Dependence between acute phase response, oxidative status and mastitis of cows

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Abstract

There are many studies exploring the topic of acute phase response and oxidative status in inflammation of the mammary gland of cows. However, many phenomena are relatively not well known. Mastitis is associated with significantly higher concentrations of inflammatory and oxidative mediators in the cells and blood. Results of experiments have shown that there are evident changes in serum interleukins (IL), acidglycoprotein (alpha1AG), tumor necrosis factor (TNF), and haptoglobin (Hp). Thus, local as well as systemic inflammation might play important roles in increased mammary oxidative stress. Reactive oxygen species (ROS) have been implicated in the pathogenesis of a variety of diseases, including mastitis and in transgenic technology leading to production of new bacterial proteins, very important in prevention of mastitis. We can also observe an interaction between inflammatory and oxidative mediators. These results suggest an important role played by acute phase response and oxidative status in inflammation of the mammary gland.

Key words: acute phase response, oxidative status, mastitis, cows

Introduction

Inflammation of the mammary gland is one of the biggest health problems in dairy cows, and a disease widespread in dairy cattle (Peeler et al. 2002). It is a physiological, protective response and the reaction to any kind of injury or mammary tissue destruction. Inflammation of the mammary gland caused by various microorganisms, among them bacterial pathogens, is characterized by pathophysiological changes in body, udder and milk. We can distinguish a clinical and subclinical form (Malinowski 1997, Aiello and Mays 1998, Wu et al. 2005). The ratio between clinical and subclinical forms in some reports was estimated as 15 clinical to 40 subclinical cases (Atroshi et al. 1996, Crist et al. 1997, Philpot and Nickerson 2000, Cook et al 2002).

The initial response of the body to foreign agents (e.g. bacteria) is usually local at the site of infection and involves neutrophils, macrophages, and other immune cells. This response includes the release of small proteins known as cytokines from macrophages and other neutrophils. The cytokines act as intercellular messengers to regulate cellular responses (van Deuren et al. 1992, Godson et al. 1995, Schijns and Horzinek 1997, Gregory 1998, Wesson et al. 2000). Some researchers have found that the degree of mammary gland tissue damage can be evaluated by systemic release of inflammatory mediators (Perl et al. 1996).