

Foreword

Mastitis is considered the most frequent and most costly production disease in dairy herds of developed countries. The bacteria which cause the great majority of mastitis are adapted to the mammary gland of dairy ruminants, but some of them, such as *Staphylococcus aureus* or *Escherichia coli*, share certain virulence determinants with clinical isolates of human origin. The impact of mastitis on dairy farming and the industry is not only the result of revenue losses and added costs for control, but also increasingly involves animal welfare and the hygienic quality of milk. In the future, dairy farming will also have to integrate ecology, ethics, and the environmental impact. Research on the means to control mastitis will have to consider the expectations of the consumers, whose concept of milk quality is complex and subjective: milk is perceived as a “biological”, natural, healthy, maternal product.

Research on the control of mastitis uses approaches relying on different disciplines such as genetics, immunology, bacteriology, epidemiology. These various approaches are represented in the collection of papers making up this special issue, which begins with the evaluation of the economical impact of clinical mastitis. There is indeed a need for multi-field approaches to fight against this multifactorial disease, in which nevertheless the pathogens play a crucial part.

A particular emphasis was given to mammary gland inflammation, to its uses for diagnosis, and to its consequences for the defence against bacteria or for milk quality. A signal of the inflammatory response in milk is the influx of leucocytes, which is translated in mastitis jargon as the well-known “somatic cell count”. The somatic cell count, used as an indicator of inflammation, is widely used to monitor udder health and more recently in genetic selection programs. It is for the most part the reflection of the recruitment of neutrophils. All these reasons justify the attention given to this cell type: three papers deal specifically with the somatic cell count or with the bovine neutrophil, its functions and the consequences of its activities, and a fourth one devotes a large part of its content to the involvement of neutrophils in *E. coli* mastitis. Attention was also given to one component which helps neutrophils to fulfill their defensive role, the complement system. Even the current genetic approach to the control of mastitis relates to neutrophils, and this issue was not forgotten. Finally, although most of the articles here were consecrated to dairy cattle, small ruminant mastitis was not forgotten, because of the increasing attention paid to goat’s and ewe’s milk quality for cheesemaking.

There was not enough place to deal with all the aspects of the current research on mastitis. In this special issue, one article deals with the bacteria themselves, but there is no paper devoted exclusively to their virulence for the udder of the ruminants. There is a lot of research to carry out in this field: a better knowledge of the pathogens would make it possible to fight better against them. Several quite distinct pathogens are involved in mastitis, but, with one exception, the pathogen-specific mastitis were not treated separately. Only coliforms are dealt with as such, because they cause clinical mastitis, and coliform mastitis constitutes the most visible problem in herds. Logically, since few

things were told of the bacteria, vaccination against mastitis, based on knowledge of the antigens and of the pathogenesis of the infection, was not tackled. These aspects of mastitis research would constitute another approach of the subject, and would amount to enough material for another special issue.

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