MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH

UNIVERSITY OF KERBALA

COLLEGE OF VETERINARY MEDICINE

**Mastitis in Cows**

**التهاب الضرع في الأبقار**

Supervision

Assistant Professor Dr.Hayder Badri Abboud

الاستاذ المساعد الدكتور حيدر بدري عبود

By

Ameer Hameed Kadhum

امير حميد كاظم الشيخ

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**Mastitis in cows**

[](http://en.wikipedia.org/wiki/File:Mamite_%C3%A5_grangrin_vatche_p%C3%A9s_fritches.jpg)

[Gangrenous](http://en.wikipedia.org/wiki/Gangrene) mastitis in a cow after 10 days. Green arrow indicates complete [necrosis](http://en.wikipedia.org/wiki/Necrosis) of the [teat](http://en.wikipedia.org/wiki/Teat). Yellow arrows indicate the limits of the gangrenous tissue, but the necrotic area is not well delimited on the upper part of the udder.

[**Mastitis**](http://en.wikipedia.org/wiki/Mastitis) **in** [**cow**](http://en.wikipedia.org/wiki/Dairy_cattle) is the persistent, [inflammatory](http://en.wikipedia.org/wiki/Inflammation) reaction of the [udder](http://en.wikipedia.org/wiki/Udder) tissue. This potentially fatal [mammary gland](http://en.wikipedia.org/wiki/Mammary_gland) [infection](http://en.wikipedia.org/wiki/Infection) is the most common [disease](http://en.wikipedia.org/wiki/Disease) in [dairy cattle](http://en.wikipedia.org/wiki/Dairy_cattle) in the [United States](http://en.wikipedia.org/wiki/United_States). It is also the most costly to the [dairy industry](http://en.wikipedia.org/wiki/Dairy).[[1]](http://en.wikipedia.org/wiki/Mastitis_in_dairy_cattle#cite_note-mcdill-1) Milk from cows suffering from mastitis has an increased [somatic cell count](http://en.wikipedia.org/wiki/Somatic_cell_count).

**Definition**

Mastitis occurs when [white blood cells](http://en.wikipedia.org/wiki/White_blood_cells) (leukocytes), are released into the [mammary gland](http://en.wikipedia.org/wiki/Mammary_gland), usually in response to an invasion of [bacteria](http://en.wikipedia.org/wiki/Bacteria) of the teat canal. [Milk](http://en.wikipedia.org/wiki/Milk)-secreting tissue, and various ducts throughout the mammary gland are damaged due to [toxins](http://en.wikipedia.org/wiki/Toxin) by the bacteria. Mastitis can also occur as a result of [chemical](http://en.wikipedia.org/wiki/Chemical), mechanical, or thermal injury. The udder sac is hard, tight, and firm.

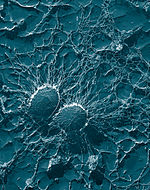
**Identification**

[](http://en.wikipedia.org/wiki/File:Mamite_grangrin_moirt_p%C3%A9s.JPG)

A gangrened udder (which [sloughed](http://en.wikipedia.org/wiki/Sloughing) naturally)

This disease can be identified by abnormalities in the udder such as swelling, heat, redness, hardness or pain if it is clinical. Other indications of mastitis may be abnormalities in milk such as a watery appearance, flakes, or clots. When infected with subclinical mastitis, a cow does not show any visible signs of infection.[[1]](http://en.wikipedia.org/wiki/Mastitis_in_dairy_cattle#cite_note-mcdill-1)

**Mastitis-causing bacteria**

[](http://en.wikipedia.org/wiki/File:Staphylococcus_aureus,_50,000x,_USDA,_ARS,_EMU.jpg)

Bacterial cells of [*Staphylococcus aureus*](http://en.wikipedia.org/wiki/Staphylococcus_aureus), one of the causal agents of mastitis in dairy cows. Its large capsule protects the organism from attack by the cow's immunological defenses.

Bacteria that are known to cause mastitis include:

* [*Pseudomonas aeruginosa*](http://en.wikipedia.org/wiki/Pseudomonas_aeruginosa)
* [*Staphylococcus aureus*](http://en.wikipedia.org/wiki/Staphylococcus_aureus)
* [*Staphylococcus epidermidis*](http://en.wikipedia.org/wiki/Staphylococcus_epidermidis)
* [*Streptococcus agalactiae*](http://en.wikipedia.org/wiki/Streptococcus_agalactiae)[[2]](http://en.wikipedia.org/wiki/Mastitis_in_dairy_cattle#cite_note-2)
* [*Streptococcus uberis*](http://en.wikipedia.org/wiki/Streptococcus_uberis)
* [*Brucella melitensis*](http://en.wikipedia.org/wiki/Brucella_melitensis)
* [*Corynebacterium bovis*](http://en.wikipedia.org/wiki/Corynebacterium_bovis)
* [*Mycoplasma*](http://en.wikipedia.org/wiki/Mycoplasma) (various species)
* [*Escherichia coli*](http://en.wikipedia.org/wiki/Escherichia_coli)*, (E. coli)*
* [*Klebsiella pneumoniae*](http://en.wikipedia.org/wiki/Klebsiella_pneumoniae)
* [*Klebsiella oxytoca*](http://en.wikipedia.org/wiki/Klebsiella_oxytoca)
* [*Enterobacter aerogenes*](http://en.wikipedia.org/wiki/Enterobacter_aerogenes)[[3]](http://en.wikipedia.org/wiki/Mastitis_in_dairy_cattle#cite_note-3)
* *Pasteurella spp.*[[4]](http://en.wikipedia.org/wiki/Mastitis_in_dairy_cattle#cite_note-4)
* [*Trueperella pyogenes*](http://en.wikipedia.org/w/index.php?title=Trueperella_pyogenes&action=edit&redlink=1)[[5]](http://en.wikipedia.org/wiki/Mastitis_in_dairy_cattle#cite_note-5) (previously *Arcanobacterium pyogenes*)
* *Proteus spp.*[[6]](http://en.wikipedia.org/wiki/Mastitis_in_dairy_cattle#cite_note-protnotes-6)
* [*Prototheca zopfii*](http://en.wikipedia.org/w/index.php?title=Prototheca_zopfii&action=edit&redlink=1) (achlorophyllic [algae](http://en.wikipedia.org/wiki/Algae))
* [*Prototheca wickerhamii*](http://en.wikipedia.org/wiki/Prototheca_wickerhamii) (achlorophyllic algae)[[6]](http://en.wikipedia.org/wiki/Mastitis_in_dairy_cattle#cite_note-protnotes-6)

**Types of mastitis**

Mastitis may be classified according two different criteria: either according to the clinical symptoms or depending on the mode of transmission. 1. Clinical symptoms

* Clinical mastitis
* Sub-Clinical mastitis

2. Mode of transmission

* Contagious mastitis
* environmental mastitis

**Transmission and prevention**

Mastitis is most often transmitted by contact with the [milking machine](http://en.wikipedia.org/wiki/Milking_machine), and through contaminated hands or materials.

A good milking routine is vital. This usually consists of applying a pre-milking teat dip or spray, such as an iodine spray, and wiping teats dry prior to milking. The milking machine is then applied. After milking, the teats can be cleaned again to remove any growth medium for bacteria. A post milking product such as iodine-propelyne glycol dip is used as a disinfectant and a barrier between the open teat and the bacteria in the air. Mastitis can occur after milking because the teat holes close after 15 minutes if the animal sits in a dirty place with dung and urine.

**Effects on milk composition**

[](http://en.wikipedia.org/wiki/File:Mamite_%C3%A5_colibacile_laecea.jpg)

Serious [exudate](http://en.wikipedia.org/wiki/Exudate) from udder in [E. coli](http://en.wikipedia.org/wiki/E._coli) mastitis in cow (left), in comparison to normal milk (right)

Mastitis can cause a decline in [potassium](http://en.wikipedia.org/wiki/Potassium) and [lactoferrin](http://en.wikipedia.org/wiki/Lactoferrin). It also results in decreased [casein](http://en.wikipedia.org/wiki/Casein), the major [protein](http://en.wikipedia.org/wiki/Protein) in milk. As most [calcium](http://en.wikipedia.org/wiki/Calcium) in milk is associated with casein, the disruption of casein synthesis contributes to lowered calcium in milk. The milk protein continues to undergo further deterioration during processing and storage.[[7]](http://en.wikipedia.org/wiki/Mastitis_in_dairy_cattle#cite_note-virginia-7) Milk from cows with mastitis also has a higher somatic cell count.[[8]](http://en.wikipedia.org/wiki/Mastitis_in_dairy_cattle#cite_note-8) Generally speaking, the higher the somatic cell count, the lower the milk quality.

**Industry costs**

This disease costs the US dairy industry about 1.7 to 2 billion [USD](http://en.wikipedia.org/wiki/USD) each year.[[7]](http://en.wikipedia.org/wiki/Mastitis_in_dairy_cattle#cite_note-virginia-7)

**Treatment**

Treatment is possible with long-acting [antibiotics](http://en.wikipedia.org/wiki/Antibiotics), but milk from such cows is not marketable until drug residues have left the cow's system. Antibiotics may be systemic (injected into the body), or they may be forced upwards into the teat through the teat canal (intramammary infusion). Cows being treated may be marked with tape to alert dairy workers, and their milk is syphoned off and discarded. Vaccinations for mastitis do exist, but as they only reduce the severity of the condition, and do not prevent new infection they should be used in conjunction with a mastitis prevention program.

**Control**

Practices such as good [nutrition](http://en.wikipedia.org/wiki/Nutrition), proper milking [hygiene](http://en.wikipedia.org/wiki/Hygiene), and the culling of chronically infected cows can help. Ensuring that cows have clean, dry bedding decreases the risk of infection and transmission. Dairy workers should wear gloves while milking, and machines should be cleaned regularly to decrease the incidence of transmission.

**References**

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