

Mouse Alloantigens

Major histocompatibility (MHC) is a group of antigens, most of which influence allograft rejection. These antigens can be divided into three major classes: class I, class II and class III. Mouse MHC antigen is also called H-2 antigen. Its gene is located on mouse chromosome 17.

Mouse MHC is composed of 11 subclasses. It includes the “classical MHC class I” (also called MHC-Ia) that comprises H-2D, H-2K and H-2L subclasses, the “non-classical MHC class I” (MHC-Ib) that comprises H-2Q, H-2M and H-2T subclasses, the “classical MHC class II” (MHC-IIa) that includes H-2A(I-A), H-2E(I-E) and H-2P subclasses, and the “non-classical MHC class II” (MHC-IIb) comprises H-2DM and H-2DO.

MHC class I molecules consist of a 45 kD highly glycosylated heavy chain non-covalently associated with a 12kD β 2-microglobulin, a polypeptide that is also found free in serum. Mouse MHC class II genes are located in the H-2 I region. The class II antigen is composed of a 33 kD α chain and a 28 kD β chain.

MHC class I antigens are expressed on almost all nucleated cells. They play an important role in presentation of altered self cell antigens (virally infected or tumor cells) to CD8⁺ cytotoxicity T cells. The MHC class II antigens are expressed on antigen presenting cells (B cells, monocytes/macrophages, dendritic cells, Langerhans cells, etc.) and a subset of T cells. They are involved in presentation of processed peptide antigens to CD4⁺ cells.

MHC molecules are highly polymorphic. Laboratory mice are inbred so that each strain is homozygous and has a unique MHC haplotype. The MHC haplotype in these strains is designated by a small letter (a, b, d, k, q, s, etc.). For example, MHC haplotype antigens of Balb/c mice are H-2K^d, H-2D^d, H-2L^d, I-A^d, and I-E^d.

Table: Some Commonly Used Laboratory Mouse Haplotypes and Alloantigens

Mouse Strains	MHC Haplotype	H-2K	H-2D	H-2L	I-A	I-E	Qa-2	Qa-1	CD8a (Ly-2)	CD8b (Ly-3)	CD45 (Ly-5)	Thy-1 (CD90)
129/-	b	b	b	null	b	k	a	b	2	2	2	2
A/J	a	k	d	d	k	k	a	a	2	2	2	2
AKR/J	k	k	k	null	k	k	b	b	1	1	2	1

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Mouse Alloantigens *(continued)*

Mouse Strains	MHC Haplotype	H-2K	H-2D	H-2L	I-A	I-E	Qa-2	Qa-1	CD8a (Ly-2)	CD8b (Ly-3)	CD45 (Ly-5)	Thy-1 (CD90)
BALB/cAnN	d	d	d	d	d	d	a	b	2	2		2
BALB/cBy	d	d	d	d	d	d	null	b				
BALB/CJ	d	d	d	d	d	d	a	b	2	2	2	2
BDP/J	p	p	p	p	p	p	b		1	2	2	2
BUB/BnJ	q	q	q	q	q	q			2			1
BXSB/Mp	b	b	b	null	b	null			2	2		1
C3H/Bi	k	k	k	null	k	k	b		1			2
C3H/He	k	k	k	null	k	k	b	b	1	2	2	2
C3HeB/FeJ	k	k	k	null	k	k						
C57BL/6	b	b	b	null	b	null	a	b	2	2	2	2
C57BL/10	b	b	b	null	b	null	a	b	2	2	2	2
C57BR/cdJ	K2	k	k	k	k	k	b	a	2	2	2	2
C57L/J	bc	b	b	null	b	null	a	b	2	2	2	2
C58/J	K2	k	k	null	k	k	b	a	1	1	2	2
C.B-17	d	d	d	d	d	d	a	b	2	2		2
CBA/Ca	k	k	k	null	k	k	b				2	2
CBA/J	k	k	k	null	k	k	b	b	1	2	2	2
CBA/N	k	k	k	null	k	k	b		1	2	2	2
CE/J	k	k	k	null	k	k	b		1	2	2	2
DA/HuSn	qp	q	s		q				2	2	1	2

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Mouse Alloantigens *(continued)*

Mouse Strains	MHC Haplotype	H-2K	H-2D	H-2L	I-A	I-E	Qa-2	Qa-1	CD8a (Ly-2)	CD8b (Ly-3)	CD45 (Ly-5)	Thy-1 (CD90)
DBA/1	q	q	q	q	q	null	a		1	2	2	2
DBA/2	d	d	d	d	d	d	a	b	1	2	2	2
FVB/N	q	q	q	q	q	q			2	2		1
GRS/J	dx	d	w3		f	null			1	2	2	2
HRS/J	k	k	k	null	k	k						
I/LnJ	j	j	b	b	j	j			1	2		2
LP/J	bc	b	b	null	b	null			2	2	2	2
MA/MyJ	k	k	k	null	k	k	b		1			1
MRL/Mp	k	k	k	null	k	k			1	1		2
NOD	g7	d	b	null	g7	null	a					2
NZB/-	d2	d	d	d	d	d	a		2	2	2	2
NZW/-	z	u	z	z	u	u	b					
P/J	p	p	p	p	p	p	b		1	2		1
PL/J	u	u	d	d	u	u			1	1	2	1
RF/J	k	k	k	null	k	k	b		1	1	2	1
RIII/-	r	r	r	r	r	r	b		2	2	1	2
SEC/-	d	d	d	d	d	d			2			2
SJL/J	s2	s	s	s	s	null	a	a	2	2	1	2
SM/J	v	v	v	v	v	v			1	2		2
ST/bJ	k	k	k	null	k	k			2	2	2	2
SWR/J	q2	q	q	q	q	q	a	a	2	2	2	2