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GLYCOSYLATION PATTERNS OF SERUM PROTEINS DURING EXPERIMENTAL INFECTION OF MICE WITH *Toxoplasma gondii*

Heegaard PMH, Lind P

Danish Institute for Food and Veterinary Research, Department of Veterinary Diagnostics and Research, Copenhagen, Denmark. E-mail: pmhh@dfvf.dk

Introduction

The acute phase protein (APP) response is accompanied by profound and transient changes in the glycosylation patterns of serum glycoproteins. These changes generally last for the duration of the acute phase protein response with the biggest changes generally observed at the peak APP response. A mouse model of aseptic inflammation for the study of such changes was previously established by us and it was shown that the glycosylation changes occurred not only in positive acute phase glycoproteins but also in non-reacting and negatively reacting glycoproteins . Interestingly, the pattern of change was constant for all glycoproteins investigated. Here we wanted to study the glycosylation changes during infection with the parasite *Toxoplasma gondii*.

Materials & Methods

Mice were inoculated i.p. with strain SSI119 of *T. gondii* and bled and killed at different times thereafter in groups of four until 27 days p.i. A control group received PBS. Crossed immunoelectrophoresis of serum samples with lectin- (con A-) interaction was used for quantitation of glycoforms of alpha-1-esterase and alpha-1-protease inhibitor. We measured the precipitate areas of the different glycoform subfractions which were classified according to lectin-binding as either non-reacting (0), weakly reacting (1) or strongly reacting (2). A summary measure of lectin reactivity ((0+1)/2) was then depicted as a function of day p.i.

Results

Alpha-1-esterase (a negative acute phase protein) and alpha-1-protease inhibitor (non-reacting) both exhibited a change in glycosylation patterns towards a greater proportion of lectin (con A) non-reactive glycoform subfractions during the acute phase of the *T. gondii* infection, corresponding to earlier findings in an aseptic inflammation model in mice. The glycosylation changes reflected accurately the onset and duration of systemic acute disease and traditional acute phase protein responses in the model. Furthermore, when comparing different doses of *T. gondii* inocula, the glycosylation response was found to correlate, with the higher dose leading to earlier glycosylation changes that the lower dose. With the high dose inoculation these changes occurred earlier than the serum TNF-alpha response.
This is the first demonstration of the kinetics and range of glycosylation changes during an experimental infection with *Toxoplasma gondii* in mice.

Discussion

As a qualitative measure that is general, sensitive and independent of the acute phase nature of the glycoproteins, determination of glycoform patterns or lectin reactivity indexes holds promise as a rapid, robust and simple method for the early detection of an ongoing acute phase reaction in a serum sample. It remains to be established if such reactions also occur in production animals like pigs and cattle and if the reactions in these species are also generalised and not dependent on glycoprotein type.