

Mouse Alloantigens

Major histocompatibility (MHC) is a group of antigens, most of which influence allograft rejection. These antigens can be divided into two major classes: class I and class II. 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-2M and H-2O.

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, and Langerhans cells, etc.). 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 | null | 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 | Q a- 2 | Q a- 1 | CD8 (Ly-2) | CD8 (Ly-3) | CD4 (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)*

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|---------------|---------------|------|------|------|-----|------|------|------|-------------|-------------|-------------|--------------|
| 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 |