Involuntary culling (IC) is where a cow is disposed of due to injury, poor health or infertility. The main reasons for IC are infertility, mastitis and lameness. These reasons have differing age profiles in when they affect cows, cost variable amounts to treat and have an effect on the value of the cow at market. They also reduce cow welfare in different ways. These factors influence the economically optimum cow replacement decision, which must balance the risks of future loss from the current cow against its future prospects and the net costs of a replacement. So the farmer's economic decision as to when to cull a cow may not occur at the same time as when the cow could, and sometimes should, be culled to maximise her welfare. To explore this dilemma, we developed a Dynamic Programme (DP) model to assess the optimum replacement policies for each of 180 possible cow states (12 parities and 15 milk-yield levels) under a simplified set of alternative husbandry systems and remedial practices. The DP was used to explore the relationships between financial outcomes, investment in improving welfare, lifespan and IC in dairy systems. There is a trade-off between dairy cattle lifespan and risk of suffering over which farmers have some control by the replacement and investment decisions they make. Our results show that improving cow welfare by reducing mastitis, lameness or infertility over the long term increases the mean longevity of the herd and also reduces the potential of long-term suffering resulting from chronic conditions. Additionally, it has the effect of increasing replacement opportunities and the annuities for each cow (pound per cow per year) mainly by increasing milk yield and reducing costly on-farm culls, creating a win-win situation for both farmer and cow.

subsp. heat shock protein 70 (Hsp70) is an immunodominant antigen, which can be used as a subunit vaccine against bovine paratuberculosis. In the present study, we evaluated the immunogenic activities of Hsp70 expressed by DNA vaccine in chicken and the use of prepared specific avian IgY antibodies for western blotting and ELISA methods. The gene encoding Hsp70 was subcloned into the eukaryotic expression vector, pcDNA3.1, and the recombinant plasmid (pcDNA3.1- Hsp70) transfected into COS-7 cells. Chickens were also immunized with pcDNA3.1- Hsp70, and egg yolk antibodies extracted from eggs were collected after immunization. DNA-designed IgY antibody was used in Western blotting analysis to detect the expression of Hsp70, and in a sandwich ELISA to assess the prevalence of anti-Hsp70 antibodies in cattle serum. Western blotting results indicate the expression of r hsp70 in COS-7 cells and sandwich ELISA could detect anti-Hsp70 antibodies in 7.5% of cows. Chicken immunization with pcDNA3.1-Hsp70 could demonstrate the effective production of anti-Hsp70 IgY antibodies. Monospecific anti-Hsp70 antibody generated in chickens is useful for detection of Hsp70 peptide in cell culture and lysate.
Infection and Immunity, 80, 2100-2108

Natural killer T (NKT) cells are known to play a protective role in the immune responses of mice against a variety of infectious pathogens. However, little is known about the detailed information of NKT cells in patients with Mycobacterium tuberculosis infection. The aims of this study were to examine NKT cell levels and functions in patients with active M. tuberculosis infection, to investigate relationships between NKT cell levels and clinical parameters, and to determine the mechanism responsible for the poor response to alpha-galactosylceramide (alpha-GalCer). NKT cell levels were significantly lower in the peripheral blood of pulmonary tuberculosis and extrapulmonary tuberculosis patients, and the proliferative responses of NKT cells to alpha-GalCer were also lower in patients, whereas NKT cell levels and responses were comparable in latent tuberculosis infection subjects and healthy controls. Furthermore, this NKT cell deficiency was found to be correlated with serum C-reactive protein levels. In addition, the poor response to alpha-GalCer in M. tuberculosis-infected patients was found to be due to increased NKT cell apoptosis, reduced CD1d expression, and a defect in NKT cells. Notably, M. tuberculosis infection was associated with an elevated expression of the inhibitory programmed death-1 (PD-1) receptor on NKT cells, and blockade of PD-1 signaling enhanced the response to alpha-GalCer. This study shows that NKT cell levels and functions are reduced in M. tuberculosis-infected patients and these deficiencies were found to reflect the presence of active tuberculosis.

Rheumatology, 51, 1070-1075

Objectives. To describe the clinical, laboratory, histopathological presentations and final diagnoses for children presenting to a tertiary paediatric rheumatology service with an inflammatory lesion of the orbit. Methods. This was a retrospective descriptive case series of children with an inflammatory lesion of the orbit presenting to a single paediatric rheumatology service between January 1999 and July 2010. Results. Ten patients, median age 11.5 (range 3.1-16.2) years at referral to the paediatric rheumatology department were identified; median duration of symptoms at referral was 9 (0.75-17) months. Imaging was performed in 9/10 cases: orbital MRI (n = 4), orbital CT scan (n = 1), both MRI and CT scan (n = 4). All 10 patients had an orbital biopsy; 2 patients had repeat biopsies. The final diagnoses were granulomatosis with polyangiitis (Wegener's) (n = 5; ANCA positive n = 4, ANCA negative n = 1), idiopathic orbital inflammation (n = 3), atypical mycobacterial infection (n = 1) and sarcoidosis (n = 1). Conclusion. Inflammatory mass lesion of the orbit is an unusual presentation in children. The differential diagnosis is wide and may evolve over time. Orbital biopsy and screening for systemic features is essential before treatment with CSs or other immunosuppressants to exclude malignancy, infection, vascular lesions, autoimmune conditions or other causes of orbital inflammation that can be associated with serious systemic manifestations.

Bmc Nephrology, 13, Article Number: 13 DOI: 10.1186/1471-2272-13-13 Published: MAR 21 2012-Background: Molecular mimicry between microbial antigens and host-proteins is one of the etiological enigmas for the occurrence of autoimmune diseases. T cells that recognize cross-reactive epitopes may trigger autoimmune reactions. Intriguingly, autoimmune diseases have been reported to be prevalent in tuberculosis endemic populations. Further, association
of Mycobacterium tuberculosis (M. tuberculosis) has been implicated in different autoimmune diseases, including rheumatoid arthritis and multiple sclerosis. Although, in silico analyses have identified a number of M. tuberculosis specific vaccine candidates, the analysis on prospective cross-reactive epitopes, that may elicit autoimmune response, has not been yet attempted. Here, we have employed bioinformatics tools to determine T cell epitopes of homologous antigenic regions between M. tuberculosis and human proteomes. Results: Employing bioinformatics tools, we have identified potentially cross-reactive T cell epitopes restricted to predominant class I and II alleles of human leukocyte antigens (HLA). These are similar to peptides of mycobacterial proteins and considerable numbers of them are promiscuous. Some of the identified antigens corroborated with established autoimmune diseases linked with mycobacterial infection. Conclusions: The present study reveals many target proteins and their putative T cell epitopes that might have significant application in understanding the molecular basis of possible T cell autoimmune reactions during M. tuberculosis infections.


Background: The first identified susceptibility gene for Crohn's disease, NOD2, acts as a sensor for the bacterial-wall peptidoglycan fragment muramyl dipeptide (MDP) and activates the transcription factor nuclear factor-kappa B (NF-kappa B). Upon NF-kappa B activation, intestinal macrophages (IMACs) induce expression of macrophage inflammatory protein (MIP)-3 alpha to attract memory T lymphocytes. We therefore investigated the influence of NOD2 ligation of IMAC differentiation and functional MIP-3 alpha induction. Methods: Human embryonal kidney HEK293 cells were transfected with NOD2 wildtype (NOD2(WT)) and the NOD2 SNP13 variant (NOD2(L1007fsinsC)) and stimulated with MDP. Recruitment of CD45R0(+) and Th17 cells was determined by immunohistochemistry. Results: Endogenous NOD2 stimulation was followed by a dose-dependent increase in MIP-3 alpha secretion in MONO-MAC-6 (MM6) cells. MIP-3 alpha mRNA was also significantly (^ p < 0.05) induced in HEK293 transfected with NOD2(WT) via MDP ligation. In vivo cell-cell contacts between IMACs and CD45R0(+) memory T cells as well as recruitment of Th17 cells in patients of NOD2 variants were unchanged as compared to wild-type patients. Conclusion: Our data demonstrate a dose-dependent increase in MIP-3 alpha secretion in the human myeloid cell line MM6 upon MDP. However, MIP-3 alpha-driven recruitment of Th17 cells or CD45R0(+) memory T lymphocytes is not affected in patients carrying heterozygous NOD2 variants. Copyright (C) 2012 S. Karger AG, Basel