to colostrums - limeflour, gypsum or Calsea
- Extreme case use methyl donor & B-Group vitamins (MecoVit)
- Check TE
- Vit E and vit A levels (if silage >40% of diet)

RUMINATION & APPETITE MINS ARE LOW & VARIABLE

PROBLEM:

- Liver is not functioning efficiently or
- Transition and/or colostrum diet not balanced properly
- Appetite low? Poor rumen fill?
- Check bloods Ca, Mg and P, NEFA and BHOB + GPx
- Stress?

SOLUTIONS:

- **Work on the balance of NDF, energy and protein**
- Better energy supply balance
- Better quality protein
- Check feed palatability and access
- Ca, Mg or P low adjust colostrum supplement and look at transition supp
- NEFA/BOHB high look at energy/protein and inflammation
- GPx low also, selenomethionine
- Boost sugar/energy density
- Betaine 15gm/cow/day is NEFA/BOHB high

COWS START WELL, BUT AFTER 20 DAYS BEGIN LOSING WEIGHT AND CRASHING?

PROBLEM:

- Liver is not functioning efficiently or
- Transition and/or colostrum diet not balanced properly
- Check rumen stability/manure score

SOLUTIONS:

- Work on the balance of NDF, energy and protein
- Check feed palatability and access
- Betaine @ 15gm/cow/day
- Check bloods for Ca, P & Mg
- Increase calcium to colostrums - limeflour, gypsum or Calsea
- Buffer rumen if needed

COWS ARE TOO FAT GOING INTO CALVING/LIVER ALB, GLU LEVELS LOW?

PROBLEM:

- Liver is not functioning efficiently
- High levels of cytokines in the Blood
- Immune system overwhelmed
- Blood albumin and glucose levels are low

SOLUTIONS:

- Keep the ME tight in the transition cows, lift protein to 16% - NDF is key!
- Keep cows on OAD day longer
- Betaine 10-15gm/cow
- If clinical Ketosis >5% use 60gm/cow MecoVit
- Flood the cows with calcium
- Ensure magnesium levels are optimum
- 5mg/cow selenomethionine to boost oxidative capacity
- 400mg/cow zinc glycinate to boost immune system capacity

GETTING TOO MUCH METRITIS, RFMS OR MASTITIS POSTPARTUM?

PROBLEM:

- Liver is not functioning efficiently or
- Inflammation is affecting the immune system

SOLUTIONS:

- Keep cows on OAD day longer
- Betaine 15gm/cow
- Flood the cows with calcium
- Ensure magnesium levels are optimum
- Check bloods
- Check transition DCAD and mineral balance
- 5mg/cow selenomethionine to boost oxidative capacity
- 400mg/cow zinc glycinate to boost immune system capacity

THANK YOU FOR ATTENDING

For more information and previous webinars:

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