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Identification of a new Patr-B*01 variant, Patr-B*0102, by sequence-based typing in a chimpanzee (*Pan troglodytes*)

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Abstract

Description of one new non-human primate MHC-B (*Patr-B*) allele.

Keywords

Patr-B; *Pan troglodytes*; polymerase chain reaction-sequencing based typing

Chimpanzees (*Pan troglodytes*), humans' closest living relative, are not only genetically similar to humans but also share susceptibility to some infectious diseases. Because the chimpanzees are used in biomedical research, investigation of their genetic background becomes important to extrapolated results for human.

This report describes the identification of a novel Patr-B*01 allele found in a chimpanzee studied under Institutional Animal Care and Use Committee-approved protocols. The determination of nucleotide sequence of the polymorphic exons 2 and 3 of Patr-B was performed by sequences-based typing (SBT) techniques as previously described (1). The electropherogram of directed sequencing showed the presence of two superimposed peaks in exon 2 of aligned Patr-B*0101.

To confirm the presence of two Patr-B alleles, one Patr-B*0101 and one new allele, the PCR product from two different reactions was cloned in Topo Ta Cloning Kit for sequencing (Invitrogen). Many clones for the allele of interest were obtained, from which 10 clones were sequenced. The consensus sequence has been submitted to GenBank, accession number GQ470394, and to the IPD-MHC Database receiving the official name Patr-B*0102 (2).

The new allele differs from the sequence of Patr-B*0101 by a non-synonymous nucleotide exchange at first and third position in codon 57 in exon 2 (CCG → TCA) (Figure 1A). This substitution changes the amino acid from proline to serine (P → S) (Figure 1B). Codon 57 is located outside of the antigen-binding cleft (3).

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A)

	EXON 2															
	1				5				10				15			
HLA-B*070201	GC	TCC	CAC	TCC	ATG	AGG	TAT	TTC	TAC	ACC	TCC	GTG	TCC	CGG	CCC	
Patr-B*0101	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Patr-B*0102	--	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	20				25				30							
HLA-B*070201	GGC	CGC	GGG	GAG	CCC	CGC	TTC	ATC	TCA	GTG	GGC	TAC	GTG	GAC	GAC	
Patr-B*0101	---	---	---	---	---	---	---	---	A-C	---	---	---	---	---	---	---
Patr-B*0102	---	---	---	---	---	---	---	---	A-C	---	---	---	---	---	---	---
	35				40				45							
HLA-B*070201	ACC	CAG	TTC	GTG	AGG	TTC	GAC	AGC	GAC	GCC	GCG	AGT	CCG	AGA	GAG	
Patr-B*0101	---	---	---	---	---	---	---	---	---	---	---	---	---	--G	AT-	
Patr-B*0102	---	---	---	---	---	---	---	---	---	---	---	---	---	--G	AT-	
	50				55				60							
HLA-B*070201	GAG	CCG	CGG	GCG	CCG	TGG	ATA	GAG	CAG	GAG	GGG	CCG	GAG	TAT	TGG	
Patr-B*0101	---	--C	---	---	--A	---	---	---	---	---	---	---	---	---	---	---
Patr-B*0102	---	--C	---	---	--A	---	---	---	---	---	---	T-A	---	---	---	---
	65				70				75							
HLA-B*070201	GAC	CGG	AAC	ACA	CAG	ATC	TAC	AAG	GCC	CAG	GCA	CAG	ACT	GAC	CGA	
Patr-B*0101	---	---	G-G	---	-G-	-AT	ATG	---	---	TCC	---	---	---	---	---	---
Patr-B*0102	---	---	G-G	---	-G-	-AT	ATG	---	---	TCC	---	---	---	---	---	---
	75				80				85							
HLA-B*070201	GAG	AGC	CTG	CGG	AAC	CTG	CGC	GGC	TAC	TAC	AAC	CAG	AGC	GAG	GCC	
G																
Patr-B*0101	---	-A-	---	---	-T-	GC-	-T-	C--	---	---	---	---	---	---	---	---
-																
Patr-B*0102	---	-A-	---	---	-T-	GC-	-T-	C--	---	---	---	---	---	---	---	---
-																

B)

	30				40				50				60				70			
HLA-B*070201	RFISVGYVDD	TQFVRFDSDA	ASPREEPRAP	WIEQEGPEYW	DRNTQIYKAQ															
Patr-B*0101	---T-----	-----	----M-----	-----	--E-RNM--S															
Patr-B*0102	---T-----	-----	----M-----	-----	---S---															

Figure 1.

Alignment of the nucleotide sequence of exon 2 (A) and the partial deduced amino acid sequence (B) of Patr-B*0102 with that of Patr-B*0101. Dashes (-) indicate identity with the Patr-B*0101 sequence. Numbers above correspond to the codon position in the mature protein. The change in the nucleotide sequence of codon 57 is indicated in bold. No difference was found in exons 3.