Insights into the evolution of B and Rfp-Y - Two genetically independent Mhc gene clusters in the chicken

Marielle Afanassieff, Rima Zoorob, Marcia M. Miller, Françoise Coudert, Charles Auffray

THE THIRTY-FIFTH MIDWINTER CONFERENCE OF IMMUNOLOGISTS

January 27-30, 1996
Asilomar Conference Center
Pacific Grove, California

Christel Uittenbogaart, Executive Director — Roberta Meyers-Elliott, Treasurer

REGULATION OF ANTIGEN-SPECIFIC IMMUNITY

Chairpersons: Mitchell Kronenberg and Susan Swain

The Dan H. Campbell Memorial Lecture
Saturday, January 27th, 8:00 PM

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National Jewish Center
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Denver, Colorado

"T-Cell Receptor Ligand Interactions"

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CONFERENCE SCHEDULE

Saturday, January 27th

8:00 PM	The Dan H. Campbell Memorial Lecture (Merrill Hall)
9:00 PM	Reception - (Nautilus and Triton Rooms)

Sunday, January 28th

8:30-12:00 Noon	SESSION I - Antigen/antigen receptor interactions
4:00- 6:00 PM	Poster Session and informal discussion groups (Firelight and Kiln Rooms)
7:30-10:00 PM	SESSION II - Antigen presentation
	Reception - (Firelight and Kiln Rooms)

Monday, January 29th

8:30-12:00 Noon	SESSION III - Development of memory cells
4:00- 6:00 PM	Poster Session and informal discussion groups (Firelight and Kiln Rooms)
7:30-10:00 PM	SESSION IV - Lymphocyte trafficking and homing
	Reception - (Firelight and Kiln Rooms)

Tuesday, January 30th

8:30-12:00 Noon	SESSION V - How pathogens modify the immune response

CONFERENCE PROGRAM

SESSION I

Sunday Morning
8:30-12:00 Noon

ANTIGEN/ANTIGEN RECEPTOR INTERACTIONS

Chairperson: MARK DAVIS

Speakers:

Lewis Lanier
DNAX Research Institute, Palo Alto, California
"Recognition of MHC class I by human NK and T cells"

Wayne Yokoyama
Washington University, St. Louis, Missouri
"The specificity of murine natural killer cells"

Mark Davis
Stanford University, Palo Alto, California
"T cell receptor biochemistry, repertoire selection and structure"

Stephen Jameson
University of Minnesota, Minneapolis, Minnesota
"T cell receptor interactions with antagonist ligands"

MIDWINTER CONFERENCE OF IMMUNOLOGISTS

POSTER ABSTRACT

(Briefly summarize theme below)

NAME: AFANASSIEFF Marielle TELEPHONE: (818) 301 8264

ADDRESS: Beckman Research Institute of City of Hope, Duarte, CA 91010

Insights into the evolution of *B* and *Rfp-Y* - Two genetically independent *Mhc* gene clusters in the chicken.

M. Afanassieff[1,3], R. Zoorob[2], M.M. Miller[1], F. Coudert[3], and C. Auffray[2].

[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 Iα and class IIβ 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 sequenced and analysed the two class Iα genes of *Rfp-Y* and the the remaining class Iα gene of *B*. Previously, only one of the two class I genes in the *B* system was sequenced (4). The class I genes of *B* and *Rfp-Y* are structurally dissimilar. While the two 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), comparisons across the systems show that the genes in each system are structurally distinct (about 76% homology in the coding sequence and 62% homology in the predicted protein sequence across the two systems). Hence, the class Iα genes in *B* and *Rfp-Y* can be classified as members of two different gene families. The class IIβ genes in *B* and *Rfp-Y* were shown earlier to also be members of two different gene families (5). These data indicate that *B* and *Rfp-Y* may have arisen by duplication and translocation of an entire gene region, followed by an additional duplication of individual class I and class II genes. We are currently analysing the expression of *B* and *Rfp-Y* class Iα 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: 408-414.
(2) Guillemot *et al.* (1988) *EMBO J.* 7:2775-2785.
(3) Miller *et al.* (1994) *PNAS* 91:4397-4401.
(4) Kroemer *et al.* (1990) *Immunogenetics* 31:405-409.
(5) Zoorob *et al.* (1993) *Eur. J. Immunol.* 23:1139-1145.

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DR. MITCHELL KRONENBERG
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