



Miltenyi Biotec

# KIR typing

## Genotyping, mRNA expression profiling, and phenotyping of human NK cells

Natural killer (NK) cells represent an important lymphocyte population of the innate immune system. They have the capacity to lyse virus-infected cells and tumor cells without prior antigenic stimulation.

Negative regulation of NK cell function is mediated by inhibitory killer cell immunoglobulin-like receptors (KIRs) recognizing HLA I molecules on target cells. KIRs exist in various isoforms. Heterogeneity occurs at the genomic and transcriptional level in every human individual and also in different subsets of NK cells.

NK cells have been implicated in the suppression of graft-versus-host disease, promotion of bone marrow engraftment, and mediation of graft-versus-leukemia effects in bone marrow transplantations, possibly as a result of donor-recipient HLA-KIR mismatching.

For KIR typing of NK cells at the DNA and mRNA level, as well as for phenotyping by flow cytometry, Miltenyi Biotec offers the KIR Typing Kit and a variety of antibodies, respectively.

### The KIR Typing Kit—genotyping and mRNA expression profiling with a single kit

The KIR Typing Kit allows the detection of all known human KIR genes and alleles at the genomic DNA and mRNA level.

#### Accurate primer design for reliable results

The presence or absence of KIR genes is analyzed by PCR using sequence-specific primers (SSPs).

Carefully designed SSPs enable the detection of all 15 known human KIR genes plus two pseudogenes, and their alleles. Allele coverage is based on the IPD-KIR sequence database (<http://www.ebi.ac.uk/ipd/kir>).

#### Ready-to-use enzyme mix and reagents

The enzyme mix including Taq DNA Polymerase is lyophilized in each well of a 96-well PCR plate. Only resuspension buffer and the template of your choice need to be added.

Thanks to the integrated loading buffer, PCR products can be directly analyzed by gel electrophoresis.

#### Internal positive control

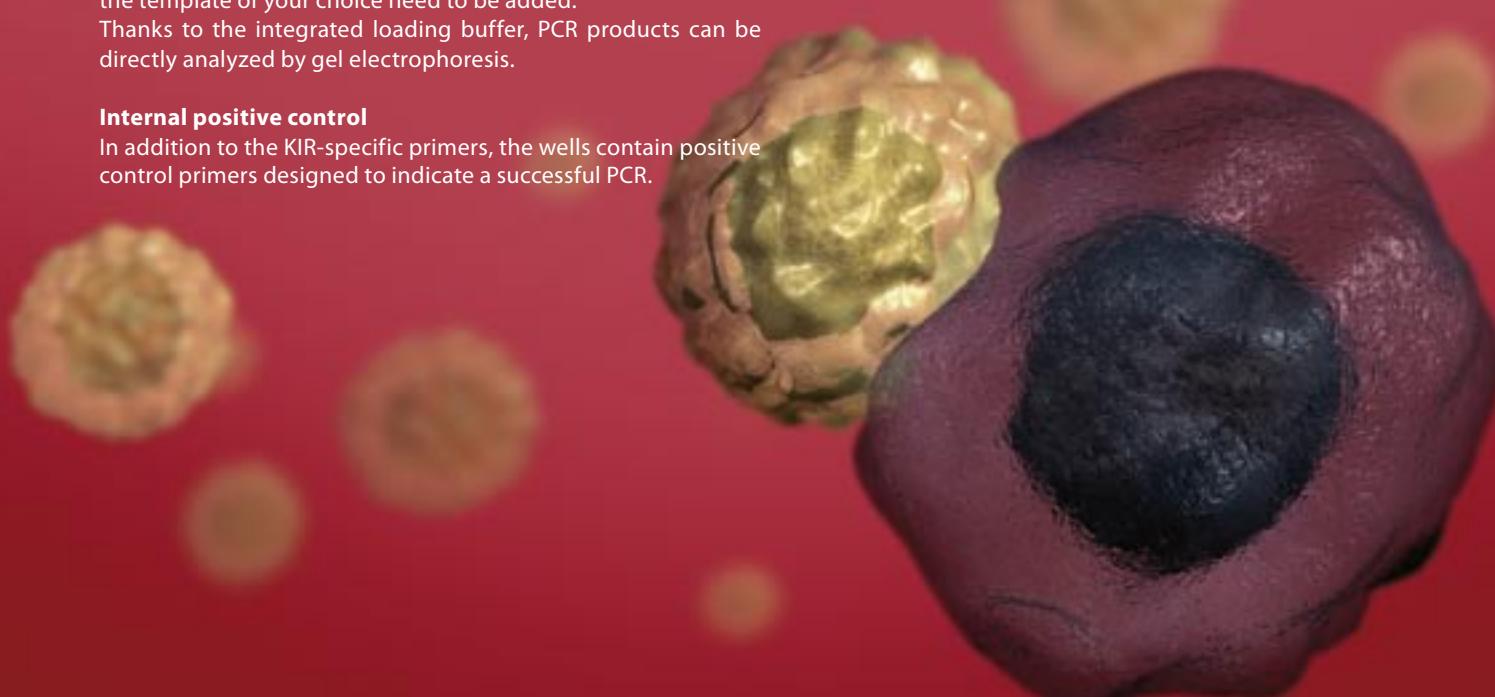
In addition to the KIR-specific primers, the wells contain positive control primers designed to indicate a successful PCR.

Lane	Gene name	Lane	Gene name	Lane	Gene name
1	2DL1	8	2DS1	15	3DL2
2	2DL2	9	2DS2	16	3DL3
3	2DL3	10	2DS3	17	3DS1
4	2DL4	11	2DS4del	18	2DP1
5	2DL5	12	2DS4ins	19	3DP1
6	2DL5A	13	2DS5		
7	2DL5B	14	3DL1		

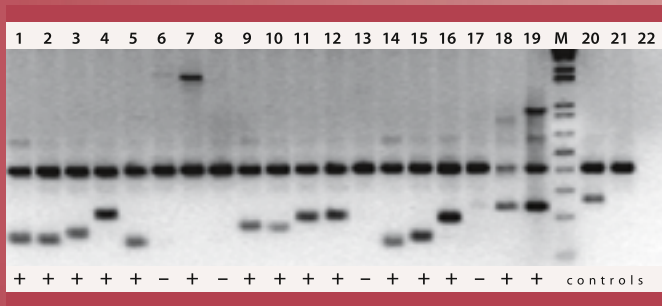
Table 1: KIR genes and variants whose presence or absence can be elucidated by the KIR Typing Kit. Lanes refer to figures 1 A and 1 B, overleaf.

### MACS® Antibodies for KIR phenotyping

The KIR genotype of an NK cell population does not always reflect its phenotype. A broad panel of KIR-specific antibodies from Miltenyi Biotec enables the determination of KIR phenotypes of human NK cell populations by flow cytometry.

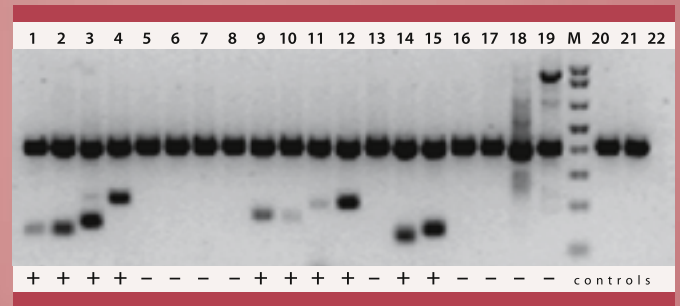


## KIR genotyping



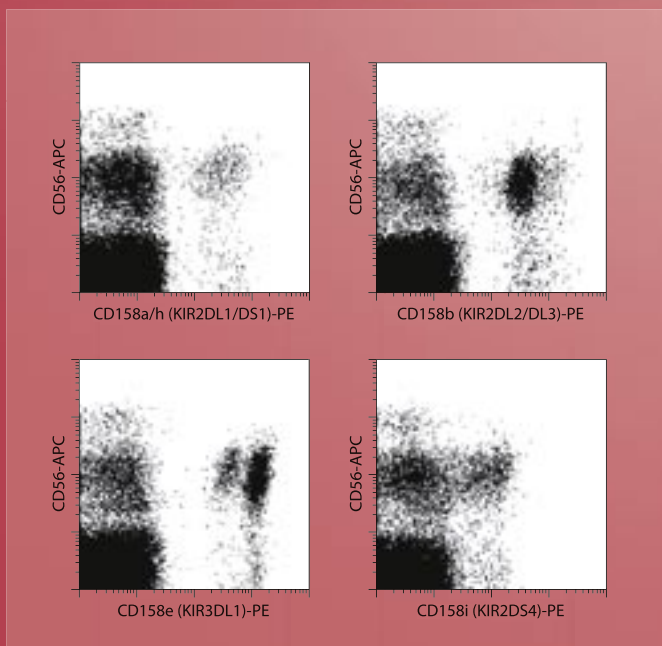
**Figure 1 A:** Gel electrophoresis of PCR products obtained from genomic DNA isolated from whole blood. Lanes 1–5, 7, 9–12, 14–16, and 18–19 are positive for KIR (+). Lanes 6, 8, 13, and 17 are negative (-). In addition, all lanes show positive control bands (400 bp). Lane 20 shows the genomic DNA control band at 260 bp, lane 21 the positive control, and lane 22 the negative control. M: DNA marker

## mRNA expression profiling of KIR genes



**Figure 1 B:** Gel electrophoresis of PCR products obtained from mRNA-derived cDNA isolated from 5 mL whole blood. Lanes 1–4, 9–12 and 14–15 are positive for KIR (+), whereas lanes 5–8, 13, and 16–19 are negative (-). In addition, all lanes include positive control bands (400 bp). Lane 20 shows no genomic DNA control band at 260 bp; thus, there is no genomic DNA contamination. M: DNA marker

## KIR phenotyping



**Figure 2:** Human PBMCs were stained with various anti-KIR antibodies and CD56-APC. Cells were analyzed by flow cytometry.

Product	Capacity	Order no.
KIR Typing Kit	8 tests	130-092-551
	24 tests	130-092-584
MACS® Antibody	Conjugate	Order no.
CD158b (KIR2DL2/DL3), human	– PE	130-092-618
	– APC	130-092-617
	pure	130-092-615
CD158e (KIR3DL1), human	– FITC	130-092-568
	– PE	130-092-473
	– APC	130-092-474
	– Biotin	130-092-475
	pure	130-092-555
CD158a/h (KIR2DL1/DS1), human	– FITC	130-092-811
	– PE	130-092-684
	– APC	130-092-685
	– Biotin	130-092-683
	pure	130-092-682
CD158i (KIR2DS4), human	– PE	130-092-680
	– APC	130-092-681
	– Biotin	130-092-898
	pure	130-092-679
Anti-KIR2D, human	– PE	130-092-688
	– APC	130-092-687
	– Biotin	130-092-904
	pure	130-092-689

A complete list of products for the separation and analysis of NK cells is available at [www.miltenyibiotec.com](http://www.miltenyibiotec.com).



**Miltenyi Biotec GmbH**  
Friedrich-Ebert-Straße 68  
51429 Bergisch Gladbach  
Germany  
Phone +49 2204 8306-0  
Fax +49 2204 85197  
[macs@miltenyibiotec.de](mailto:macs@miltenyibiotec.de)

**Miltenyi Biotec Inc.**  
12740 Earhart Avenue  
Auburn, CA 95602  
USA  
Phone 800 FOR MACS,  
+1 530 888 8871  
Fax +1 530 888 8925  
[macs@miltenyibiotec.com](mailto:macs@miltenyibiotec.com)

**Miltenyi Biotec Australia Pty. Ltd.**  
Phone +61 02 8877 7400  
[macs@miltenyibiotec.com.au](mailto:macs@miltenyibiotec.com.au)

**Miltenyi Biotec B.V. (Benelux)**  
[macs@miltenyibiotec.nl](mailto:macs@miltenyibiotec.nl)  
**Customer service Netherlands**  
Phone 0800 4020120  
**Customer service Belgium**  
Phone 0800 94016  
**Customer service Luxembourg**  
Phone 800 24971

**Miltenyi Biotec Trading (Shanghai) Co., Ltd. (P.R. China)**  
Phone +86 21 6235 1005  
[macs@miltenyibiotec.com.cn](mailto:macs@miltenyibiotec.com.cn)

**Miltenyi Biotec SAS (France)**  
Phone +33 1 56 98 16 16  
[macs@miltenyibiotec.fr](mailto:macs@miltenyibiotec.fr)

**Miltenyi Biotec S.r.l. (Italy)**  
Phone +39 051 646 0411  
[macs@miltenyibiotec.it](mailto:macs@miltenyibiotec.it)

**Miltenyi Biotec K.K. (Japan)**  
Phone +81 3 5646 8910  
[macs@miltenyibiotec.jp](mailto:macs@miltenyibiotec.jp)

**Miltenyi Biotec Asia Pacific Pte. Ltd. (Singapore)**  
Phone +65 6238 8183  
[macs@miltenyibiotec.com.sg](mailto:macs@miltenyibiotec.com.sg)

**Miltenyi Biotec S.L. (Spain)**  
Phone +34 91 512 12 90  
[macs@miltenyibiotec.es](mailto:macs@miltenyibiotec.es)

**Miltenyi Biotec Ltd. (UK)**  
Phone +44 1483 799 800  
[macs@miltenyibiotec.co.uk](mailto:macs@miltenyibiotec.co.uk)