ACUTE PHASE VARIABLES TO ASSESS HEALTH IN VARIOUS SPECIES

Mathilda JM Toussaint1, Caroline J Hogarth1,2, T Kim A Nguyen1,3, Erik Gruys1
1Department of Pathobiology, Faculty of Veterinary Medicine, Utrecht University, Utrecht, The Netherlands, 2Department of Veterinary Clinical Studies, University of Glasgow, Glasgow, Scotland, 3Animal Sciences Group, Lelystad, The Netherlands.

Introduction

During tissue damage, infection and inflammation, pro-inflammatory cytokines are liberated. This first reaction of the body to immunological stress is the innate, non-specific, response preceding specific immune reactions. Within a few hours after infection the pattern of protein synthesis by the liver is drastically altered (1). Some proteins show an increase in concentration, the positive reactants (such as C-reactive protein (CRP)), whereas others decrease, the negative ones (such as albumin, retinol binding protein (RBP) and alpha-1 lipoprotein). Individual variability in reactivity occurs and depending on energy balance, the negative blood variables may be more indicative of a changed metabolism than the positives. The positive APPs are regarded as having general functions in opsonisation and trapping of micro-organisms and their products, in activating complement, in binding cellular remnants like nuclear fractions, in neutralising enzymes, scavenging free haemoglobin and radicals, and in modulating the host's immune response. Measurement of positive acute phase variables in combination with negative ones and calculation of an index results in a rather sensitive method to analyse the nutritional and inflammatory state of an individual.

The index has been used as prognostic inflammatory and nutritional index (PINI) for human patients (2,3) and as acute phase index (API) for cattle (4). When well chosen it becomes a nutritional and acute phase indicator (NAPI). Such index enhances sensitivity and specificity in comparison to single APPs remarkably detect non-healthy subjects in populations of normal animals, as was shown for cattle and finishing pigs at slaughter (4-6) and was favoured in experiments with Streptococcus suis infection (5).

Results from measurements in cattle and pig will be shown as model for other species including man. Furthermore preliminary results from milk analyses are presented. Milk is described to contain a specific isotype of SAA, measurable in mastitis cows at an earlier moment compared to the elevation of SAA found in blood (7). Isoelectric focus (IEF) was used for a time curve of samples from cows intra-mammarily infected with E. coli 0:157 (30 cfu in one quarter) for detecting SAA isoforms in blood and milk. With these findings an easy and reliable to determine, early determent of mastitis blood values were determined. These values are calculated here.

Isoelectric focus (IEF) and Western blot (WB) techniques were performed routinely. For detecting SAA isoforms on the WB after IEF, the biotinylated anti human antibody from a commercial kit (TP 802, Tridelta, Ireland) in 1:100 dilution was used, followed by Streptavidin-Horse Radish Peroxidase, 1:4000. (DAKO, Denmark), and visualization by incubating for 10 to 15 minutes with a TBS solution containing 0.5 mg/ml 3,3’-diaminobenzidin (Sigma-Aldrich, USA) and 0.02% of 30% hydrogen peroxide (Merck, Germany).

Discussion

The findings presented indicate the calculated index to be more powerful in discriminating between normal and diseased animals. Furthermore the results indicate milk SAA to be a marker for infectious mammary disorders. The milk isof orm has a different pi, compared to the plasma isoform and it was measurable at an earlier time point compared to the blood plasma SAA.

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References