

HPA- & HNA-Ready Gene THE SSP-PCR SYSTEM

Genotyping of the Human Platelet & Human Neutrophil Antigen Systems
CE certified

Ready Gene

SuBiTo

FluoGene

Software

PCR & Elektrophorese

Ready Plate

DNA Extraktion

Life Science

TECHNIQUE

Ready Gene is inno-train's product line for genotyping the HPA-, HNA-, HLA- and blood group loci by molecular SSP-PCR method. The evaluation is performed by standard agarose gel electrophoresis. As an internal PCR control each tube

contains primers for amplification of the Human Growth Hormone (HGH). If no specific product is present after PCR, the amplicate of this positive control must be clearly detectable.

THE HPA-SYSTEM

Human Platelet Antigens (HPA) are glycoproteins expressed on the thrombocyte membrane. Antibodies against the Human Platelet Antigens can cause immune reactions in the recipient's blood leading to the lysis of the transfused thrombocytes. In these cases the patient has to be provided with platelet concentrates without the antigen structure

which is recognized by the antibody.

HPA-1, HPA-2, HPA-3, HPA-4, HPA-5, HPA-6, HPA-9 and HPA-15 each exist in two variant antigen structures known as „a“ and „b“. These biallelic forms are caused by SNPs, which result in single amino acid changes between the two different gene products.

SYSTEM	GLYCOPROTEIN	ANTIGEN	AMINO ACID (POSITION)	ORIGINAL NAME	ANTIGEN FREQUENCY (CAUCASIANS)
HPA-1	Glycoprotein IIIa (CD61)	HPA-1 a	Leucine (33)	Zw ^a , Pl ^{A1}	97,9 %
		HPA-1 b	Proline (33)	Zwb, Pl ^{A2}	28,8 %
HPA-2	Glycoprotein Ib (CD42b)	HPA-2 a	Threonine (145)	Ko ^b	> 99 %
		HPA-2 b	Methionine (145)	Ko ^a , Sib ^a	13,2 %
HPA-3	Glycoprotein IIb (CD41)	HPA-3 a	Isoleucine (843)	Bak ^a , Lek ^a	80,9 %
		HPA-3 b	Serine (843)	Bak ^b	69,8 %
HPA-4	Glycoprotein IIIa (CD61)	HPA-4 a	Arginine (143)	Yuk ^b , Pen ^a	> 99,9 %
		HPA-4 b	Glutamine (143)	Yuk ^a , Pen ^b	< 0,1 %
HPA-5	Glycoprotein Ia (CD49b)	HPA-5 a	Glutamic Acid (505)	Br ^b , Zav ^b	99,0 %
		HPA-5 b	Lysine (505)	Br ^a , Zav ^a , Hc ^a	19,7 %
HPA-6	Glycoprotein IIIa (CD61)	HPA-6 a	Arginine (489)	-	> 99 %
		HPA-6 b	Glutamine (489)	Ca ^a , Tu ^a	0,7 %
HPA-9	Glycoprotein IIb (CD41)	HPA-9 a	Valine (837)	-	> 99%
		HPA-9 b	Methionine (837)	Max ^a	0,6 %
HPA-15	CD109	HPA-15 a	Serine (703)	Gov ^b	74 %
		HPA-15b	Tyrosine (703)	Gov ^a	81 %

reference: www.ebi.ac.uk/ipd/hpa

Platelet antibodies can cause among others autoimmune thrombocytopenia (**AITP**), neonatal alloimmune thrombocytopenia (**NAIT**), post transfusion purpura (**PTP**) and passive alloimmune thrombocytopenia.

After transfusions of platelet concentrates, in case of mismatch constellations between donor and patient the recipient of the blood unit may produce antibodies. This activation against

foreign platelet antigens would prevent an increase in the number of platelets in subsequent transfusions.

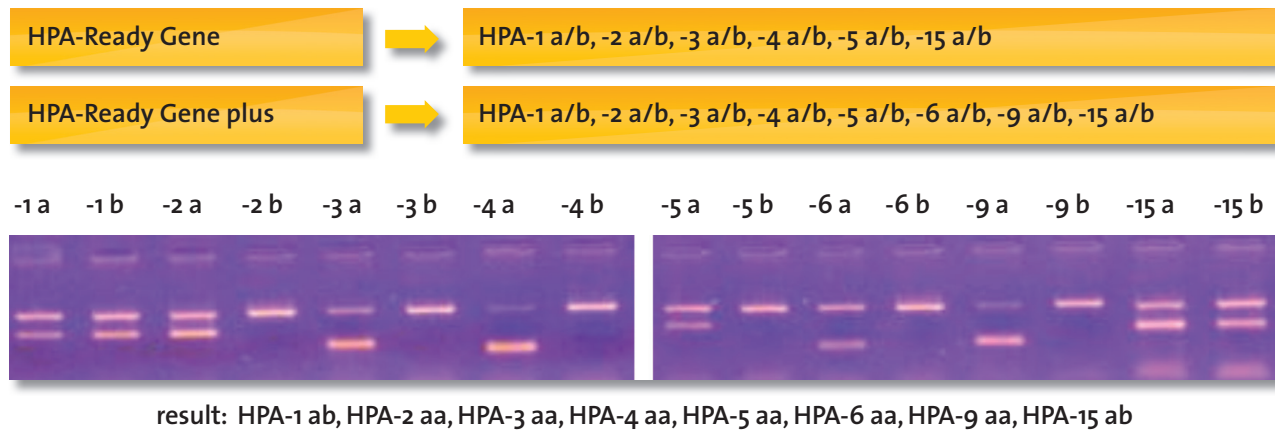
By detecting the genotype of the patients concerned the specificity of the antibodies that are present can be predicted. Furthermore genotyping of patients and platelet donors is an important requirement for compatible platelet transfusion.

HPA-Ready Gene

HPA-Ready Gene FOR GENOTYPING:

With two different kit designs different HPA alleles depending on your requirement profile can be detected: The **HPA-Ready Gene plus** system is an enlargement of the standard **HPA-Ready Gene** kit with four additional

reactions. Besides the HPA-1 a/b, HPA-2 a/b, HPA-3 a/b, HPA-4 a/b, HPA-5 a/b and HPA-15 a/b the alleles HPA-6 a/b and HPA-9 a/b can be detected.



HPA-1 a/b Ready Gene FOR HPA-1 a SCREENING:

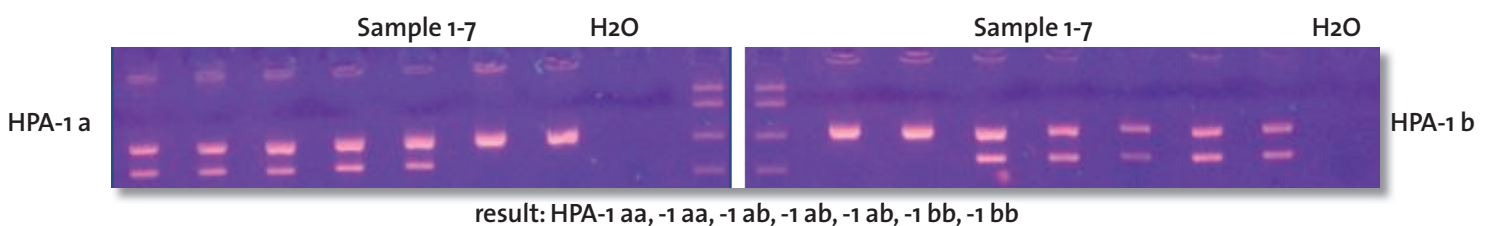
Neonatal alloimmune thrombocytopenia (NAIT) is mostly triggered by anti-HPA-1a antibodies. Genotyping of the mother with regard to HPA-1 makes it possible to predict possible neonatal alloimmune thrombocytopenia.

With **HPA-1 a/b Ready Gene** you have the possibility of typing pregnant women specifically for their genotype. With the flexible format you can perform one screening assay and also an individual tests.



Both mixes are aliquoted in different colored 8-well PCR strips so that individual or several HPA-1a/b tests can be

performed in parallel.



ORDER INFORMATION

ARTICLE NO.	HPA-Ready Gene SYSTEM	REACTIONS/TEST	TESTS/KIT
001 030 012	HPA-Ready Gene For detection of platelet antigens HPA-1 a/b, -2 a/b, -3 a/b, -4 a/b, -5 a/b and 15 a/b.	12	12
001 031 012	HPA-Ready Gene plus For detection of platelet antigens HPA-1 a/b, -2 a/b, -3 a/b, -4 a/b, -5 a/b, -6 a/b, -9 a/b and 15 a/b.	16	12
001 030 096	HPA-1 a/b Ready Gene For detection of platelet antigens HPA-1 a and HPA-1 b. For screening purposes.	2	96

HNA-Ready Gene FOR GENOTYPING

Human Neutrophil Antigens (HNA) are glycoproteins expressed on the cell surface of neutrophil granulocytes. Alloimmune reactions against neutrophils can lead to a serious blood transfusion complication called Transfusion Related Acute Lung Injury (TRALI). Furthermore during

pregnancy an alloimmune reaction can be triggered by the mother producing antibodies against the antigens of the HNA-system of the child. The transfer of these antibodies into the fetal circuit leads to the destruction of the neutrophil granulocytes (Neonatale Immune Neutropenia, NIN).

HNA specificities detected by HNA-Ready Gene:

SYSTEM	ANTIGEN	ORIGINAL NAME	GLYCOPROTEIN
HNA-1	HNA-1a	NA1	Fcγ-Rezeptor IIIb (CD 16b)
	HNA-1b	NA2	
	HNA-1c	SH	
HNA-3	HNA-3a	5b	CTL-2 (Choline Transporter-Like)
	HNA-3b	5a	
HNA-4	HNA-4a	MART	MAC 1, CR3; αMβ2-integrin (CD 11b)
	HNA-4b	MART negative	
HNA-5	HNA-5a	OND	LFA-1 αLβ2-integrin (CD 11a)
	HNA-5b	OND negative	

HNA-frequencies:

SYSTEM	ANTIGEN	FREQUENCY		
		WHITES	ASIANS	AFRICANS
HNA-1	HNA-1a	57 – 62 %	88 – 91 %	46 – 66 %
	HNA-1b	88 – 89 %	51 – 54 %	78 – 84 %
	HNA-1c	5 %	< 1 %	23 – 31 %
	HNA-1 null	0,15 %	< 1 %	4 %
HNA-3	HNA-3a	89 – 96 %	-	-
HNA-4	HNA-4a	99 %	-	-
HNA-5	HNA-5a	86 – 92 %	81 %	88 %

reference: Bux J. Human neutrophil alloantigens. Vox Sanguinis 2008; 94:277-285.

Clinical disorders caused by neutrophil specific antibodies:

ANTIBODY	CLINICAL CONDITION
HNA-1	Autoimmune neutropenia
	NIN
	TRALI
HNA-3a	NIN
	TRALI
HNA-4a	NIN
	Autoimmune neutropenia
HNA-5	NIN

ARTICLE NO.	HNA-READY GENE	REACTIONS/TEST	TESTS/KIT
001 090 012	HNA-Ready Gene For detection of granulocyte antigens HNA-1a, -1b, -1c, -3a, -3b, -4a, -4b, -5a and -5b.	8	12

