



# Modern Calf Rearing Practices

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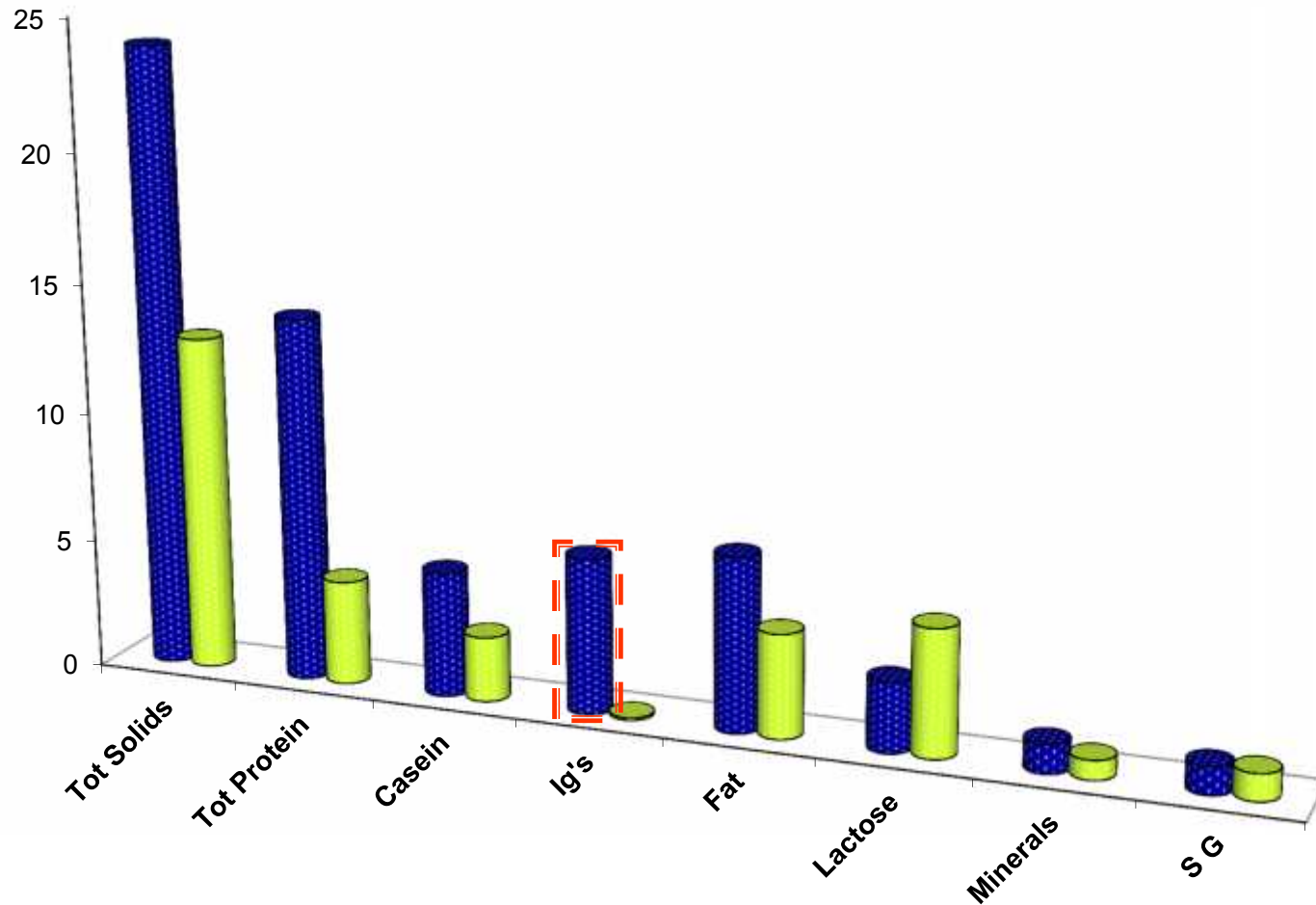






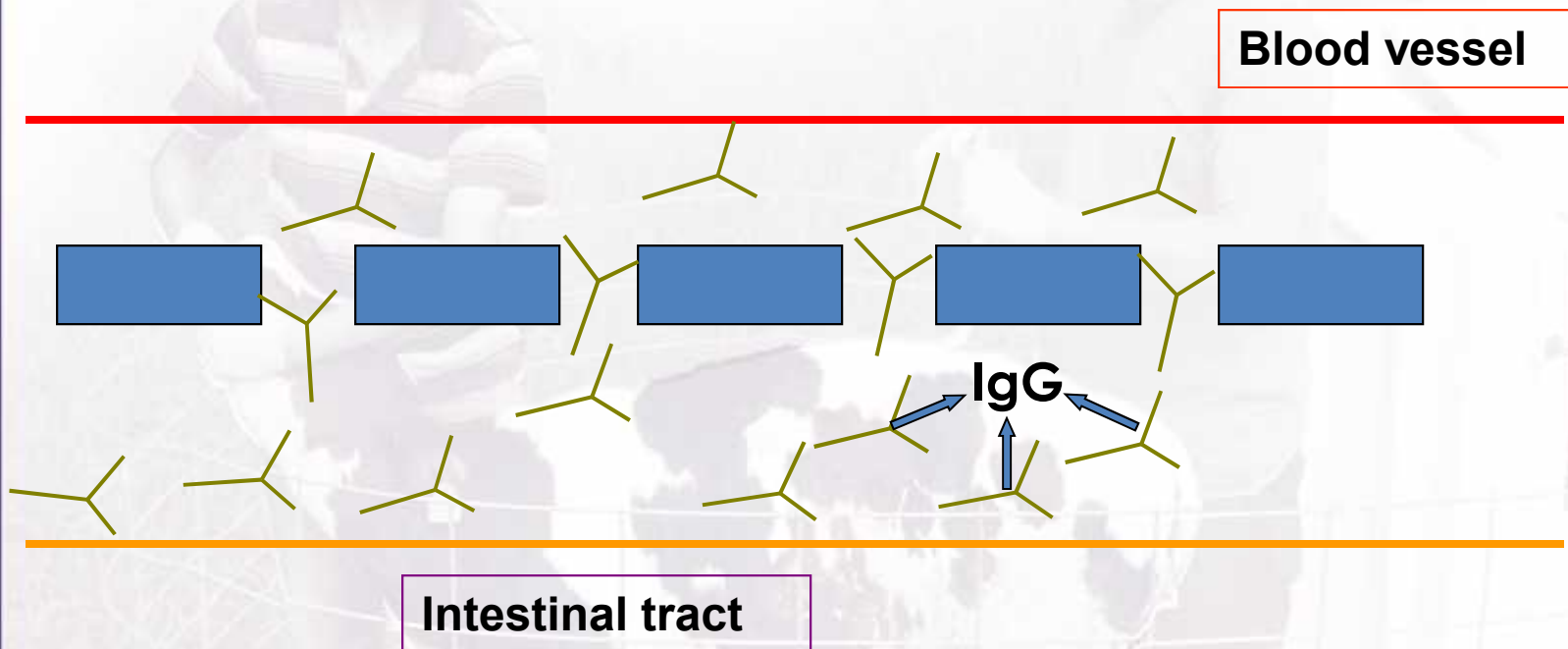
# Importance of Colostrum

Colostrum Milk



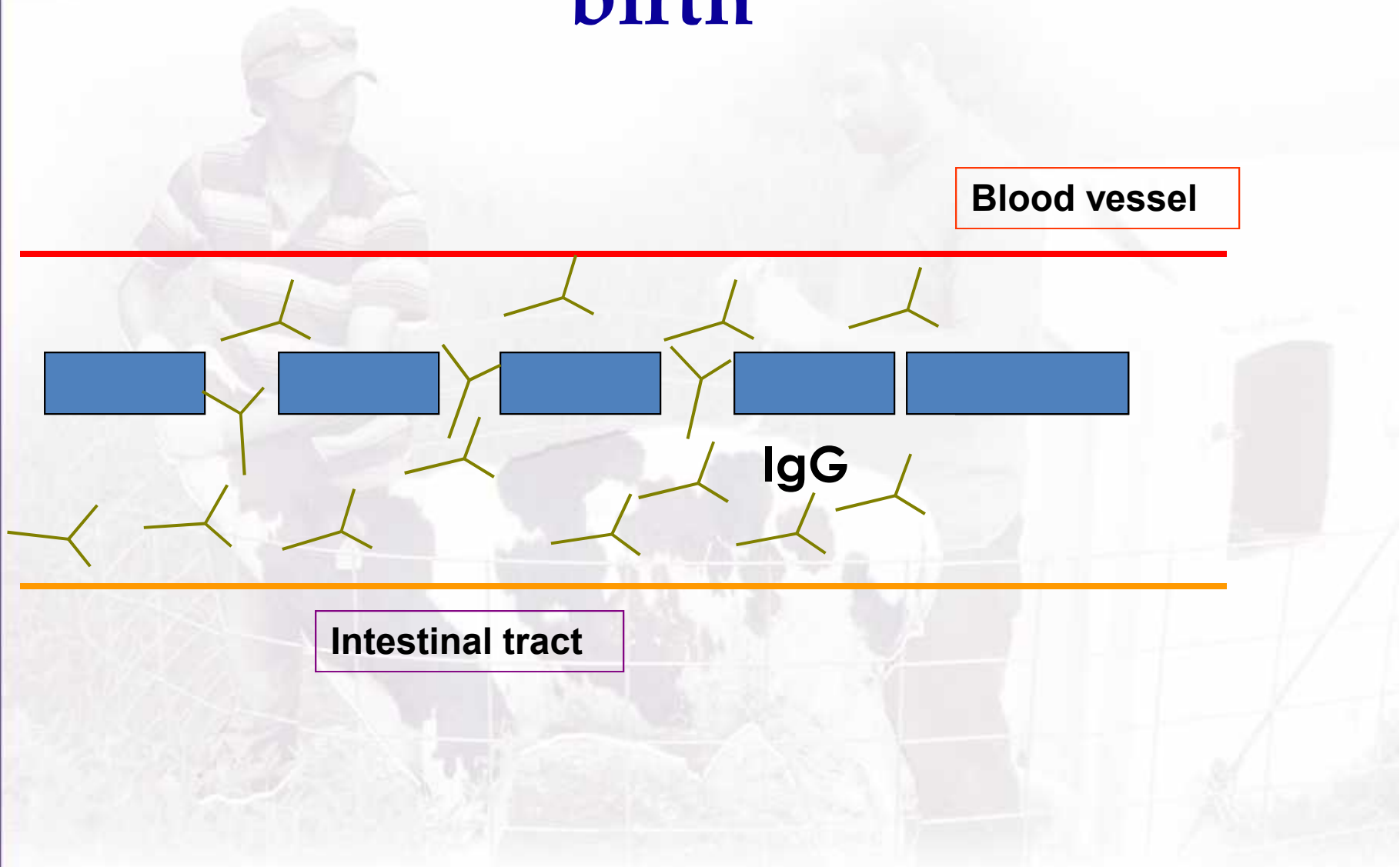


# Absorption within 2 hours of birth





# Absorption within 4 hours of birth



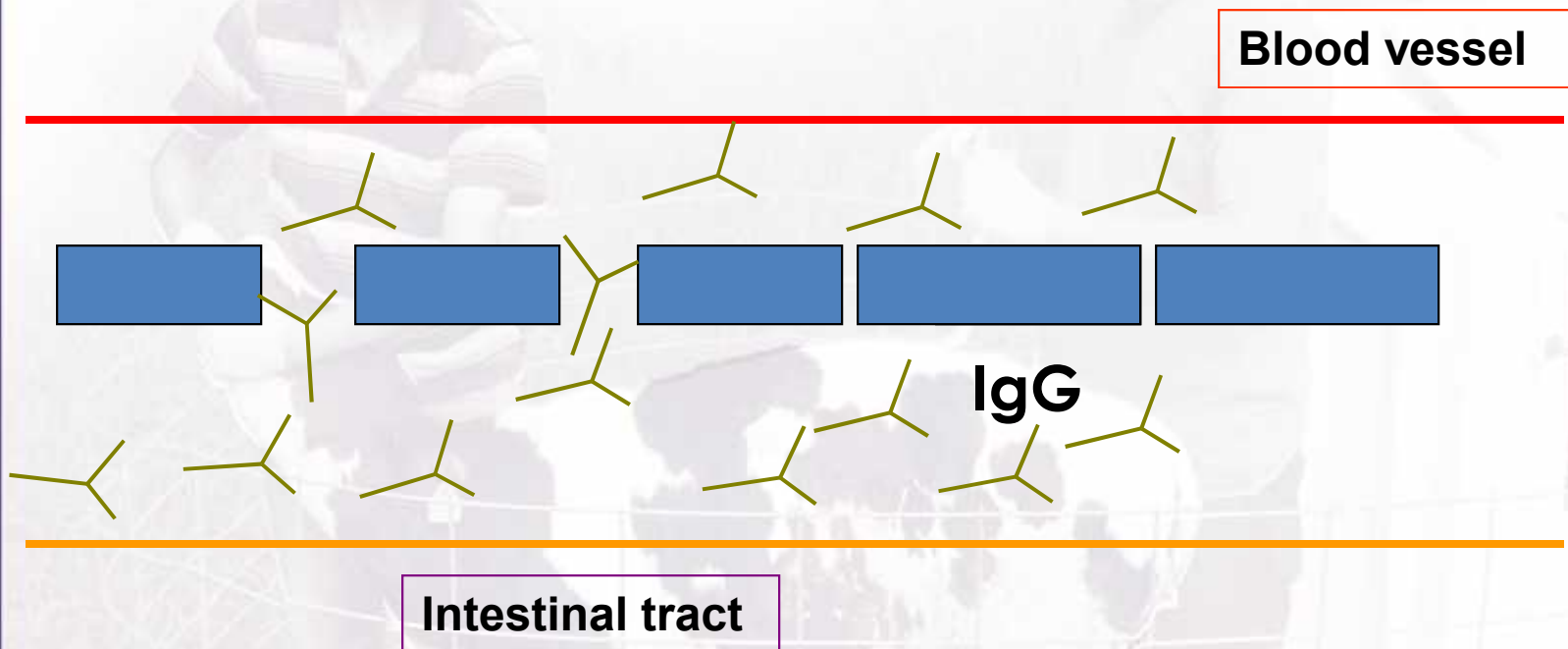
Blood vessel

Intestinal tract

IgG



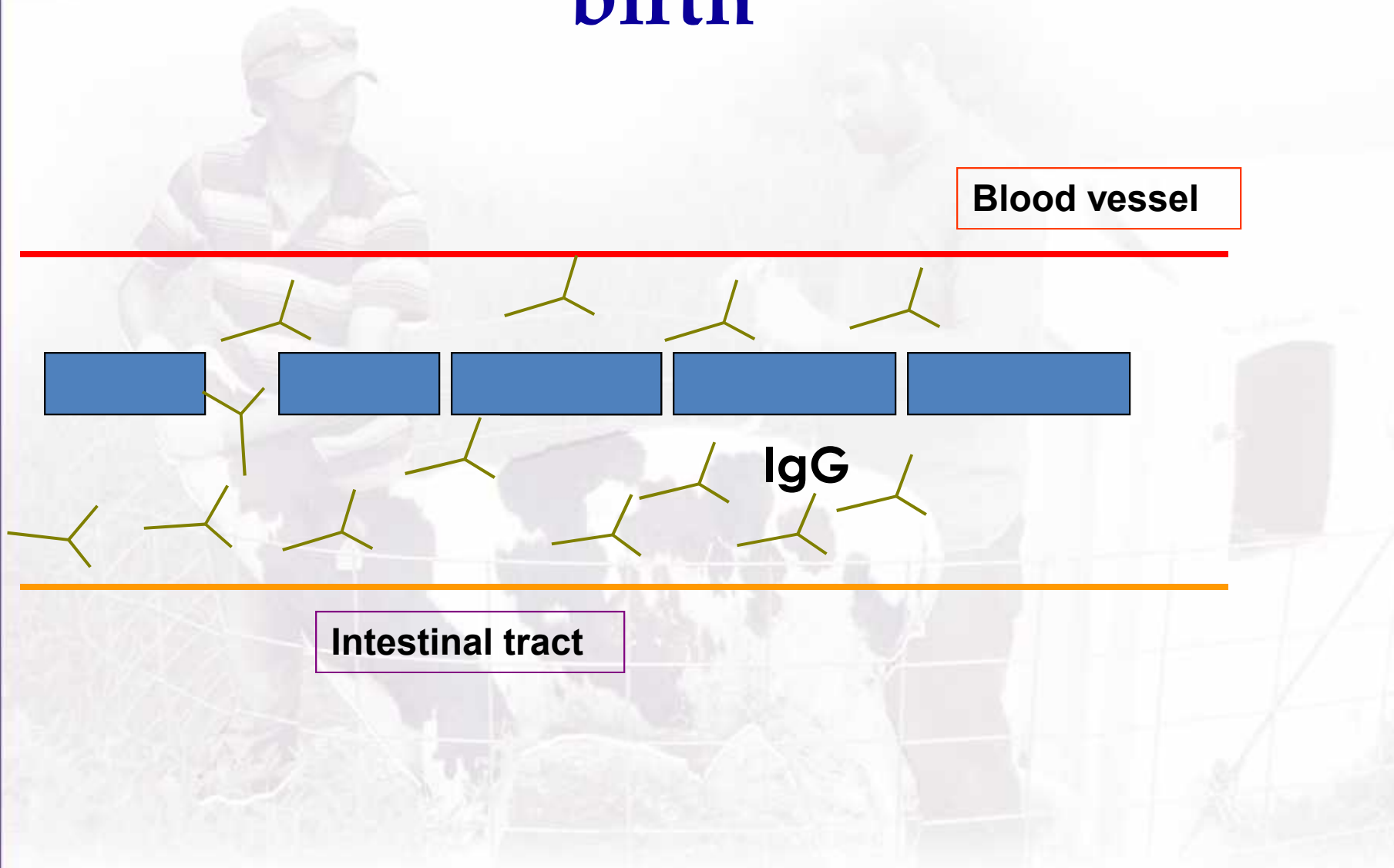
# Absorption within 10 hours of birth







# Absorption within 16 hours of birth



Blood vessel



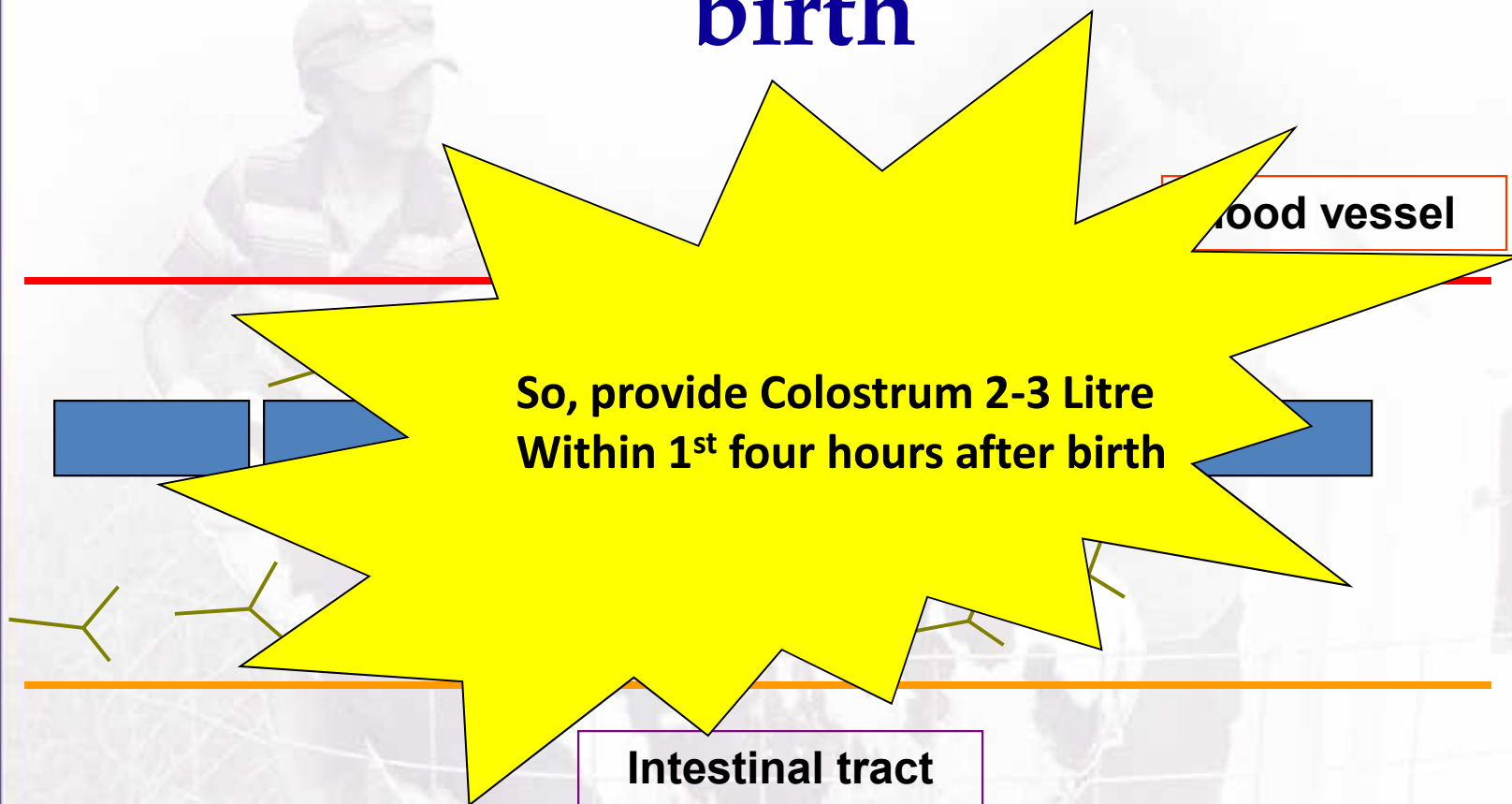
IgG

Intestinal tract





# Absorption within 24 hours of birth



Blood vessel

So, provide Colostrum 2-3 Litre  
Within 1<sup>st</sup> four hours after birth

Intestinal tract

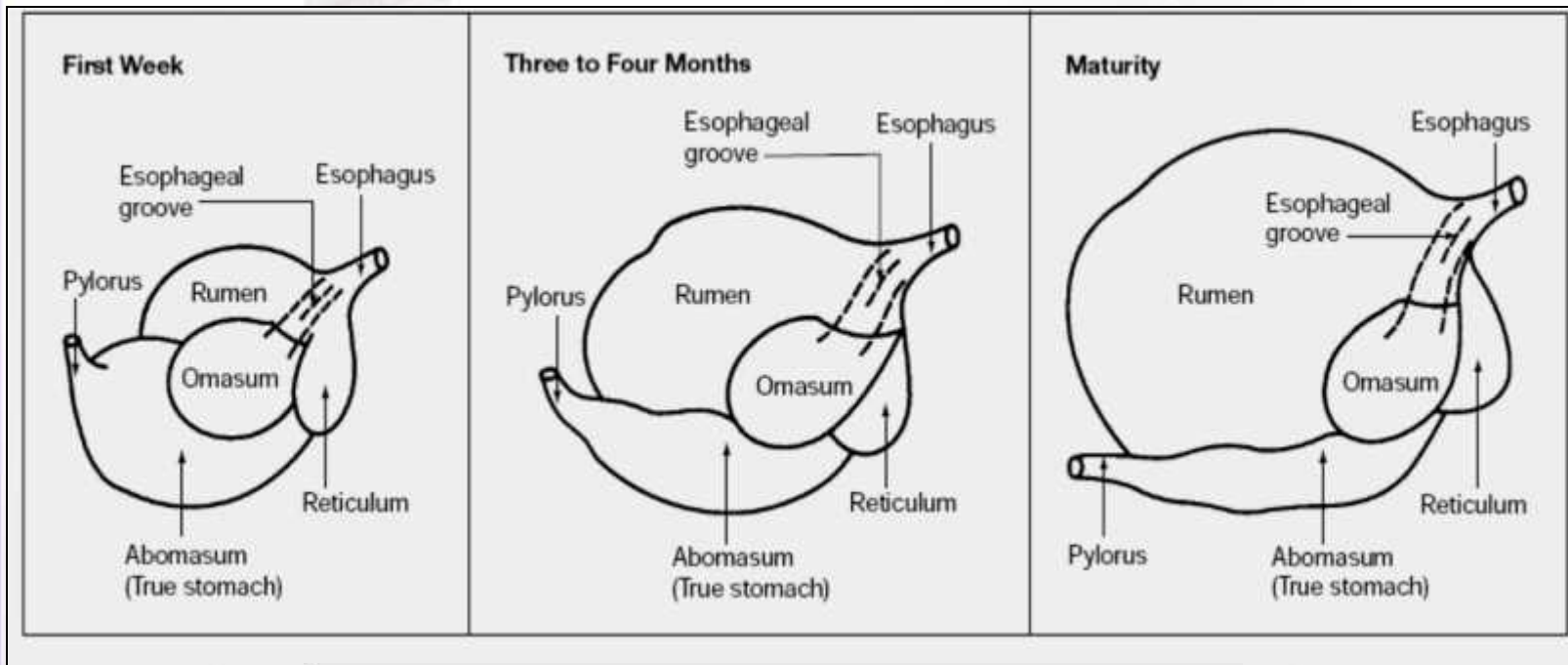


# How to detect immunity Transfer?

- $> 5.5$  g/dl: successful passive transfer
- $5.0$  to  $5.4$  g/dl: moderately successful passive transfer
- $< 5.0$  g/dl: failure of passive transfer



# Calf is Born Monogastric



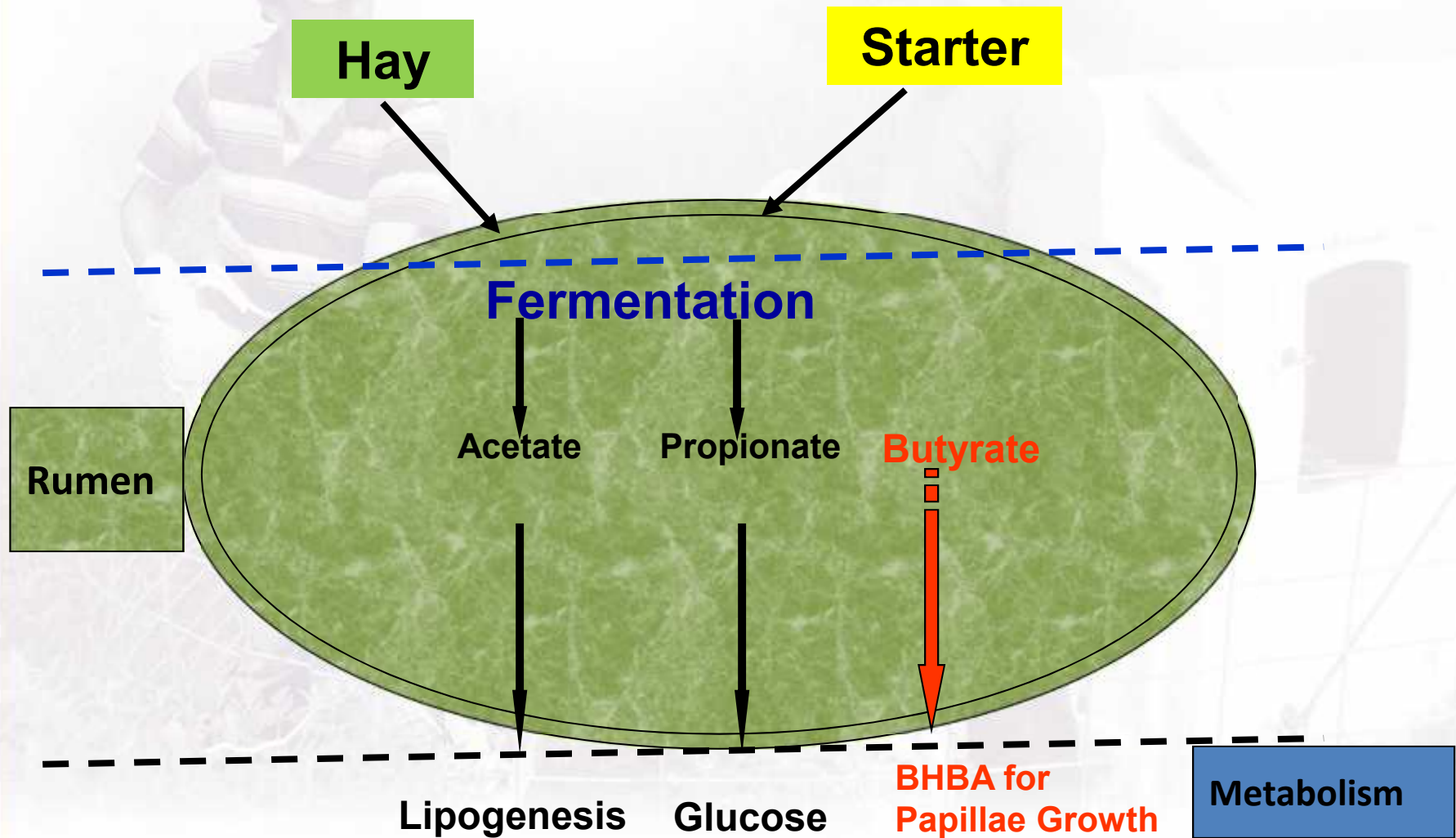
Age	% of Total stomach capacity			
	Rumen	Reticulum	Omasum	Abomasum
Newborn	25	5	10	60
3 to 4 mo.	65	5	10	20
Mature	80	5	7 to 8	7 to 8



# Rumen Development

- Factors Required for Rumen Development
  - Establishment of bacteria
    - Present in enough number at birth
    - Increase in population with dry feed intake
  - Water based environment
  - Muscular development
  - Absorptive ability of tissue (rumen papillae)

# Rumen Development





# Housing

- Individual Calf Hutches
- Bedding
- Straw and Wood Shavings
  - Straw the Gold standard
- Keep pilling up until calves weaned and moved to super hutches



# Feeding



- Milk
- Milk Replacer .... Nipple vs. Pal (45 sec/feeding)
  - NRC @ 8% of B.W
  - Conventional @ 10% of Birth B.W
  - Calves can consume upto 12 L/d when fed *ad Libitum*
- Milk Replacer Composition
  - Typical MR = 20% Protein and 20% Fat
  - Current trend towards high Pro
    - **28% Protein and 20% Fat**
  - Major MR companies
    - **Land o Lakes and Hubbard**





# Intensive Milk Replacer Feeding Program

- Mix 680 g of MR in 3.8 L of water
- Keep the temp at 43 °C

Step	Days of age	MR/ Feeding	Feedings/d
1	4-10	2 Quarters	2
2	11-45	2 Quarters	2
3	46-52	2 Quarters	1
4	53	Weaning	0



# Calf starter

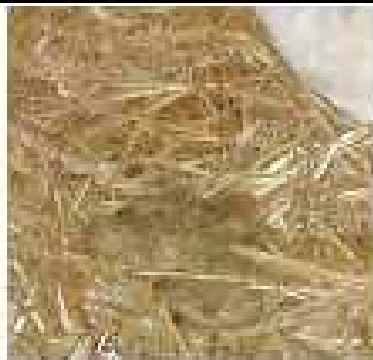
- Calf Starter
- NRC =18% Crude Protein
- Commercial Calf Starter
  - 22% CP
  - Whole Corn/ Steam Flaked Corn + Protein Pellets
- Consumption as weaning criterion
  - 1.4 kg/d
- Hay
  - Not Very Common

## Fecal scores

Normal



Semi-formed, pasty



Loose, but stays on top of bedding



Watery, sifts through bedding



**1= Normal**

**2= Normal but less sticky**

**3= Abnormally thin but not watery**

**4= Watery**

**5= Watery with abnormal color**



# Drum Goon Dairy

















# Lyn Bodewine Dairy









# Minnesota State University

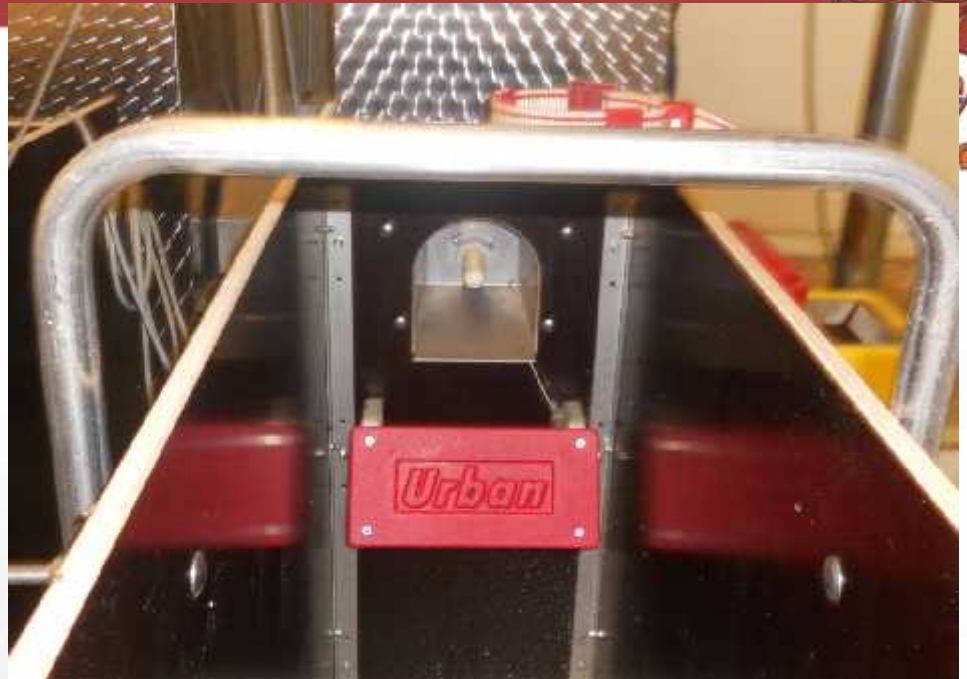


















# Rumen Development in Early Weaned Holstein Calves Fed Different Types of DDGS





# ALFRED DAIRY SCIENCE HALL





# Experiment lay out

Total calves (N=21) with 7 Calves/Treatment



- Milk Replacer
  - CP 28% and 20% Fat (Mother's Pride; Hubbard Feeds)
- Feeding @ 680 g/d in 3.78 L of water at 37 °C twice daily at 8:00 am and 4:00 pm
- MR quantity reduced to half on week 5 and fed in morning only
- Weaning at the end of week 5
- Calf starter and water *ad libitum*

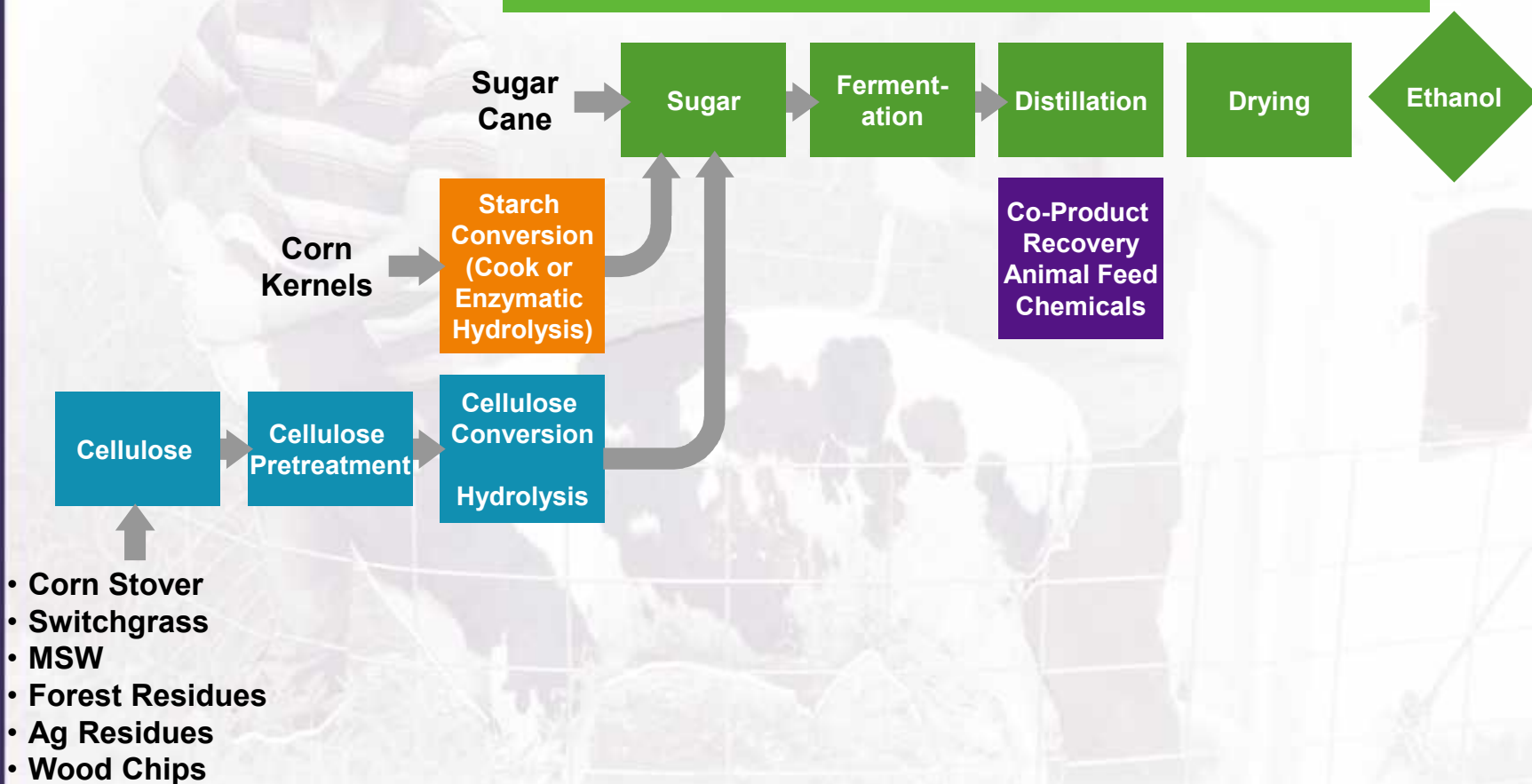


# Ethanol Production Flowchart

## Cellulose Process

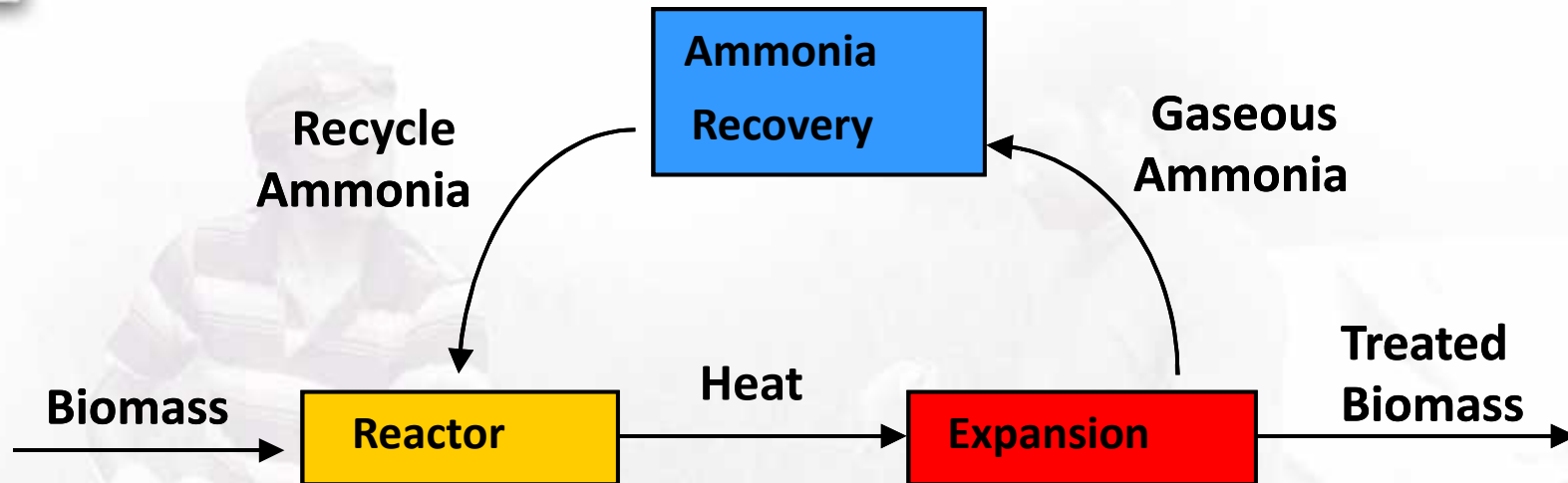
### Corn Process

### Sugar Cane Process





# How CAFEX pretreatment work?



	DM	CP	Me	Fat	NDF	ADF	Ash	NFC	Starch	Ca	P	S
<b>DDGS</b>	91.83	<b>29.49</b>	2.96	12.22	<b>29.23</b>	15.06	5.84	23.22	7.00	0.04	0.96	0.69
<b>CAFEX- DDGS</b>	91.05	<b>40.19</b>	3.02	10.59	<b>24.37</b>	12.28	7.33	17.52	6.00	0.03	1.05	1.02





# Calf starter Diets



Ingredients	Control	DDGS	CAFEX-DDGS
Ground Maize	44.50	35.00	39.60
Oats	18.40	14.50	16.40
Molasses	4.00	4.00	4.00
SBM	30.00	18.50	12.00
<b>DDGS</b>	-	<b>25.00</b>	-
<b>CAFEX- DDGS</b>	-	-	<b>25.00</b>
Salt	0.45	0.45	0.45
DCP	0.50	-	-
Binder	0.50	0.50	0.50
Calcium Carbonate	1.10	1.50	1.50
Mineral premix	0.50	0.50	0.50
Vitamin premix	0.05	0.05	0.05



# Housing





# Health Management

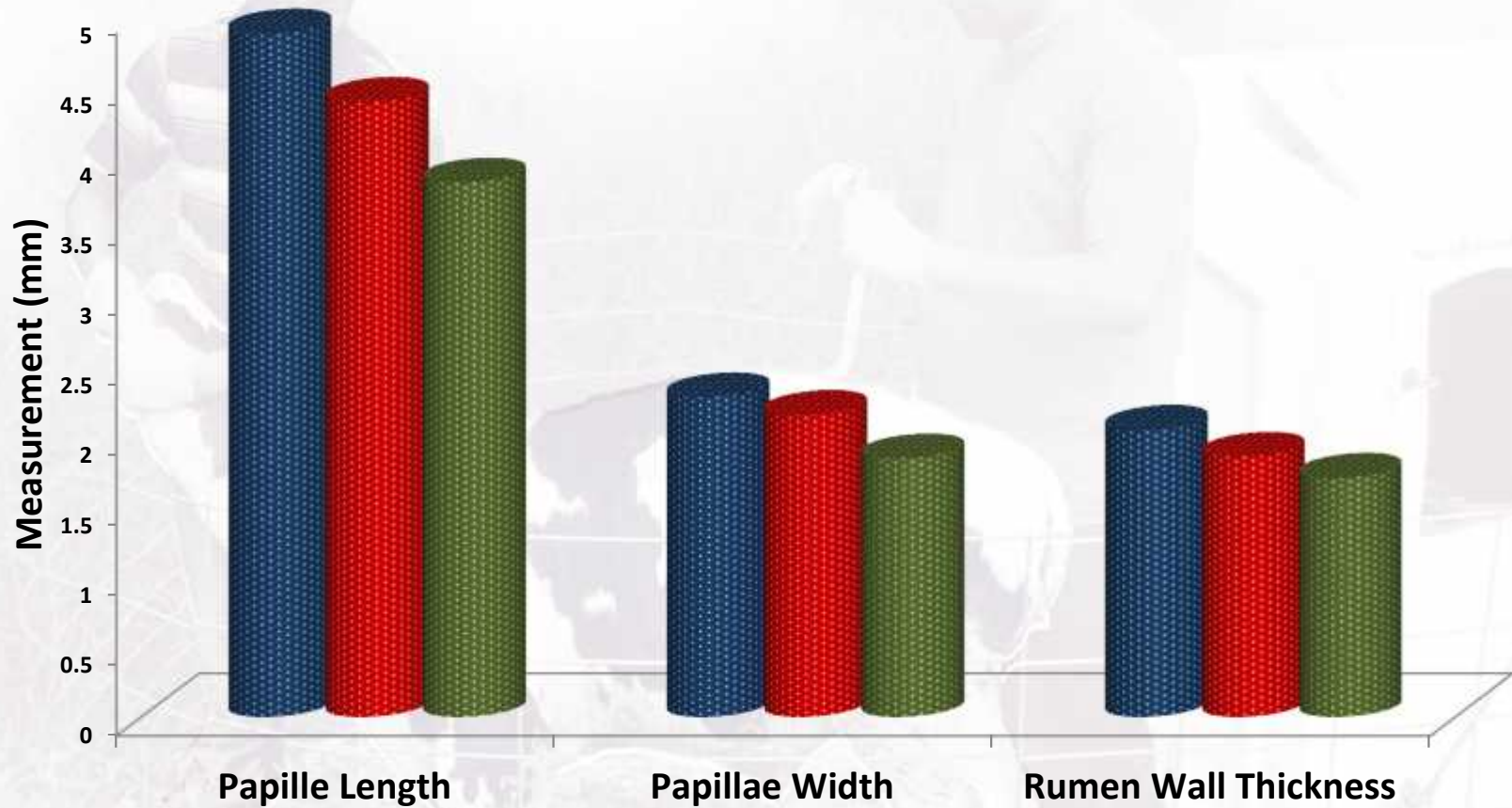


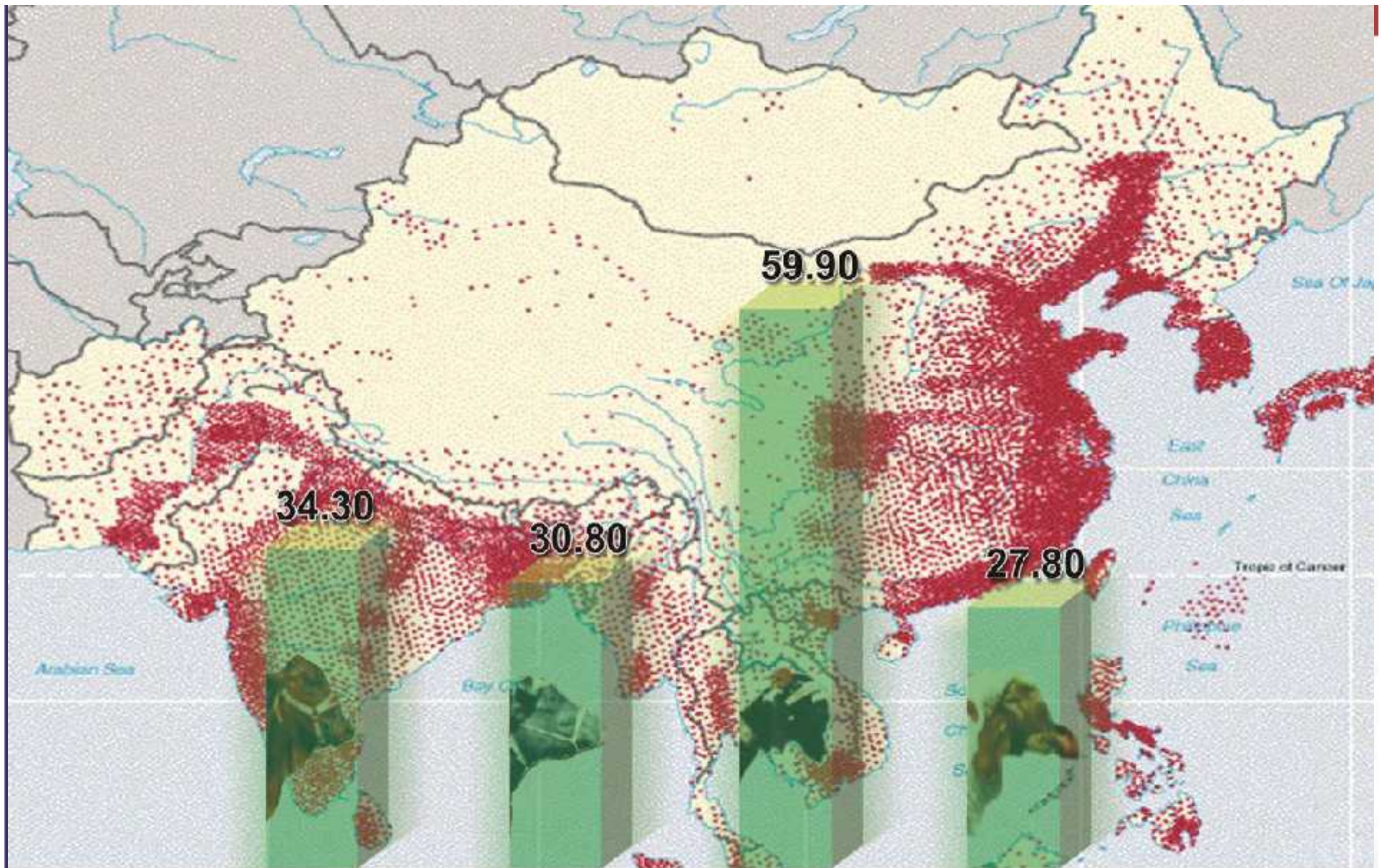






■ Control ■ DDGS ■ CAFEX-DDGS









# Take Home Message

- Feed 3-4 L of Colostrum after birth
- Milk or Milk replacer @ 10% of Birth B.W
- Keep MR Program feeding simple
- Maintain Temperature of liquid feed
- Quality Calf starter *ad libitum* right from start
- Water *ad libitum*
- Proper Health Monitoring (Fecal Scoring)
- [www.calfnotes.com](http://www.calfnotes.com)



**Happy Calf**

