

# NEW ALLELE

# Alerts

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## Novel major histocompatibility complex class I alleles extracted from two rhesus macaque populations

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We report here the novel *Mamu-A* and *-B* alleles that were detected in two groups of rhesus monkeys.

Rhesus macaques (*Macaca mulatta*) are often used as animal models in the research on human diseases. Their use in immune-related research mandates the investigation of their major histocompatibility complex (MHC), also known as *MhcMamu*. Various populations of rhesus monkeys, mainly originating in India and China, have been subjected to analyses of their *Mamu-A* and *-B* genes, the equivalents of human leukocyte antigen (HLA)-A and -B. The restricted overlap in the *Mamu-A* and *-B* allele repertoires of animals of different geographic origins is evident in these studies.

We report here the novel *Mamu-A* and *-B* alleles that were detected in two groups of animals. The first group of 22 animals is of Burmese origin, and is housed at the Biomedical Primate Research Centre in Rijswijk, the Netherlands. The other cohort of 42 individuals is of Chinese origin, and is kept at the Institute for Infectious Disease Control in Solna, Sweden. RNA was isolated from peripheral blood mononuclear cells (PBMCs) or from lymphoblastoid B cells (RNease, Qiagen, Venlo, Netherlands). Reverse transcriptase polymerase chain reaction (RT-PCR) (Promega, Leiden, Netherlands), cloning, and sequencing were performed as described earlier (1, 2).

In the Burmese group, 58 *Mamu-A* and *-B* sequences were detected, most of which had been seen earlier in monkeys of either Indian or Chinese origin (2–4). Approximately 135 sequences were detected in the Chinese cohort, and the majority of these had been documented earlier in another Chinese cohort (2). The 48 novel sequences (Table 1), of which at least three full-length clones were present, were submitted to the EMBL-EBI database, and for official designations to the non-human primate MHC section of the Immuno Polymorphism Database (5).

Some alleles extend sequences, as indicated by the accession numbers in the last column in Table 1. Two other alleles, *Mamu-B\*101:01:01* and *Mamu-A1\*043:03:01* confirm the findings of others, which have recently become available.

Most novel alleles are variants of already known lineages, and have only one or very few base-pair differences from known alleles. Three *Mamu-A* alleles and seven *Mamu-B* alleles represent lineages that had not been reported earlier in the rhesus macaque population.

**Table 1** The unreported alleles detected in two populations of rhesus macaques<sup>a</sup>

| Allele                   | Accession numbers | Reference animal | Remarks        |
|--------------------------|-------------------|------------------|----------------|
| Burmese animals          |                   |                  |                |
| <i>Mamu-A1*004:01:01</i> | FN396407          | 4049             | U41380 ext.    |
| <i>Mamu-A1*007:05:01</i> | FN396403          | 4064             |                |
| <i>Mamu-A1*008:01:02</i> | FN396401          | 4052             |                |
| <i>Mamu-A1*032:02:01</i> | FN396408          | 4064             | AB444933 ext.  |
| <i>Mamu-A1*043:01:01</i> | FN396404          | 4052             | EU252157 ext.  |
| <i>Mamu-B*049:04:01</i>  | FN396402          | 96,091           | AB444881 ext.  |
| <i>Mamu-A1*059:01:01</i> | FN396405          | 4077             | New lineage    |
| <i>Mamu-A1*110:01:01</i> | FN396406          | 4065             | AB444884 ext.  |
| <i>Mamu-A7*02:01:01</i>  | FN396409          | 4077             |                |
| <i>Mamu-B*038:02:01</i>  | FN396410          | 4065             | GU130439 ext.  |
| <i>Mamu-B*050:02:01</i>  | FN396411          | 94045            | AJ620415 ext.  |
| <i>Mamu-B*061:05:01</i>  | FN396412          | 94045            |                |
| <i>Mamu-B*063:02:01</i>  | FN396413          | 4064             | AB540210 ext.  |
| <i>Mamu-B*064:02:01</i>  | FN396414          | 96090            |                |
| <i>Mamu-B*098:01:01</i>  | FN396415          | 96090            | New lineage    |
| <i>Mamu-B*099:01:01</i>  | FN396416          | 96090            | New lineage    |
| <i>Mamu-B*100:01:01</i>  | FN396417          | 96090            | New lineage    |
| <i>Mamu-B*101:01:01</i>  | FN396418          | 4065             | AB477400 conf. |
| Chinese animals          |                   |                  |                |
| <i>Mamu-A1*003:01:03</i> | FN985470          | F066             | AB496714 ext.  |
| <i>Mamu-A1*004:06:01</i> | FN985471          | F101             |                |
| <i>Mamu-A1*018:09:01</i> | FN995437          | F004             |                |
| <i>Mamu-A1*026:02:02</i> | FN985479          | F024             |                |
| <i>Mamu-A1*028:03:01</i> | FN985472          | F011             | EF112561 ext.  |
| <i>Mamu-A1*032:07:01</i> | FN985473          | F019             |                |
| <i>Mamu-A1*040:04:01</i> | FN985474          | F023             |                |
| <i>Mamu-A1*041:02:01</i> | FN985475          | F065             | EU429608 ext.  |
| <i>Mamu-A1*043:02:02</i> | FN985480          | F020             |                |
| <i>Mamu-A1*043:03:01</i> | FN985476          | F001             | GU592075 conf. |
| <i>Mamu-A1*122:01:01</i> | FN985477          | F044             | New lineage    |
| <i>Mamu-A1*123:01:01</i> | FN985478          | F037             | New lineage    |
| <i>Mamu-B*025:01:02</i>  | FN985462          | F021             |                |

**Table 1** Continued

| Allele                  | Accession numbers | Reference animal | Remarks       |
|-------------------------|-------------------|------------------|---------------|
| <i>Mamu-B*027:04:01</i> | FN985461          | F042             |               |
| <i>Mamu-B*034:02:01</i> | FN985459          | F019             |               |
| <i>Mamu-B*034:03:01</i> | FN985460          | F012             |               |
| <i>Mamu-B*035:02:01</i> | FN985466          | F044             |               |
| <i>Mamu-B*044:07:01</i> | FN985454          | F001             |               |
| <i>Mamu-B*065:03:02</i> | FN985468          | F083             |               |
| <i>Mamu-B*069:07:01</i> | FN985467          | F045             |               |
| <i>Mamu-B*075:03:01</i> | FN985469          | F119             |               |
| <i>Mamu-B*076:01:01</i> | FN985455          | F001             | EF057840 ext. |
| <i>Mamu-B*076:02:01</i> | FN985456          | F018             | EF112569 ext. |
| <i>Mamu-B*086:04:01</i> | FN985457          | F011             |               |
| <i>Mamu-B*086:05:01</i> | FN985458          | F037             |               |
| <i>Mamu-B*106:01:01</i> | FN985464          | F032             | New lineage   |
| <i>Mamu-B*137:01:01</i> | FN985463          | F026             | New lineage   |
| <i>Mamu-B*142:01:01</i> | FN985465          | F042             | AB542050 ext. |
| <i>Mamu-B*145:01:01</i> | FN985452          | F032             | New lineage   |
| <i>Mamu-B*149:01:01</i> | FN985453          | F038             | New lineage   |

<sup>a</sup>Displayed are the accession numbers and reference animals. Some sequences are extensions or conformations of already known alleles. Other alleles represent new lineages. This is indicated in the last column.

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