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# A REVOLUTIONARY NEW TOOL FOR MASTITIS SCREENING

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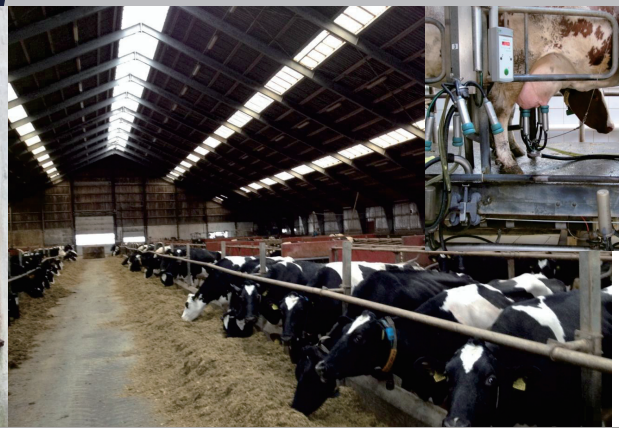



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## FACTS ABOUT MASTITIS

- Inflammation of the mammary gland
- Multifactorial disease (environment, keeping, feeding)
- Worldwide, mastitis is associated with economic losses of $35 billion annually **(Wellenberg et al., 2002)**
- Mastitis diagnosis: somatic cell counts (SCC) and bacteriology are standard **(Viguer et al., 2009)**



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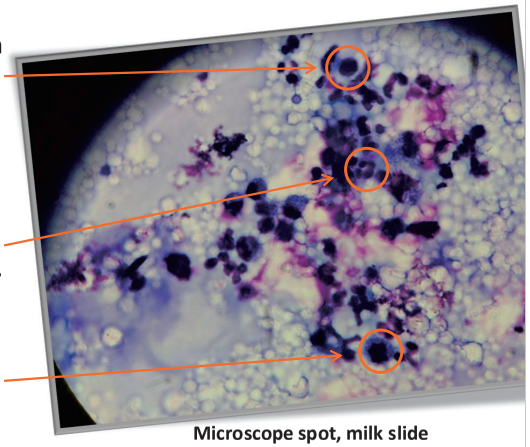
## CELLS IN MILK

**Consist mainly of three populations:**

1. **Lymphocytes** – Initiation and regulation of the immune response, production of antibodies **(Nickerson, 1989; Oviedo-Boyso et al., 2007)**
2. **Polymorphonuclear neutrophils (PMN)** – Phagocytosis of bacteria at the beginning of an inflammation **(Paape et al., 2002; Oviedo-Boyso et al., 2007)**
3. **Macrophages** – Regulation of immune response, phagocytosis of bacteria and cell debris **(Sordillo and Nickerson, 1988)**



Microscope spot, milk slide



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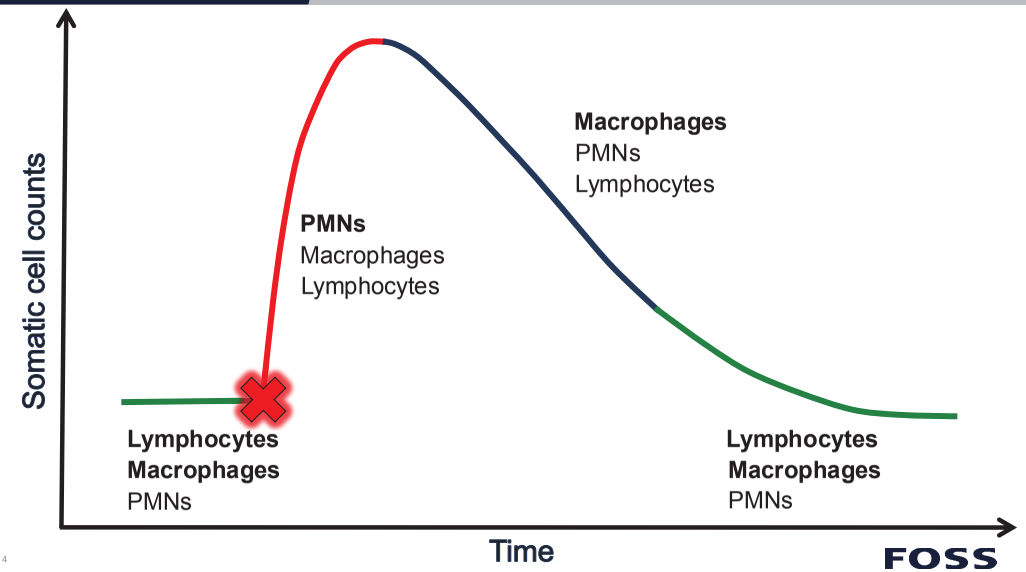
## SCHEMATIC DIAGRAM OF AN IMMUNE REACTION IN THE MAMMARY GLAND



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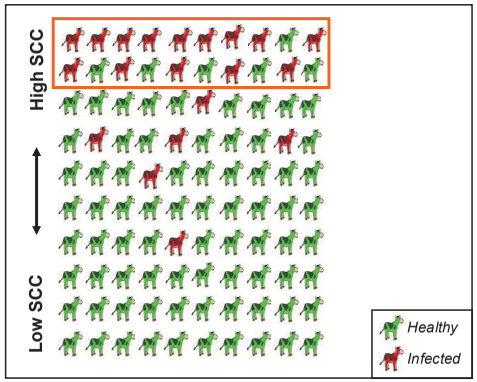
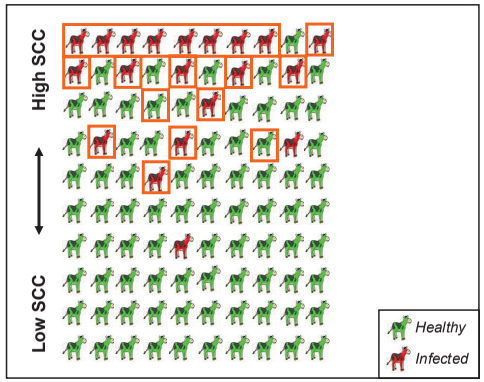
According to Rivas et al., 2001; Paape et al., 2002; Schwarz et al., 2011a,b

## ENHANCED TOOL FOR MASTITIS MONITORING

**Current state, SCC:**




**Prospective state, SCC and DSCC:**




→Targeted selection of suspicious cows



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## RECENT INVESTIGATIONS

- Key question: How to apply DSCC in the frame of regular DHI testing?

A. Type of milk sample

- DSCC literature based on investigation of quarter foremilk samples
- Relation between quarter foremilk and cow-composite (DHI sample)
- Hypothesis:

| Sample type | SCC (x 1,000 cells/ml) | SCC (%) |
|---|---|---|
| Composite | 12 | |
| FR | 21 | 36 |
| RR | 11 | |
| FL | 15 | |
| RL | 11 | |
| Composite | | |
| FR | | 11 |
| RR | 15 | 10 |
| FL | 97 | 67 |
| RL | 16 | 11 |
| | 3608 | |
| | 65 | 0.4 |
| RR | 16972 | 98 |
| FL | 153 | 1 |
| RL | 91 | 0.6 |

→ Quarter milking trial running



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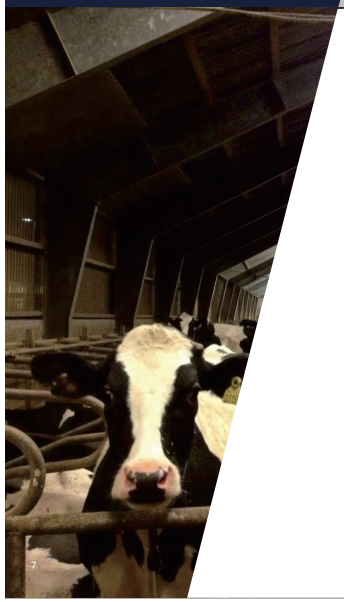
## RECENT INVESTIGATIONS (II)



B. Application of DSCC results in daily farm management

Better management of subclinical mastitis

- Identification of mastitis in its early stage

  → Information on time point of infe… segregation/treatment accordi… proinflammatory drugs)

- Identifications of … bacterial infection (selection for further a… PCR))

  → Se… special treatment on farm in order to … spread of infection

- …rmation about probability of cure

  → Prudent use of antibiotics: treatment worthwhile vs. non-treatable chronic infection

→ Cost-intensive longitudinal studies required



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## NEW RESEARCH PROJECT

- FOSS has joint forces with the Veterinary Institute of Technical University of Denmark and SEGES
- Financed by Danish Ministry for Environment and Food
- The project:
  - 3-year duration
  - Detailed investigation of the udder health status of 1,000 cows in 5 modern dairy herds
  - Main objective: Investigation of new parameters for mastitis monitoring and development of guidelines for using these new parameters on dairy farms



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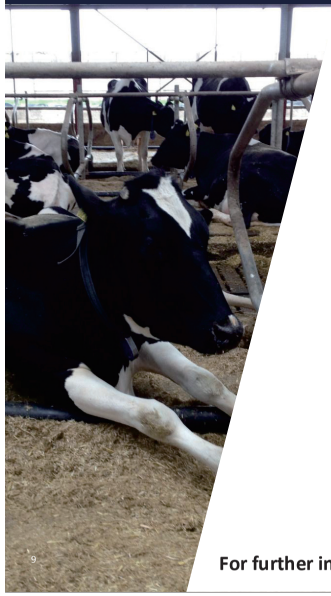
# A MESSAGE TO TAKE HOME



- Literature: SCC is an undisputed and well established criterion, but DSCC is well appropriated for more detailed characterization of udder health
- Promising new applications enabling a better management of subclinical mastitis:
  - Identification of mastitis in its early stage
  - Identification of cows with bacterial infection
  - Information about probability of cure
- A lot of research necessary in order to develop the actual application of DSCC in the frame of regular DHI testing

**For further information, please do not hesitate to contact: das@foss.dk**

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