

## Chicken MHC Class I genes in B and Rfp-Y are members of two different gene families

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# AVIAN IMMUNOLOGY RESEARCH GROUP

Avian Immunology Meeting 1996

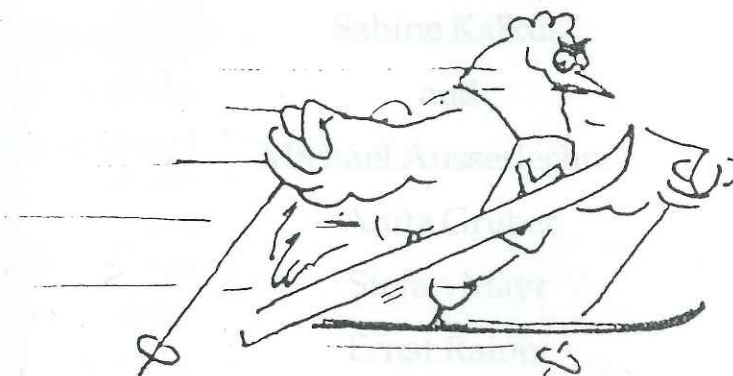
April 21 - 24, 1996

**Avian Immunology Meeting 1996**

April 21 - 24, 1996

Obergurgl, Tyrol, Austria

Special thanks are due to:

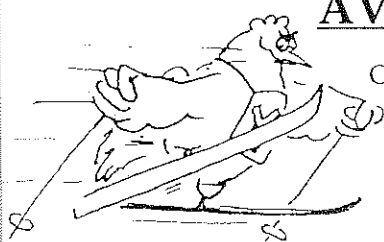


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# AVIAN IMMUNOLOGY RESEARCH GROUP



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AIRG MEETING - Obergurgl, Tyrol, Austria, 21 - 24 April 1996

## Program

### Saturday, April 20, 1996

REGISTRATION: reception at Hotel Hochfirst, Obergurgl, Tyrol

20.00 DINNER

### Sunday, April 21, 1996

14.30 K. Hala and H. Dietrich: Opening Remarks

#### Development and function of macrophages

Chairpersons: H.S. Lillehoj, B. Kaspers

14.45 Keyspeaker: S.H.M. Jeurissen

Non lymphoid cells in chicken immune system.

15.15 C. Corbel, O. Pourquié, F. Cormier, & N.M. Le Douarin

BEN/SC1/DM-GRASP, a homophilic adhesion molecule, required for *in vitro* myeloid colony formation by avian hemopoietic progenitors.

15.30 B. Kaspers, M. Gütlich, I. Ziegler, & U. Lösch

Coordinate induction of tetrahydrobiopterin synthesis and NOS activity in chicken macrophages.

15.45 M. Zenke

Assessing the gene expression repertoire of antigen-presenting dendritic cells.

16.00 COFFEE BREAK

## Immunogenetics (MHC)

Chairpersons: J. Kaufman, J. Plachy

- 16.30 M. Afanassieff, R. Zoorob, M.M. Miller, F. Coudert, & C. Auffray  
Chicken MHC class I genes in *B* and *Rfp-Y* are members of two different gene families.
- 16.45 H.R. Juul-Madsen & J.E. Hedemand  
*Rfp-Y* haplotypes on the basis of MHC class II RFLP and MLR analysis.
- 17.00 J. Salomonsen, D. Avila, R. Brodersen, L. Engel, O. Vainio, M. Wiles, & J. Kaufmann  
Cloning and analysis of chicken MHC class II alpha cDNA.
- 17.15 J. Kaufman  
MHC-determined resistance of chickens to infectious pathogens may be due to the simple nature of the MHC of chickens compared to mammals.
- 17.30 J. Plachy, J. Svoboda, J. Hejnar, J. Geryk, & K. Hala  
Specific rejection immunity against *src* oncogene-induced tumors in inbred chickens.
- 17.45 P. Thoraval, E. Esnault, F. Coudert, & G. Dambrine  
Genetic resistance to Rous sarcoma virus induced tumors in B19 chicken line is antiviral.

18.15 DINNER

## Immunity, vaccines, mucosal immunology

Chairpersons: T. Schat, P. Thoraval

- 20.00 R. Baelmans, F. Demey, V.S. Pandey, P. Dorny, & A. Verhulst  
Complement system: a neglected tool in immunological studies of chickens.
- 20.15 T. Göbel  
Avian natural killer cells: characterization of their phenotype, tissue distribution and generation of NK cell lines.
- 20.30 A.R. Omar & T. Schat  
Characterization of Marek's disease virus-specific cytotoxic T cells.
- 20.45 F. Lescure, F. Poisson, F. Lasserre, F. Guyonnet, A. Goudeau, F. Barin, & G. Dambrine  
Location of epitopes on the major core protein *p27* of avian retroviruses.
- 21.00 D.E. Heller, N. Yonash, J. Hillel, & A. Cahaner  
Selection for increased immune response by DNA markers.
- 21.15 G. Agbede, J.-G. Bell, F. Demey, R. Baelmans, & A. Verhulst  
Variability of the humoral and cellular immune responses in native chickens from Cameroon.
- 21.30 P.H. Russell & P.N. Dwivedi  
Virus replication and cellular changes in the Harderian gland after eyedrop vaccination with the Hitchner B1 strain of Newcastle Disease Virus.
- 21.45 G. Koch, J. Hartog, & K.A. Schat  
MHC-restricted cytotoxic cell response directed against Newcastle disease virus.

## CHICKEN MHC CLASS I GENES IN *B* AND *Rfp-Y* ARE MEMBERS OF TWO DIFFERENT GENE FAMILIES.

M. Afanassieff<sup>1,3</sup>, R. Zoorob<sup>2</sup>, M.M. Miller<sup>1</sup>, F. Coudert<sup>3</sup>, and C. Auffray<sup>2</sup>.

<sup>1</sup>Beckman Research Institute, City of Hope, Duarte, CA 91010, USA; <sup>2</sup>CNRS UPR 420, BP 8, 94801 Villejuif Cedex, France; <sup>3</sup>INRA-Tours, Station de PAP, 37380 Nouzilly, France.

The chicken major histocompatibility complex (*Mhc*) genes are organized in two genetically independent systems, designated *B* and *Rfp-Y* (1), corresponding to cosmid clusters I and II/III/IV, respectively, on the molecular map of chicken *Mhc* (2, 3, Miller *et al.* submitted). *B* and *Rfp-Y* each contain both class I and class II genes. This organization of *Mhc* genes into two systems might be of functional significance in chickens and perhaps represents an evolutionary important alternative way of organizing *Mhc* genes. To gain insight into the relationship between the *Rfp-Y* and *B* systems, we have analysed the class I genes in *B* and *Rfp-Y*. Until now, only one class I gene in the *B* system has been sequenced (4). We have sequenced the three other class I genes present in the cosmid clusters I and II/III/IV. The results show that the class I genes of *B* and *Rfp-Y* are structurally dissimilar. While the genes present within each system are highly similar to each other (about 94% homology in the coding sequence and 90% homology in the predicted protein sequence), the *B* and *Rfp-Y* genes are structurally distinct (about 76% homology in the coding sequence and 62% homology in the predicted protein sequence across the two families). Hence, the class I genes in *B* and *Rfp-Y* can be classified as members of two different gene families. A similar finding was shown earlier for the class II genes in *B* and *Rfp-Y* (5). These data indicate that *B* and *Rfp-Y* may have arisen by duplication and translocation of an entire region of *Mhc* genes. We are currently analysing the expression of *B* and *Rfp-Y* class I genes in several tissues of adult chickens by RT-PCR to determine if the organizational and structural separation of the two system is associated with a functional specialization as well. The first results show that the two class I genes of *B* system and at least one of the two class I gene of the *Rfp-Y* system are expressed.

(1) Briles *et al.* (1993) *Immunogenetics* 37: 408. (2) Guillemot *et al.* (1988) *EMBO J.* 7:2775. (3) Miller *et al.* (1994) *PNAS* 91:4397. (4) Kroemer *et al.* (1990) *Immunogenetics* 31:405. (5) Zoorob *et al.* (1993) *Eur. J. Immunol.* 23:1139.

## *Rfp-Y* haplotypes on the basis of MHC class II RFLP and MLR analysis

\*H. R. Juul-Madsen and J.E. Hedemand

Danish Institute of Animal Science, Research Center Foulum, DK-8830 Tjele, Denmark

Major histocompatibility complex (MHC) of the chicken, termed the B-system, includes three highly polymorphic loci separated on the basis of genetic and biochemical evidence. These loci are named B-F, B-L, and B-G. The B-F and B-L are equivalents of the mammalian MHC class I and class II molecules, respectively. In contrast, the B-G molecules have so far only been found in birds and the B-G molecules are as polymorphic as the B-F and B-L molecules, but their function is still unknown.

Recently, a new locus for MHC genes, termed the *Rfp-Y* system, was found in the chicken, but studies in back-cross families show that the *Rfp-Y* locus and the B-locus are unlinked. So far only limited information is available for the *Rfp-Y* system.

The resistance to Marek's Disease (MD) was shown to be associated with the B-F/B-L region, and not the B-G region, but it is known that other genes outside the B-system may play a role in resistance to MD.

We have defined new *Rfp-Y* haplotypes using standard B-complex characterized haplotypes (B21, B19, and B15) in order to establish well characterized herds of animals. The *Rfp-Y* haplotypes were defined on the basis of molecular genotyping with probes for B-L $\beta$  and *Rfp-Y* using different restriction enzymes and compared in mixed lymphocyte reaction (MLR).