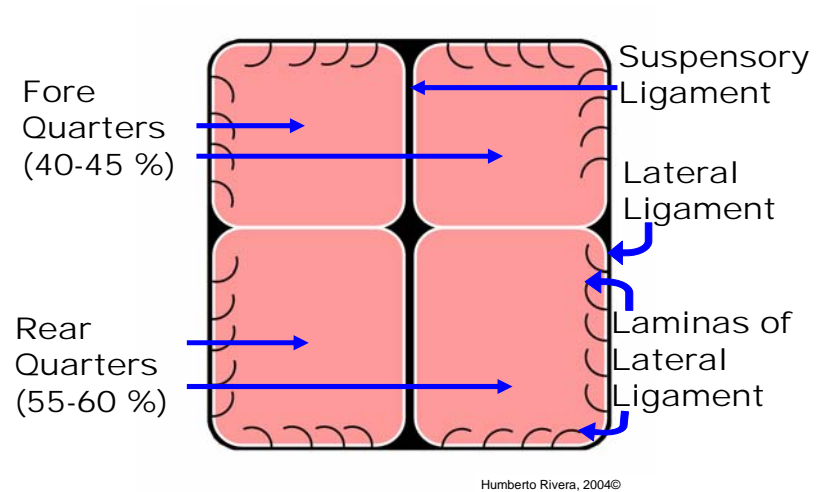


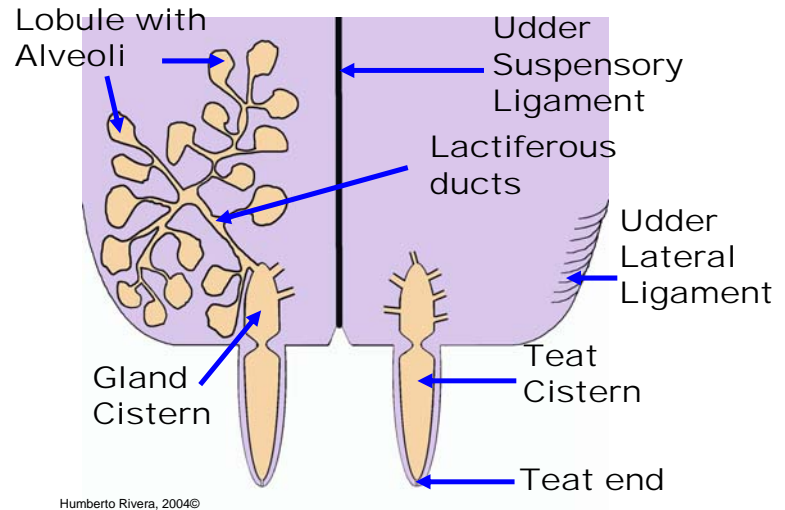
# THE UDDER OF THE COW

## HOW IS IT INSIDE?



### DORSAL VIEW OF THE UDDER

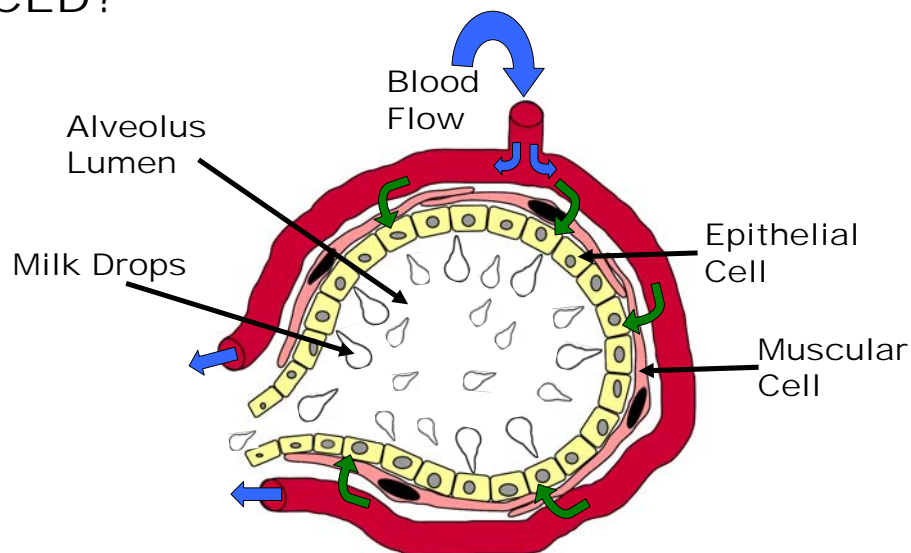
It comprises four independent glands, with one teat and one exit duct each. Right and left halves are totally separated.



### POSTERIOR VIEW OF REAR QUARTERS

## HOW IS MILK PRODUCED?

1. Blood stream delivers nutrients to alveolus epithelial cells
2. Using these nutrients, epithelial cells produce milk, which is then released inside the alveolus lumen.
3. During milking, oxytocin is released in the blood stream, and induces contraction of the muscular cells covering the alveolus.
4. This contraction on the alveolus, leads to milk ejection (milk let down), forcing the milk out to lactiferous ducts and the gland cistern.



### MAMMARY ALVEOLUS

Humberto Rivera, 2004©

# MASTITIS

## WHAT IS IT?

“Inflammation of the mammary gland”. It leads to high economic losses, and is characterized by:

- **High somatic cell count** (decreased milk quality)
- **Decreased milk production** (less amount)
- **Abnormal milk** to visual observation
- **General symptoms** (fever, depression, etc.).

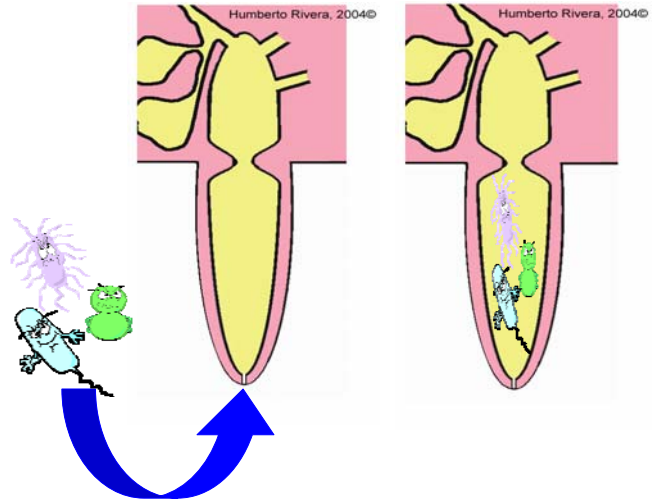
**Moisture, Dirty pens, Manure,  
Inappropriate milking routine**

} = Higher exposure to mastitis germs =



## WHAT CAUSES MASTITIS?

- Many germs live freely in the environment waiting for an opportunity to colonize the teat end and, enter the udder, and establish disease.
- Other germs are highly contagious and live in the udder of sick cows. These are transmitted to healthy cows during milking due to erroneous milking procedures.
- The best defense is maximizing hygiene to avoid colonization of the **teat end**



The streak canal is the main defensive barrier



The streak canal is 8-9 mm long, and has numerous folds to prevent germs from entering the udder



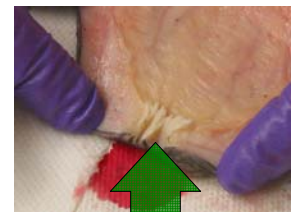
Transversal section of the teat end at about 4 mm from its external orifice. Notice the tightness of the streak canal.



Transversal section at 8 mm from the skin. The canal begins to open to the teat cistern.



Opening of the teat cistern after the streak canal is indicated by the arrow



Longitudinal section of the streak canal with open folds

# TYPES OF MASTITIS

## ➤ By presentation

### Clinical Mastitis



- ✓ Abnormal milk
- ✓ Signs of disease present

### Subclinical Mastitis



- ✓ Normal milk
- ✓ No signs of disease present

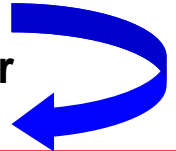
#### **Easy detection = Timely treatment**

Cow is isolated to be treated. Contamination to other cows and bulk tank is prevented. Economic loss will be minimized after successful treatment.

#### **No detected = No treatment administered**

Cow continue to spread the disease and to contaminate the bulk tank.

**Represents the greater economic loss**



## ➤ By source of origin

### Environmental Mastitis

- ✓ Reservoir: the environment
- ✓ Exposure in the pens
- ✓ Transmitted from the environment to healthy cows
- ✓ Cannot be eradicated



### Contagious Mastitis

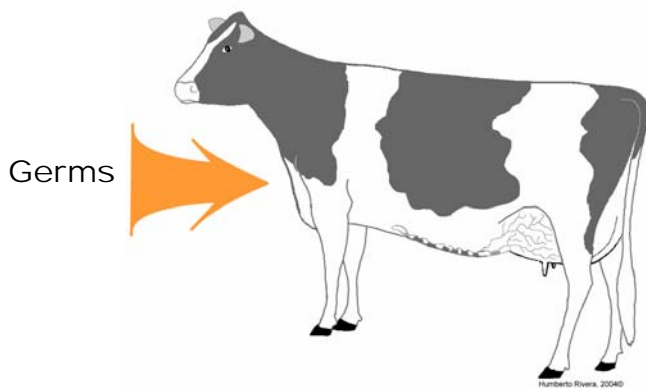
- ✓ Reservoir: udder and teat skin of cows
- ✓ Spread during milking
- ✓ Transmitted from sick to healthy cows
- ✓ In most cases can be eradicated



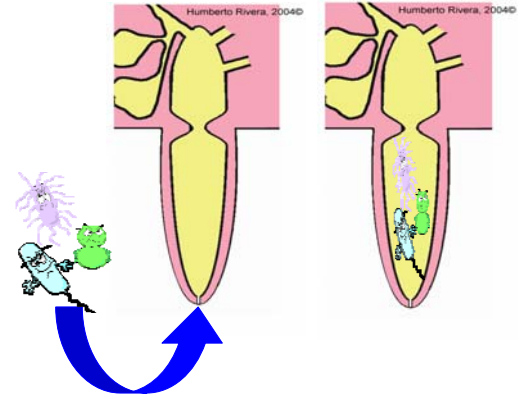


# WHAT ARE SOMATIC CELLS?

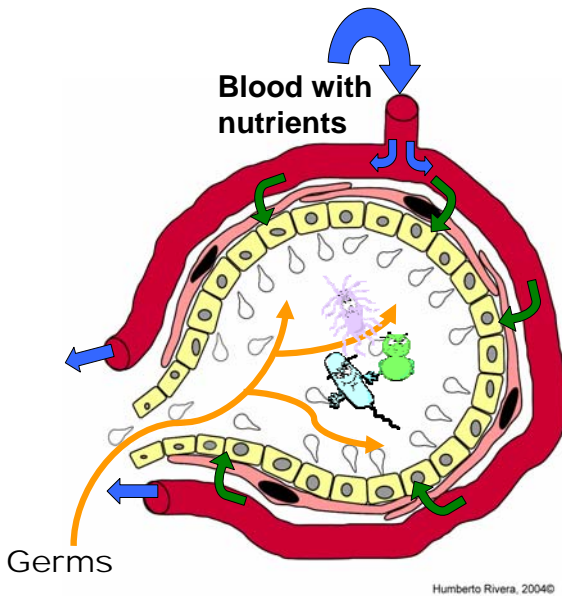
Somatic cells are blood cells sent to fight udder infection



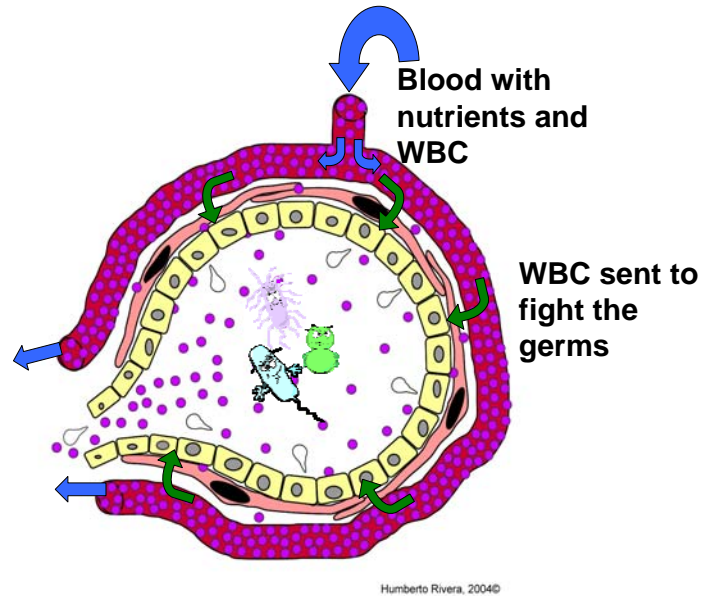
**1** Cows are exposed to mastitis causing bacteria in pens or in the milking parlor



**2** These germs make it to colonize the teat end and enter the udder



**3** Germs ascend to the healthy alveolus of the gland to establish infection.



**4** White Blood Cells (somatic cells) are sent to the infected tissue to fight the germs, thereby, they become a component in the milk of mastitic cows.

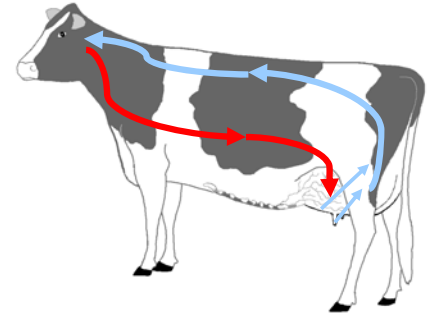
# WHY MILKING PROCEDURES?

## Forestripping

Only practical tool to identify clinical mastitis during milking



Stimulates oxytocin release in the brain, which in turn induces milk let down



Humberto Rivera, 2004

## Predipping

Pre milking disinfection reduces:

- Amount of bacteria on the teat skin
- Chance of germs from entering the udder
- Bacterial presence in the bulk tank



Key points during application:

- Allow 20 to 30 sec of action
- Min. coverage: 75% of the teat

## Wiping

- Wipes off predip removing dirtiness and germs
- Dries and cleans the teat prior to unit attachment



Key point during application:

- One individual clean and dry towel per cow
- Teat totally clean, especially teat end

## Unit attachment

Clean, dry and milk-ballooned teats (appropriate stimulation time: 60-90 sec)

There should be immediate milk flow



Milking unit should be straight and balanced

During unit attachment and during milking air entrance should be prevented



Incorrect

Correct

## Postdipping

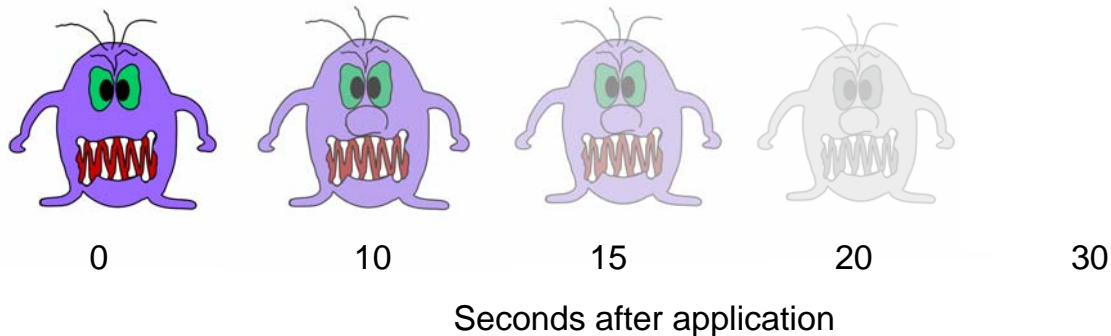
Normally after milking, teat end will be relaxed for the next 20 minutes. During this period, postdipping will be the only defense of the udder against mastitis causing germs



Offering fresh feed after milking prevents cows from laying down, and allow the product to reach its protective action before cows are exposed to sources of contamination in the pen

# DESINFECTANTS AND ANTIBIOTICS

## DESINFECTANTS

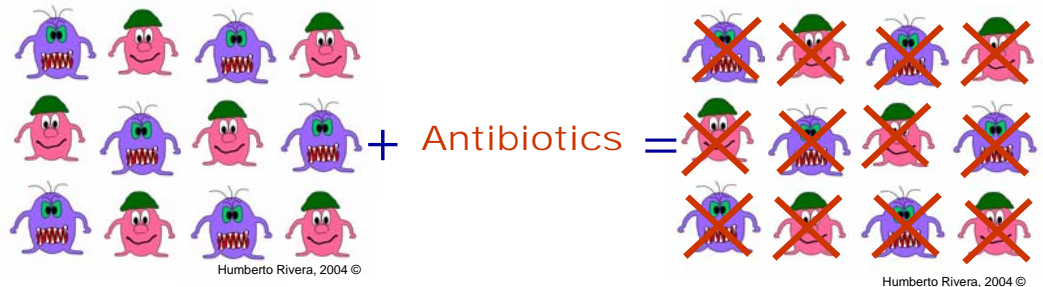


Disinfectants need time to kill bacteria, although they do not completely eliminate them. These products may be applied externally on the animal body (antiseptics), or on milking equipment (disinfectants).

## ANTIBIOTICS

**Medications administered to the cow to kill disease causing bacteria.**

They do not kill either virus or fungi, and need several days of action to achieve good results.



Antibiotics do not differentiate among “good” and “bad” bacteria, thus, they also kill benign bacteria. In such a case, the body of the cow may not be strong enough to fight new infections.

## DANGER: ANTIBIOTICS

- Extended use, or poor antibiotic selection lead to development of antibiotic resistance. Poor selection also favor the development of bacteria resistant to antibiotic.
- Antibiotics can destroy benign digestive flora. These good bacteria are important for digestion processes.
- In mild cases, the cow can fight the infection on her own without antibiotics.
- Antibiotics contaminate milk, and that is hazardous to consumers.
- **Extra-label use of antibiotics is restricted to veterinarians** to determine what, how, when and the appropriated dosage of antibiotic to be used.



# FACILITIES HYGIENE

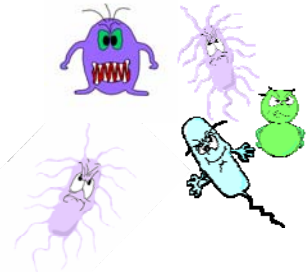
## MILK HYGIENE BEGINS WITH FACILITIES HYGIENE



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Unsanitary, dirty pens represent high number of bacteria and high risk of mastitis because:

- Cows lie down on dirty beds, and udder become contaminated
- Manure is scattered on cows' udders when they are forced to run or walk fast

Scrape pens every time cows are milked (2 or 3 times per day)



Provide clean bedding 1 or 2 times per week.

*Remember.* The bed is in **direct contact** with the udder.

## POOR HYGIENE AND STRESS: FATAL COMBINATION



How clean or dirty the cows are when entering the parlor reflects not only on facilities hygiene, but also how the cows are handled in the pens by the farm personnel. Under stress, cow body defenses are suppressed making her more vulnerable to disease.

