Analysis of MHC polymorphism in a histocompatible B19 chicken line: role of Rfp-Y locus

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Analysis of MHC polymorphism in a histocompatible *B19* chicken line : role of the *Rfp-Y* locus.

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The chicken MHC was first described in 1950 as a locus controlling strong blood groups . It is composed of three highly polymorphic loci that have been defined by alloantisera and monoclonal antibodies, named *B-F*, *B-L* and *B-G*. The *B-F* and *B-L* genes code for molecules homologous to mammalian class I and class II proteins respectively. The *B-G* genes code for cell surface disulfide-linked dimers, related to mammalian butyrophilin and myelin/oligodendrocyte glycoprotein. Recently, a study of restriction fragment patterns presented by members of fully pedigreed families showed that chicken MHC genes are organized in two genetically independant systems : the *B* complex and the *Rfp-Y* system. Each system contains both class Iα and class IIβ genes. The two systems, although genetically unlinked, are located on the same chromosome apparently on the opposite side of the nucleolar organizer region. This organization of MHC genes in two systems might be of functional significance in chickens.
Molecular polymorphism of MHC was studied in serologically defined *B19* haplotype by use of class I, class II and class IV (*B-G*) probes in Southern blot experiments. All chickens studied shared identical class IV restriction patterns. In contrast, class I and class II probes revealed six and five subtypes of *B19* haplotypes, respectively. These subtypes may be resolved in three homozygous genotypes and their corresponding heterozygous combinations. We have shown by classical genetic testing within fully pedigreed families that some of the polymorphism of restriction fragments revealed in Southern blot hybridizations was due to fragments which do not segregate with the *B* complex but was contributed by alleles within the *Rfp-Y* locus. The existence of three *Rfp-Y* alleles was confirmed by the analysis of expression of the chicken class Iα in the *B19* polymorphic chickens by RT-PCR-SSCP.
Then we have studied the possible role of these *Rfp-Y* haplotypes in several immunological functions. Tests were conducted to determine whether graft versus host reaction, magnitude of responses in one-way mixed lymphocyte reaction and reciprocal skin graft rejection , differ in *B19* chickens selected for the presence of different alleles at the *Rfp-Y* locus. Results indicated that *Rfp-Y* alleles did not induce any significant response in graft versus host reaction nor in one-way mixed lymphocyte reaction. Skin graft rejection is under current investigation, but preliminary results seem to indicate that skin grafts when donor and receptor differ at *Rfp-Y* locus were rejected more frequently and at a faster rate than *Rfp-Y* compatible grafts.The question is : are *Rfp-Y* MHC genes expressed as minor histocompatibility antigens in chickens?