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

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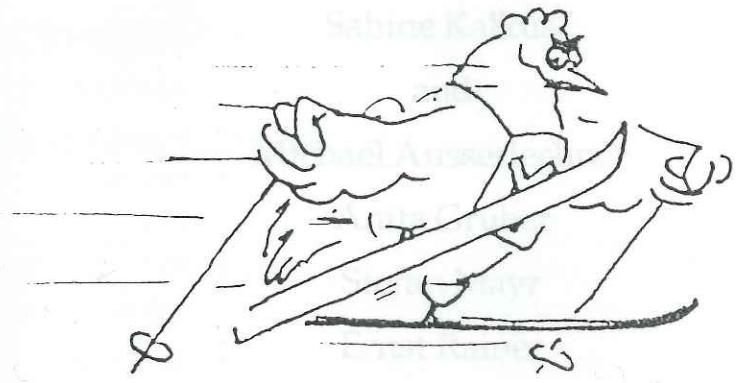
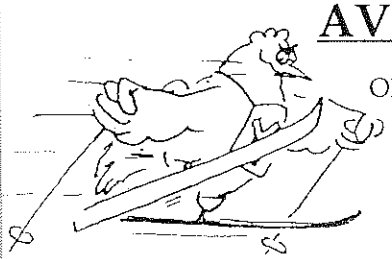
AVIAN IMMUNOLOGY RESEARCH GROUP

Avian Immunology Meeting 1996

April 21 - 24, 1996

Obergurgl, Tyrol, Austria





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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.

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[1]Beckman Research Institute, City of Hope, Duarte, CA 91010, USA; [2]CNRS UPR 420, BP 8, 94801 Villejuif Cedex, France; [3]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

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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 avaible 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-Lβ and Rfp-Y using different restriction enzymes and compared in mixed lymphocyte reaction (MLR).