

### Multiplex PCR kits

- ◆ Convenience Efficiency and of time saving :
- ◆ Amplify multiple genes of interest simultaneously in a single reaction !
- ◆ Same condition of reaction = better comparative analysis
- ◆ Choice of applications : from basic pathway gene expression profiling to diagnostic pathogen identification.
- ◆ Ideal for gene expression profiling

RT-MPCR kit provides an accurate method to detect multiple gene expression by simultaneously amplifying all the genes under the same conditions. MPCR kits combine PCR amplification technology and multiple target detection throughput in a single tube. This new technology overcomes the non-specific amplification of PCR products between primers. The PCR products, also known as amplicons, are amplified efficiently to give relatively quantitative results from amplicon to amplicon, and sample to sample. MPCR's capacity to simultaneously quantify multiple mRNA species from a single sample of RNA allows comparative analysis of different mRNA species within samples. Variations in RNA isolation, initial quantification errors or tube-to-tube variations in RT and PCR can be compensated by including a known housekeeping gene. MPCR can also be performed on total RNA prepared by standard methods without further purification of poly(A) RNA.

RT-MPCR kit is ideal for use in the analysis and comparison of genes when, where, and to what degree genes are expressed. That is to say, RT-MPCR kits are ideal for gene expression profiling. Furthermore, they go ahead in our understanding of the control and mode of action of individual gene products. DNA chip technology is currently the most common method for determining gene abundance in a total RNA or poly(A) RNA sample, but this method is limited by low sensitivity and high cost. DNA chips may serve a better purpose as a discovery tool to identify genes related to a specific biological process, followed by using MPCR for further analysis of the genes of performance of gene expression profiling and quantitative assays.

#### Each kit contains

	50 tests	100 tests
Optimized MPCR Buffer	1250 µl	1250 µl x 2
Positive Control	50 µl	50 µl x 2
Primer mixture	250 µl	250 µl x 2
DNA M.W. Marker	100 µl	100 µl x 2
(100bp Ladder)		
ddH <sub>2</sub> O (Dnase free)	2 ml	2 ml x 2

### Cytokine - Chemokines - Hormones

#### Chemokine and Chemokine Receptors

The gene expression of chemokines and their receptors can be quickly analyzed using RT-MPCR technique. The PCR primers designed have similar T<sub>m</sub> and no obvious 3'-end overlap to enhance multiple-genes amplification in a single tube; The gene expression of these genes can be analyzed and compared with GAPDH gene expression.

Product description	50 tests	100 tests
MPCR Kit for Human Chemokine Genes Set-1, with GAPDH as Internal Control	T56271	T56270
MPCR Kit for Human Chemokine Genes Set-2, with GAPDH as Internal Control	T56381	T56280
MPCR Kit for Human Chemokine Receptors CCR Set-1, with GAPDH as Internal Control	T56001	T56000
MPCR Kit for Human Chemokine Receptors CCR Set-2, with GAPDH as Internal Control	T56011	T56010
MPCR Kit for Human Chemokine Receptors Cxcr Set-1, with GAPDH as Internal Control	T56081	T56080
MPCR Kit for Mouse Chemokine Receptors CCR Set-1, with GAPDH as Internal Control	T56041	T56040
MPCR Kit for Mouse Chemokine Receptors CCR Set-2, with GAPDH as Internal Control	T56051	T56050
MPCR Kit for Mouse Chemokine Receptors CXCR Set-1, with GAPDH as Internal Control	T56110	T56111
MPCR Kit for Mouse Chemokine Genes Set-1, with GAPDH As Internal Control With GAPDH as Internal Control	T56310	T56311
MPCR Kit for Mouse Chemokine Genes Set-1, with GAPDH As Internal Control With GAPDH as Internal Control	T56320	T56321

#### Technical tip

**Chemokines** and their receptors are important elements for the activation and selective attraction of various subsets of leukocytes, and play a critical role in controlling the movement of these cells during inflammation. Evidence gathered during past few years suggests an important role for chemokines in a variety of pathophysiological processes (e.g., chronic and acute inflammation, infectious diseases, modulation of angiogenesis, tumor growth, and hematopoietic progenitor cell proliferation). The most notable of these recent discoveries is that certain chemokine receptors function as co-receptors for HIV-1. Moreover, mutations in these receptors can result in host resistance to infection and also effect the progression of disease course.

# Amplification Products for PCR and RT-PCR

## Multiplex PCR (MPCR)

### MPCR/Cytokines and their receptors

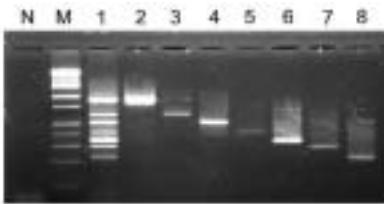
**Cytokines** play important roles in orchestrating and controlling inflammation and sepsis process. The cytokines IL-1, IL-6, and TNF are sometimes referred to as the "inflammatory triad" since they mediate both local and systemic inflammatory responses which are believed to have survival value (1, 2). IL-1 and TNF are rapidly produced by monocytes and macrophages in response to a number of stimuli such as endotoxins, muramyl dipeptides, lectins, immune complexes and other noxious agents. Of these bacteria, endotoxin has frequently been used both in vivo and in vitro to stimulate the production of IL-1 and TNF and to study their activity. IL-6 is produced by a wide variety of lymphoid and non-lymphoid cells both constitutively and in response to many stimuli including other cytokines. For example, both IL-1 and TNF are potent inducers of IL-6 and once IL-6 is induced cytokines may be distributed to a large number of activity sites via the circulation system. Thus, their activity may be represented in both local and systemic inflammatory events.

Summary of genes included in each individual MPCR kit :

Genes \ Products	Beta-actin	ICAM-1	IL1-beta	IL-2	IL-3	IL-4	IL-5	IL-6	IL-8	IL-10	IL-13	TNF-alpha	GAPDH
<b>Human</b>													
T56121	-	+	-	+	+	+	+	-	-	-	+	-	+
<b>Dog</b>													
FL1131	+	-	+	-	-	-	-	+	+	+	-	+	-
<b>Rat</b>													
FL1241	-	-	-	+	-	+	-	-	-	+	-	-	+

Each kit contains primers, an optimized buffer, a positive control, PCR M.W. 100pb ladder and ddH<sub>2</sub>O.

Description	50 tests	100 tests
MPCR Kit for Human Cytokines Set-1, with GAPDH as Internal Control	<b>T56121</b>	<b>T56120</b>
MPCR Kit for Dog Cytokines Set-1, with b-actin as Internal Control	<b>FL1131</b>	<b>FL1130</b>
MPCR Kit for Rat Cytokines Set-1, with GAPDH as Internal Control	<b>FL1241</b>	<b>FL1240</b>



Lane N : PCR using hCYK1G Primers without positive (Negative)  
 Lane 1 : PCR using hCYK1G Primers with 1x positive  
 Lane 2 : PCR using Human GAPDH Primers  
 Lane 3 : PCR using Human IL3 Primers  
 Lane 4 : PCR using Human IL4 Primers  
 Lane 5 : PCR using Human IL2 Primers  
 Lane 6 : PCR using Human IL5 Primers  
 Lane 7 : PCR using Human IL13 Primers  
 Lane 8 : PCR using Human ICAM-1 Primers  
 Lane M : DNA M.W. Marker

### MPCR/Inflammatory Cytokine Genes

Inflammation is a powerful and protective mechanism by which the cells are brought to a site of infection or trauma to clear microorganisms and effect repair. Cytokines play important roles in orchestrating and controlling the process. However their continued presence in chronic inflammation or in acute life-threatening inflammation is undesirable. The MPCR primers designed all have similar <sup>TM</sup> and no obvious 3'-end overlap to enhance MPCR amplification. The gene expression of these cytokines can be analyzed in a single step by using these Kits.

Description	50 tests	100 tests
<b>Human</b>		
MPCR Kit for Human Inflamm. Cytokines Set-1, with GAPDH as Internal Control	<b>T56571</b>	<b>T56570</b>
MPCR Kit for Human Inflamm. Cytokines Set-2, with GAPDH as Internal Control	<b>T56581</b>	<b>T56580</b>
MPCR Kit for Human Inflamm. Cytokines Set-3, with GAPDH as Internal Control	<b>T56591</b>	<b>T56590</b>
MPCR Kit for Human Inflamm. Cytokines Set-4, with GAPDH as Internal Control	<b>T56601</b>	<b>T56600</b>
<b>Mouse</b>		
MPCR Kit for Mouse Inflamm. Cytokines Set-1, with GAPDH as Internal Control	<b>S09500</b>	<b>S09501</b>
<b>Rat</b>		
MPCR Kit for Rat Inflamm. Cytokines Set-1, with GAPDH as Internal Control	<b>T56661</b>	<b>T56660</b>
MPCR Kit for Rat Inflamm. Cytokines Set-2, with GAPDH as Internal	<b>FL1221</b>	<b>FL1220</b>

Summary of genes included in each individual MPCR kit :

	GM-CSF	GM-CSFR	IkB	IL1-beta	IL-6	IL-6R, gp80	IL-6R, gp130	IL-8	NfKb	SSI-1	TGF-beta	TNF-alpha	TNFR-I	TNFR-II	GAPDH
<b>Human</b>															
T56610	+	-	-	+	+	-	-	+	-	-	+	+	-	-	+
T56620	-	+	-	-	-	-	+	-	-	-	-	-	+	+	+
T56630	+	+	-	+	+	+	-	-	-	-	-	+	+	+	+
T56640	-	-	-	-	+	+	+	-	-	+	-	-	-	-	+
<b>Mouse</b>															
S09500	+	-	-	+	+	-	-	-	-	-	+	+	-	-	+
<b>Rat</b>															
T56670	+	-	-	+	+	-	-	-	-	-	+	+	-	-	+
FL1230	-	-	+	+	+	-	-	-	+	-	-	+	-	-	+

# Amplification Products for PCR and RT-PCR

## Multiplex PCR (MPCR)

### MPCR/Sepsis Cytokine

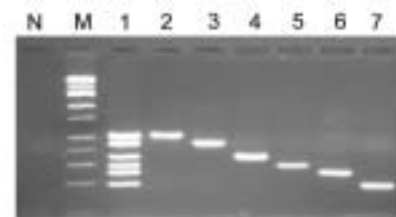
#### Sepsis Cytokine Genes

The sepsis reaction appears to involve sequential release of cytokines. The pathophysiological effects of severe sepsis, septic shock and other related syndromes are a consequence of uncontrolled production of inflammatory mediators.

The MPCR primers designed all have similar TM and no obvious 3'-end overlap to enhance MPCR amplification. The gene expression of these cytokines can be analyzed in a single step by using these Kits.

Summary of genes included in each individual MPCR kit :

	IL1-beta	IL-6	IL-8	IL-10	IL-12, p40	TNF-alpha	GAPDH
<b>Human</b>							
T56891	+	+	+	-	-	+	+
T56901	+	+	+	+	+	+	+
<b>Mouse</b>							
T56931	+	+	-	+	+	+	+
<b>Rat</b>							
T56951	+	+	-	+	+	+	+

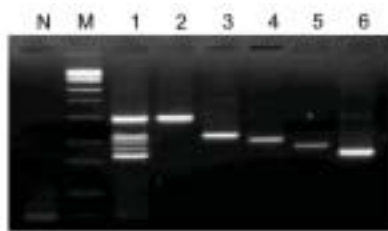


Lane N : mINF1G MPCR Primers without Positive (negative)  
 Lane 1 : mINF1G MPCR Primers with 1x Positive  
 Lane 2 : Mouse GAPDH PCR Primers with 1x Positive  
 Lane 3 : Mouse IL-6 PCR Primers with 1x Positive  
 Lane 4 : Mouse TNF-a PCR Primers with 1x Positive  
 Lane 5 : Mouse IL-1b PCR Primers with 1x Positive  
 Lane 6 : Mouse TGF-b PCR Primers with 1x Positive  
 Lane 7 : Mouse GM-CSF PCR Primers with 1x Positive  
 Lane M : DNA M.W. Marker

Description	50 tests	100 tests
<b>Human</b>		
MPCR Kit for Human Sepsis-related Cytokines Set-1, with GAPDH as Internal Control	T56891	T56890
MPCR Kit for Human Sepsis-related Cytokines Set-2, with GAPDH as Internal Control	T56901	T56900
<b>Mouse</b>		
MPCR Kit for Mouse Sepsis-related Cytokines Set-2, with GAPDH as Internal Control	T56931	T56930
<b>Rat</b>		
MPCR Kit for Rat Sepsis-related Cytokines Set-2, with GAPDH as Internal Control	T56951	T56950

# Amplification Products for PCR and RT-PCR

## Multiplex PCR (MPCR)



Lane N : PCR using hTH12G Primers without positive (Negative)  
 Lane 1 : PCR using hTH12G Primers with positive control  
 Lane 2 : PCR using Human GAPDH Primers with positive control  
 Lane 3 : PCR using Human IL-10 Primers with positive control  
 Lane 4 : PCR using Human IL-2 Primers with positive control  
 Lane 5 : PCR using Human IFN-gamma Primers with positive control  
 Lane 6 : PCR using Human IL-4 Primers with positive control  
 Lane M : DNA M.W. Marker

### MPCR/TH1/TH2 Cytokine Genes

The terms TH1 Cytokines (also referred to as T helper Type-1 cytokines) and TH2 cytokines (also referred to as T helper Type-2 cytokines) refer to the patterns of cytokines secreted by two different subpopulations of CD4 (+)T-cells which determine the outcome of an antigenic response toward humoral or cell-mediated immunity. TH1 cells, which produce interferon (IFN)-gamma, interleukin (IL)-2, and tumor necrosis factor (TNF)-beta, evoke cell-mediated immunity and phagocyte-dependent inflammation. TH2 cells, which produce IL-4, IL-5, IL-6, IL-9, IL-10, and IL-13, evoke strong antibody responses (including those of the IgE class) and eosinophil accumulation, but inhibit several functions of phagocytic cells (phagocyte-independent inflammation). The different patterns of cytokine secretion correspond with different functions of immune effectors. TH1 cells promote cell-mediated effector responses. TH2 cells are mainly helper cells that influence B- cell development and increase humoral responses such as the secretion of antibodies, predominantly IgE, by B-cells. Both types of TH cells influence each other by the "cytokines" they secrete; IFN-gamma, for example, can down regulate TH2 clones while TH2 cytokines, such as IL10, can suppress TH1 functions. IFN-gamma has been also shown to inhibit the proliferation of TH2 cells but not of TH1 helper T-lymphocyte clones. Thus, it appears that the TH1 and TH2 subsets are mutually antagonistic, such that the decision of which subset predominates within an infection may also determine its outcome

Summary of genes included in each individual MPCR kit :

	Tubulin, a	IFN-gamma	IL-2	IL-4	IL-5	IL-8	IL-10	IL-12	IL-13	IL-14	TGF-beta	TNF-a	GAPDH
<b>Human</b>													
T57051	-	+	+	+	-	-	+	-	-	-	-	-	+
T57061	-	+	+	+	+	-	+	+	+	-	-	-	+
FL1051	-	+	-	+	+	-	+	+	+	-	+	-	+
FL1201	-	-	+	-	+	+	+	-	-	+	+	+	+
<b>Mouse</b>													
T28420	-	+	+	+	-	-	+	-	-	-	-	-	+
S09490	-	+	+	+	+	-	+	+	+	-	-	-	+
<b>Rat</b>													
T57111	-	+	+	+	-	-	+	-	-	-	-	-	+
T57121	-	+	+	+	+	-	+	+	+	-	-	-	+
<b>Pig</b>													
T57151	-	+	+	+	-	-	+	-	-	-	-	-	+
<b>Monkey</b>													
T57171	+	+	+	+	-	-	+	-	-	-	-	-	-

Description	50 tests	100 tests
<b>Human</b>		
MPCR Kit for Human TH1/TH2 cytokines Set-1, with GAPDH as Internal Control	T57051	T57050
MPCR Kit for Human TH1/TH2 cytokines Set-2, with GAPDH as Internal Control	T57061	T57060
MPCR Kit for Human TH1/TH2 cytokines Set-3, with GAPDH as Internal Control	FL1051	FL1050
MPCR Kit for Human TH1/TH2 cytokines Set-4, with GAPDH as Internal Control	FL1201	FL1200
<b>Mouse</b>		
MPCR Kit for Mouse TH1/TH2 cytokines Set-1, with GAPDH as Internal Control	T28420	T28421
MPCR Kit for Mouse TH1/TH2 cytokines Set-2, with GAPDH as Internal Control	S09490	S09491
<b>Rat</b>		
MPCR Kit for Rat TH1/TH2 cytokines Set-1, with GAPDH as Internal Control	T57111	T57110
MPCR Kit for Rat TH1/TH2 cytokines Set-2, with GAPDH as Internal Control	T57121	T57120
<b>Pig</b>		
MPCR Kit for Pig TH1/TH2 cytokines Set-1, with GAPDH as Internal Control	T57151	T57150
<b>Monkey</b>		
MPCR Kit for Monkey TH1/TH2 cytokines Set-1, with alpha-tubulin	T57171	T57170

# Amplification Products for PCR and RT-PCR

## Multiplex PCR (MPCR)

### TNF Signaling Genes (TNF-a, NFk-B, Ikb, ICE, bcl-2)

TNF-a is a major cytokine present at sites of inflammation. Although it triggers a biochemical pathway via ICE or other proteases that leads to the apoptosis (programmed cell death), TNF also activates a key molecule (NFk-B) that can block this very pathway, and so sets up a delicate life-death balance within the cell (see below). The MPCR primers designed all have similar™ and no obvious 3'-end overlap to enhance MPCR amplification. The gene expression of these cytokines can be analyzed in a single step by using these Kits.

Summary of genes included in each individual MPCR kit :

	bcl-2	c-myc	Cox-1	Cox-2	cyp-32	Fas	ICE	IKB	NFKB	NFKB1A	NFKB1	NFKB1B	NFKB2	P53	TNF-alpha	GAPDH
<b>Human</b>																
T57191	+	-	-	-	-	-	+	+	+	-	-	-	-	-	+	+
FL1111	-	-	+	+	-	-	-	-	-	+	+	+	+	-	-	+
<b>Mouse</b>																
T57211	+	-	-	-	-	-	-	+	+	-	-	-	-	-	+	+
T57241	+	+	-	+	+	-	-	+	+	-	-	-	-	-	+	+
FL1270	+	+	-	+	-	+	-	+	+	-	-	-	-	+	+	+
<b>Rat</b>																
T57251	+	-	-	-	+	-	-	+	+	-	-	-	-	-	+	+

Description	50 tests	100 tests
<b>Human</b>		
MPCR Kit for Human TNF signaling genes, with GAPDH as Internal Control	T57191	T57190
MPCR Kit for Human TNF signaling genes set-2, with GAPDH as Internal Control	FL1111	FL1110
<b>Mouse</b>		
MPCR Kit for Mouse TNF signaling genes set-1, with GAPDH as Internal Control	T57211	T57210
MPCR Kit for Mouse TNF signaling genes set-2, with GAPDH as Internal Control	T57241	T57240
<b>Rat</b>		
MPCR Kit for Rat TNF signaling genes, with GAPDH as Internal Control	T57251	T57250

Literature :  
 Amer A. Beg and David Baltimore, Science (1996) 274: 782-784.  
 Daniel J. Van Antwerp et al., Science (1996) 274: 787-789.

# Amplification Products for PCR and RT-PCR

## Multiplex PCR (MPCR)

### MPCR/TGFs Superfamily

Summary of genes included in each individual MPCR kit :

	CTGF	SMAD-2	SMAD-3	SMAD-4	SMAD-7	TGF-alpha	TGF-beta 1	TGF-beta 2	TGF-beta 3	TGB-R1	TGB-R2	GAPDH
<b>Human</b>												
T57031 (TGF-M050G)	+	-	-	-	-	+	+	+	+	-	-	+
GR2651	-	+	+	+	+	-	+	-	-	+	+	+
<b>Mouse</b>												
U27440	-	-	-	-	-	-	+	+	+	+	+	+

Description	50 tests	100 tests
<b>Human</b>		
MPCR Kit for Human TGF-b Superfamily Genes, with GAPDH as Internal Control	T57031	T57030
MPCR Kit for Human TGF-b Superfamily Genes Set 2, with GAPDH as Internal Control	GR2651	GR2650
<b>Mouse</b>		
MPCR Kit for Mouse TGF-b Superfamily Genes, with GAPDH as Internal Control	U27440	U27441

### VEGF Family Genes

Angiogenesis is the development of new blood vessels via the migration and proliferation of endothelial cells from preexisting blood vessels. Angiogenesis is tightly regulated and depends on a dynamic balance between stimulators and inhibitors. The vascular endothelial growth factor (VEGF), a homodimer glycoprotein of relative molecular mass 45 000, is the only mitogen that specifically acts on endothelial cells and may be a major regulator of tumor angiogenesis in vivo. VEGF and placental growth factor constitute a family of regulatory peptides capable of controlling blood vessel formation and permeability by interacting with two endothelial tyrosine kinase receptors, FLT1 and FLK1. A third member of family may be the ligand of the related FLT4 receptor involved in lymphatic vessel development. VEGF is known to occur as at least six differentially spliced variants, giving rise to mature isoforms containing 121, 145, 165, 183, 189 or 206 amino acids. VEGF-121 is more angiogenic and tumorigenic than are the 165 and 189 isoforms due to its ability to freely diffuse from the cells.

Summary of genes included in each individual MPCR kit :

	Angiopoietin-1	Angiopoietin-2	Cox-2	FLK-1	FLT-1	FLT-4	TIE receptor	TIE-2	VEGF (all)	VEGF121	VEGF165	VEGF189	VEGF-C	GAPDH
<b>Human</b>														
T57291	-	-	-	+	+	-	-	-	-	+	+	+	-	+
T57301	+	-	-	+	+	+	+	-	+	-	-	-	+	+
T57311	+	+	-	+	+	-	-	+	-	+	+	+	-	+
<b>Rat</b>														
T57350	+	+	+	-	-	-	-	+	+	-	-	-	-	+

Description	50 tests	100 tests
<b>Human</b>		
MPCR Kit for Human VEGF and its receptors Set-1, with GAPDH as Internal Control	T57291	T57290
MPCR Kit for Human VEGF and its receptors Set-2, with GAPDH as Internal Control	T57301	T57300
MPCR Kit for Human VEGF and its receptors Set-3, with GAPDH as Internal Control	T57311	T57310
<b>Rat</b>		
MPCR Kit for Rat VEGF and its receptors Set-1, with GAPDH as Internal Control	T57350	T57351

### MPCR/Insulin-like Growth Factors and their Binding Proteins

Insulin-like growth factor (IGF)-binding protein (IGFBP)-related proteins (IGFBP-rPs) are newly described cysteine-rich proteins that share significant amino-terminal structural similarity with the conventional IGFBPs and are involved in a diversity of biological functions, including growth regulation. Insulin-like growth factor II is a polypeptide hormone with structural homologies to insulin and IGF-I. In contrast to these other hormones, the in vivo function of IGF-II is not known. Although IGF-II can stimulate a broad range of biological responses in isolated cells, these responses appear to be mediated by the insulin and IGF-I receptors.

IGF-I and IGF-II play an essential role in cell proliferation and differentiation, via both endocrine and paracrine or autocrine mechanisms. In biological media, IGF-I and IGF-II are reversibly associated with specific, high-affinity binding proteins. (IGFBP-1 to -6) whose expression varies with tissue of origin, stage of development, and hormonal and nutritional status. They have diverse functions in IGF transport, delivery of the IGFs to their target cells and in modulating the IGFs' interactions with their receptors.

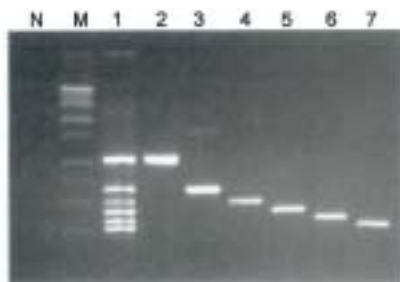
Summary of genes included in each individual MPCR kit :

	18S	IGFBP-1	IGFBP-2	IGFBP-3	IGFBP-4	IGFBP-5	IGFBP-6	IGF-I	IGF-II	GAPDH
<b>Human</b>										
T56460	-	+	+	+	+	+	+	+	+	+
T56480	+	+	+	+	+	+	+	+	+	-
<b>Mouse</b>										
T56500	-	+	+	+	-	+	+	+	+	+
T56520	+	+	+	+	-	+	+	+	+	-
<b>Rat</b>										
T56540	-	+	+	+	-	+	+	+	+	+
T56560	+	+	+	+	-	+	+	+	+	-

Description	50 tests	100 tests
<b>Human</b>		
MPCR Kit for Human Insulin Binding Proteins, with H18S as Internal Control	T56460	T56450
MPCR Kit for Human Insulin Binding Proteins, with GAPDH as Internal Control	T56480	T56470
<b>Mouse</b>		
MPCR Kit for Mouse Insulin Binding Proteins, with GAPDH as Internal Control	T56500	T56490
MPCR Kit for Mouse Insulin Binding Proteins, with 18S as Internal Control	T56520	T56510
<b>Rat</b>		
MPCR Kit for Rat Insulin Binding Proteins, with GAPDH as Internal Control	T56540	T56530
MPCR Kit for Rat Insulin Binding Proteins, with 18S as Internal Control	T56560	T56550

# Amplification Products for PCR and RT-PCR

## Multiplex PCR (MPCR)



Quality control validation of MPCR kit with individual primer pair and multiplex primer set, MP-70036  
 Lane N : PCR using rCATs Primers without positive (Negative)  
 Lane M : DNAM.W. Marker  
 Lane 1 : PCR using rCATs Primers with 1x positive  
 Lane 2 : PCR using Rat 18S Primers with 1x positive  
 Lane 3 : PCR using Rat CAT-B Primers with 1x positive  
 Lane 4 : PCR using Rat CAT-K Primers with 1x positive  
 Lane 5 : PCR using Rat CAT-H Primers with 1x positive  
 Lane 6 : PCR using Rat CAT-L Primers with 1x positive  
 Lane 7 : PCR using Rat CAT-S Primers with 1x positive

### MPCR/CD Molecules

The most widespread use of CD markers is in the determination of cell lineage and sublineage. Leukocytes express distinct assortments of CD molecules on their cell surfaces, many of which reflect either different stages of their lineage-specific differentiation or different states of activation or inactivation.

Description	50 tests	100 tests
<b>Human</b>		
MPCR Kit for Human CD molecules Set 1, with GAPDH as Internal Control	U30420	U30421
MPCR Kit for Human CD molecules Set 1, with H18S as Internal Control	U30410	U30411
MPCR Kit for Human CD molecules Set 2, with GAPDH as Internal Control	FL1140	FL1141
<b>Mouse</b>		
MPCR Kit for Human CD molecules Set 3, with GAPDH as Internal Control	FL1160	

Summary of genes included in each individual MPCR kit :

	18S	BRP1	CD3	CD4	CD8	CD14	CD19	CD28	CD45	CD80	CD86	CD152	ICOS	TCR-a	GAPDH
U30420	-	-	+	+	+	+	+	-	+	-	-	-	-	+	+
U30410	+	-	+	+	+	+	+	-	+	-	-	-	-	+	-
FL1140	-	+	-	-	-	-	-	+	-	+	+	+	-	-	+
FL1160	-	+	-	-	-	-	-	+	-	+	+	-	+	-	+

### MPCR/TLR Signaling (LPS binding proteins)

Vertebrates and invertebrates initiate a series of defence mechanisms following infection by Gram-negative bacteria by sensing the presence of lipopolysaccharide (LPS), a major component of the cell wall of the invading pathogen. In humans, monocytes and macrophages respond to LPS by inducing the expression of cytokines, cell-adhesion proteins, and enzymes involved in the production of small proinflammatory mediators. Under pathophysiological conditions, LPS exposure can lead to an often fatal syndrome known as septic shock. Sensitive responses of myeloid cells to LPS require a plasma protein called LPS-binding protein and the glycosylphosphatidylinositol-anchored membrane protein CD14.

The LPS signaling across the plasma membrane is via Toll-like receptors, which can be activated by LPS in a response that depends on LPS-binding protein and is enhanced by CD14 (1,2). Five human Toll-like receptors—named TLRs 1-5—are probably the direct homologs of the fly Toll molecule and, as such, could constitute an important and unrecognized component of innate immunity in humans.

Summary of genes included in each individual MPCR kit :

	18S	CD-14	TLR-1	TLR-2	TLR-3	TLR-4	TLR-5	TLR-6	TLR-7	TLR-8	TLR-9	GAPDH
<b>Human</b>												
T56991	-	+	+	+	+	+	+	-	-	-	-	+
U27260	-	+	+	+	+	+	+	+	-	-	+	+
T56230	+	+	+	+	-	+	+	+	-	-	+	-
<b>Mouse</b>												
BD6920	-	-	+	+	+	+	+	+	+	+	+	+

Description	50 tests	100 tests
<b>Human</b>		
MPCR Kit for Human Signaling Receptor TLRs, with GAPDH as Internal Control	T56991	T56990
MPCR Kit for Human Signaling Receptor Set-2, with GAPDH as Internal Control	U27260	U27261
MPCR Kit for Human Signaling Receptor Set-3, with 18S as Internal Control	T56230	T56231
<b>Mouse</b>		
MPCR Kit for Human Signaling Receptor TLRs, with GAPDH as Internal Control	BD6920	BD6921

### MPCR/Transcription factors

#### MPCR/Transcription Factors

Understanding how information is conveyed from the outside to the inside of a cell is a critical challenge for all biologists involved in signal transduction. The flow of information initiated by cell-cell and cell-extracellular matrix contacts is mediated by the formation of adhesion complexes involving multiple proteins. Inside adhesion complexes, connective membrane skeleton (CMS) proteins are signal transducers that bind to adhesion molecules, organize the cytoskeleton, and initiate biochemical cascades. Adhesion complex-mediated signal transduction ultimately directs the formation of supramolecular structures in the cell nucleus, as illustrated by the establishment of multi complexes of DNA-bound transcription factors and the redistribution of nuclear structural proteins to form nuclear subdomains.

The nuclear factor of activated T cells (NFAT) plays an important role in T-cell biology. Activation of T cells results in the rapid calcineurin-dependent translocation of NFAT transcription factors from the cytoplasm to the nucleus. This translocation process coupled to the subsequent active maintenance of NFAT in the nucleus compartment is critical for the induction of expression of several genes encoding cytokines and membrane proteins that modulate immune responses.

Transcription factors of the nuclear factor-kappa B (NF-kappa B)/Rel family have an important function in the regulation of a variety of genes involved in the inflammatory and proliferative responses of cells.

Summary of genes included in MPCR kit #T57271 are IκB, NFATc, NFATx, NFκB, OCT-2 and GAPDH as internal control.

Description	50 tests	100 tests
<b>Human</b>		
MPCR Kit for Human transcriptional Factors, with GAPDH as Internal Control	T57271	T57270

#### Telomerase genes

Major advances have been made during the last few years in understanding the link between telomerase expression and cell immortality.

Telomerase is an unusual reverse transcriptase that contains an RNA molecule as well as various protein subunits. During synthesis of new telomeric DNA, the catalytic subunit utilizes a small templating domain in the RNA component to copy additional telomeric repeats onto the end of chromosome.

Human telomerase consists of an essential RNA subunit (hTER), the reverse transcriptase subunit (hTERT), and accessory proteins (hTP). The activity of telomerase is modulated by other proteins such as TRF-1 and TRF-2. Several studies have shown that there is a good correlation between expression of hTERT mRNA and telomerase activity in normal and cancer tissue extracts. How hTERT is upregulated is not yet understood, but in some cases, elevated expression may be caused by an increase in the level of c-myc. The MPCR primers designed all have similar™ and no obvious 3'-end overlap to enhance MPCR amplification.

The gene expression of these cytokines can be analyzed in a single step by using these Kits.

Genes included in MPCR kit #T57011 are 18S, c-myc, TER, TERT, TP-1, TRF-1, TRF-2

Description	50 tests	100 tests
<b>Human</b>		
MPCR Kit for Human Telomerase genes, with H18S as Internal Control	T57011	T57010

# Amplification Products for PCR and RT-PCR

## Multiplex PCR (MPCR)

### Apoptosis

Apoptosis (programmed cell death) plays a major role in many biological processes, including embryogenesis, development of the immune system and tissue regeneration. Like growth and differentiation, apoptosis requires active and coordinated regulation of specific genes. For example, Bcl-2 is the potent suppressor of apoptosis; ICE, c-myc and P53 can induce apoptosis.

MPCR Kits were designed to detect the expression of apoptosis genes as listed in Table below. The PCR primers designed all have similar™ and no obvious 3'-end overlaps to enhance multiple & equal amplification. The gene expression of these genes during apoptosis can be analyzed in a single step by using this Kit.

Summary of genes included in each individual MPCR kit :

	18S	ApaF (activator)	BAD	Bag-1	Bax-alpha	Bcl-2	Bcl-xL	Bcl-xS	BIM	c-Myc	ICE (caspase 1)	ICH1 (caspase 2)	CPP-32 (caspase 3)	ICH2 (caspase 4)
<b>Human</b>														
T55760	-	-	-	-	-	+	-	-	-	+	+	-	-	-
T55770	-	-	-	-	+	+	+	+	-	-	-	-	+	-
T55780	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T55790	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T55800	-	+	-	-	-	-	-	-	-	-	-	-	+	-
T55810	-	-	-	-	-	-	-	-	-	-	-	+	-	+
T55820	-	-	+	+	+	+	-	-	+	+	-	-	-	-
T55830	+	-	+	+	+	+	-	-	+	+	-	-	-	-

<b>Mouse</b>														
T55870	-	-	-	-	-	+	-	-	-	+	+	-	-	-
T55880	-	-	-	-	+	+	+	+	-	-	-	-	+	-
T55890	+	+	-	-	-	-	-	-	-	-	+	+	+	-

<b>Rat</b>														
T55930	-	-	-	-	-	+	-	-	-	+	+	-	-	-
T55940	-	-	-	-	+	+	+	+	-	-	-	-	+	-
T55950	+	-	-	-	-	-	-	-	-	-	+	+	+	-

	CErel3 (caspase 5)	MCH2 (caspase 6)	MCH3 (caspase 7)	Flice (caspase 8)	MCH6 (caspase 9)	MCH4 (caspase 10)	P53	TRADD	Trail	Fadd	Fas	FasL	GAPDH
<b>Human</b>													
T55760	-	-	-	-	-	-	+	-	-	-	-	-	+
T55770	-	-	-	-	-	-	-	-	-	-	-	-	+
T55780	-	-	-	+	-	-	-	-	+	-	+	+	+
T55790	-	-	-	+	-	-	-	+	-	+	+	+	+
T55800	+	-	-	+	+	-	-	-	-	-	-	-	+
T55810	-	+	+	-	-	+	-	-	-	-	-	-	+
T55820	-	-	-	-	-	-	+	-	-	-	-	-	+
T55830	-	-	-	-	-	-	+	-	-	-	-	-	-

<b>Mouse</b>													
T55870	-	-	-	-	-	-	+	-	-	-	-	-	+
T55880	-	-	-	-	-	-	-	-	-	-	-	-	+
T55890	-	-	-	+	+	-	-	-	-	-	-	-	-

<b>Rat</b>													
T55930	-	-	-	-	-	-	+	-	-	-	-	-	+
T55940	-	-	-	-	-	-	-	-	-	-	-	-	+
T55950	-	+	-	+	+	-	-	-	-	-	-	-	-

Description	50 tests	100 tests
<b>Human</b>		
MPCR Kit for Human Apoptic Genes Set 1, with GAPDH as Internal Control	T55681	T55680
MPCR Kit for Human Apoptic Genes Set 2, with GAPDH as Internal Control	T55691	T55690
MPCR Kit for Human Apoptic Genes Set 3, with GAPDH as Internal Control	T55701	T55700
MPCR Kit for Human Apoptic Genes Set 4, with GAPDH as Internal Control	T55711	T55710
MPCR Kit for Human Apoptic Genes Set 5, with GAPDH as Internal Control	T55721	T55720
MPCR Kit for Human Apoptic Genes Set 6, with GAPDH as Internal Control	T55731	T55730
MPCR Kit for Human Apoptic Genes Set 7, with GAPDH as Internal Control	T55741	T55740
MPCR Kit for Human Apoptic Genes Set 7, with H18 as Internal Control	T55751	T55750
<b>Mouse</b>		
MPCR Kit for Mouse Apoptic Genes Set 1, with GAPDH as Internal Control	T55841	T55840
MPCR Kit for Mouse Apoptic Genes Set 2, with GAPDH as Internal Control	T55851	T55850
MPCR Kit for Mouse Apoptic Genes Set 4, with 18S as Internal Control	T55861	T55860
<b>Rat</b>		
MPCR Kit for Mouse Apoptic Genes Set 1, with GAPDH as Internal Control	T55901	T55900
MPCR Kit for Mouse Apoptic Genes Set 2, with GAPDH as Internal Control	T55911	T55910
MPCR Kit for Mouse Apoptic Genes Set 4, with 18S as Internal Control	T55921	T55920

See also MPCR/TNF genes

### NO Metabolism Genes

NO is a signaling molecule that elicits numerous biochemical responses. NO exhibits contradictory effects in the regulation of apoptosis. Both pro- and anti-apoptotic effects have been demonstrated. The pro-apoptotic effects seem to be linked to pathophysiological conditions, where high amounts of NO are produced by the inducible nitric oxide synthase. In contrast, the continuous release of endothelial NO inhibits apoptosis and may contribute to the anti-atherosclerotic function of NO. Nitric oxide (NO) is produced by iNOS (inducible NOS), eNOS (endothelial NOS) and nNOS (neuronal NOS). IL-1 beta is a potent inducer of iNOS while TNF-alpha may induce the production of NO and free radicals.

Analysis of the temporal and spatial distribution of RNA expression can provide researchers with important clues about the function of these cytokines within their own systems.

Summary of genes included in each individual MPCR kit :

	IL1-beta	eNOS	iNOS	nNOS	TNF-alpha	GAPDH
<b>Human</b>						
T56771	+	+	+	+	+	+
<b>Mouse</b>						
T56791	+	+	+	+	-	+
<b>Rat</b>						
T57221	-	+	+	+	-	+

Description	50 tests	100 tests
<b>Human</b>		
MPCR Kit for Human NO metabolism genes, with GAPDH as Internal Control	T56771	T56770
<b>Mouse</b>		
MPCR Kit for Mouse NO metabolism genes, with GAPDH as Internal Control	T56791	T56790
<b>Rat</b>		
MPCR Kit for Rat NO metabolism genes, with GAPDH as Internal Control	T57221	T57220

# Amplification Products for PCR and RT-PCR

## Multiplex PCR (MPCR)

### MPCR/Proteinases Genes

#### MPCR/MMPs Superfamily Genes

The matrix metalloproteinases (MMPs) are mediators of structural protein degradation during turnover of the extracellular matrix. During normal tissue remodeling such as wound healing, bone resorption, and morphogenesis, MMPs are accurately produced and precisely targeted to specific extracellular substrates by a wide variety of cells. Atypical production of MMP is thought to contribute to progression of many destructive diseases, such as arthritis and chronic ulcerations, and disease-related processes, such as inflammatory tissue destruction and remodeling. Overexpression of MMPs also may play important roles in tumor metastasis and invasion, and angiogenesis. MMPs have also been implicated in the pathogenesis of various inflammatory diseases of the central nervous system. Evidence is accumulating that several MMPs might be involved in the pathogenesis of meningitis. MMP3 and MMP13 mRNAs have been shown to be selectively upregulated in experimental meningococcal meningitis. In contrast, mRNA levels for MMPs 2, 7, 10, and 11 remained unchanged. These data suggests that MMP3 and MMP13 may contribute to the pathogenesis of this infectious disease of the central nervous system.

Cytokines, growth factor, hormones, oncogenes, and tumor promoters play important roles in the transcriptional regulation for most of the MMP family members. In addition, there is evidence for regulation at the level of mRNA stability. Analysis of the temporal and spatial distribution of RNA expression can provide researchers with important clues about the function of these cytokines within their own systems. Northern Blot and RNase Protection Assay are the most widely used procedures for determining the abundance of a specific mRNA in a total or poly(A) RNA sample.

RT-MPCR provides an alternate and accurate method to detect multiple gene expression by amplifying all the genes under the same conditions. Variations in RNA isolation, initial quantitation errors or tube-to-tube variations in RT and PCR can be compensated by including a house-keeping gene, such as GAPDH or beta-actin, in MPCR. Alternatively, a parallel RT-PCR using the same cDNA, PCR conditions and primers for one of house-keeping genes may be run to offset any variations. Differences in gene expression can be determined by normalizing its expression against beta-actin or GAPDH expression.

Summary of genes included in each individual MPCR kit :

	18S	MMP-1	MMP-2	MMP-3	MMP-7	MMP-9	MMP-13	MT-MMP1	TMP-1	TMP-2	TMP-3	TMP-4	Tryptase	GAPDH
<b>Human</b>														
T56681	-	-	-	+	+	-	+	+	-	-	-	-	+	+
T56691	+	-	-	+	+	-	+	+	-	-	-	-	+	-
T56730	-	+	-	-	-	-	-	+	+	-	-	-	-	+
FL1091	+	+	-	-	-	-	-	+	+	-	-	-	-	-
FL1071	-	+	+	+	+	+	-	-	-	-	-	-	-	+
GR2631	-	-	+	-	-	+	-	-	+	+	+	+	-	+

Description	50 tests	100 tests
<b>Human</b>		
MPCR Kit for Human Matrix, MMP genes, with GAPDH as Internal Control	<b>T56681</b>	<b>T56680</b>
MPCR Kit for Human Matrix, MMP genes, with H18S as Internal Control	<b>T56691</b>	<b>T56690</b>
MPCR Kit for Human MMP genes set-2, with GAPDH as Internal Control	<b>T56730</b>	<b>T56731</b>
MPCR Kit for Human MMP genes set-2, with 18S as Internal Control	<b>FL1091</b>	<b>FL1090</b>
MPCR Kit for Human MMP genes set-3, with GAPDH as Internal Control	<b>FL1071</b>	<b>FL1070</b>
MPCR Kit for Human MMP genes set-2, with GAPDH as Internal Control	<b>GR2631</b>	<b>GR2630</b>

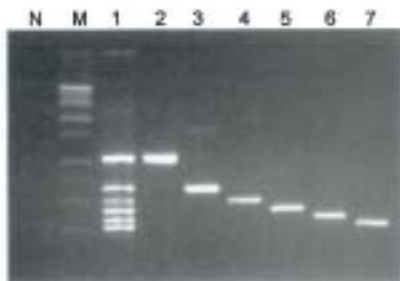
#### MPCR/Cathepsin family

Cathepsin B, H, K, L and S are papsin family cysteine proteinases involved in a variety of physiological processes such as proen-zyme activation, enzyme inactivation, antigen presentation, hormone maturation, tissue remodeling and bone matrix resorption. In addition, cysteine proteinases appear to be involved in a variety of pathological processes, cancer invasion and metastasis. All of them are glycoproteins and contain an essential cysteine residue in their active site but differ in some enzymatic properties, including substrate specificities and pH stability.

Summary of genes included in each individual MPCR kit :

	18S	CAT-B	CAT-H	CAT-K	CAT-L	CAT-S	GAPDH
T55961	-	+	+	+	+	+	+
T55981	+	+	+	+	+	+	-

Description	50 tests	100 tests
MPCR Kit for Rat Cathepsin genes, with GAPDH as Internal Control	<b>T55961</b>	<b>T55960</b>
MPCR Kit for Rat Cathepsin genes, with 18S as Internal Control	<b>T55981</b>	<b>T55980</b>



Quality control validation of MPCR kit with individual primer pair and multiplex primer set, T55981  
 Lane N : PCR using rCATS Primers without positive (Negative)  
 Lane M : DNAM.W. Marker  
 Lane 1 : PCR using rCATS Primers with 1x positive  
 Lane 2 : PCR using Rat 18S Primers with 1x positive  
 Lane 3 : PCR using Rat CAT-B Primers with 1x positive  
 Lane 4 : PCR using Rat CAT-K Primers with 1x positive  
 Lane 5 : PCR using Rat CAT-H Primers with 1x positive  
 Lane 6 : PCR using Rat CAT-L Primers with 1x positive  
 Lane 7 : PCR using Rat CAT-S Primers with 1x positive

### Cell cycling Genes

The cell cycle is composed of four stages. In the G1, or gap one, stage, the cell increases in size and prepares to copy its DNA. Once all the necessary molecules are made, the clock moves the cell to the S phase, called S for synthesis. This is when the cell copies its DNA. After the DNA is copied, a second gap period called G2 occurs, and then the cell divides. Two types of genes play a major role in regulating the cell cycle. Genes called proto-oncogenes (cFOS, C-Jun) encourage cell division. Proteins produced by these genes act like accelerators stimulating the cell to grow and divide. In contrast, genes called tumor-suppressor genes (p16, p53, RB1) inhibit cell proliferation. Proteins produced by these genes act like brakes to slow down or stop cell division. Cydin D1 (CCND1) is a key cell cycle regulatory protein, the expression and subcellular localization of which is often altered in human tumor cells. The balance between the activities of proto-oncogenes and tumor-suppressor genes keeps normal cells dividing at a rate that is appropriate for their position and role in the body.

Summary of genes included in MPCR kit :

	CCND1	c-FOS	c-JUN	c-myc	RB1	P16	P21	P53	PCNA	GAPDH
GR2671	+	+	+	+	+	+	+	+	+	+

Description	50 tests	100 tests
MPCR Kit for Human cell cycling genes, with GAPDH as Internal Control	GR2671	GR2670

- ◆ Convenience Efficiency and Gain of time
- ◆ Amplify multiple genes of interest simultaneously in a single reaction !
- ◆ Same condition of reaction = better comparative analysis
- ◆ Choice of applications : from basic pathway gene expression profiling to diagnostic pathogen identification.
- ◆ Ideal for gene expression profiling

### MPCR/Thrombosis

Venous thromboembolism is a major medical problem, with an annual incidence in the general population of approximately 1 in 1000. An increased risk of venous thrombosis has been found to be associated with several hereditary abnormalities of the anticoagulant pathway involving the Factor V Linden Mutation (Arg506Gln), eventually leading to activated protein C resistance.

Another candidate gene for venous thrombosis is the prothrombin gene. The mature prothrombin protein is the precursor of the serine protease thrombin, which is an enzyme with procoagulant, anticoagulant, and fibrinolytic activities. The G20210A allele in the 3' untranslated region of the prothrombin gene has been reported to be associated with the elevated plasma prothrombin levels and increased risk of venous thrombosis.

Our multiplex PCR amplification kit detects site-directed mutagenesis for one-step determination of Factor V Linden and G20210A presence in the prothrombin gene

Summary of genes included in each individual MPCR kit :

	Factor V	Factor IX	Prothrombin
T57391	+	+	+
Description			
MPCR Kit for human thrombosis point mutations detection			
	T57391	T57390	

RT-MPCR provides an accurate method to detect multiple genes expression by simultaneously amplifying all the genes under the same conditions. It is ideal to compare genes when, where, and to what degree genes are expressed. See the introduction page D45.

Each kit contains :

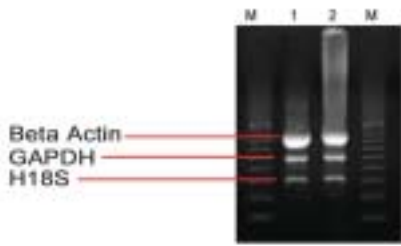
	50 tests	100 tests
Optimized MPCR Buffer	1250 µl	1250 µl x 2
Positive Control	50 µl	50 µl x 2
Primer mixture	250 µl	250 µl x 2
DNA M.W. Marker (100bp Ladder)	100 µl	100 µl x 2
ddH <sub>2</sub> O (Dnase free)	2 ml	2 ml x 2



Genomic DNA quality control validation of human thrombosis MPCR kit  
M : DNA M.W. Marker  
Lane 1 : PCR using wild type MPCR primers with patient #1 DNA  
Lane 2 : PCR using mutant type MPCR primers with patient #1 DNA  
Lane 3 : PCR using wild type MPCR primers with patient #2 DNA  
Lane 4 : PCR using mutant type MPCR primers with patient #2 DNA  
Lane 5 : PCR using wild type MPCR primers with patient #3 DNA  
Lane 6 : PCR using mutant type MPCR primers with patient #3 DNA  
Lane 7 : PCR using wild type MPCR primers with patient #4 DNA  
Lane 8 : PCR using mutant type MPCR primers with patient #4 DNA  
Lane 9 : PCR using wild type MPCR primers with type positive control  
Lane 10 : PCR using mutant type MPCR primers with mutant type positive control

# Amplification Products for PCR and RT-PCR

## Multiplex PCR (MPCR)



Detection of house keeping gene expression by MPCR.  
Lane1 & 2 : Two independent human cDNA preparations are used in RT-MPCR for detection of 18S, b-actin & GAPDH genes.  
M : Gel marker.

## House-Keeping Genes

This kit has been designed to amplify sequences specific for house-keeping genes. This kit allows you (1) to check the quality of your cDNA before proceeding to PCR or cloning; (2) to offset variations in RNA isolation, initial quantitation errors or tube-to-tube variations in RT and PCR steps by this RT-MPCR using the same cDNA and PCR conditions. PCR primers have similar tm and no obvious 3'-end overlap to enhance multiple gene amplification.

Summary of genes included in each individual MPCR kit :

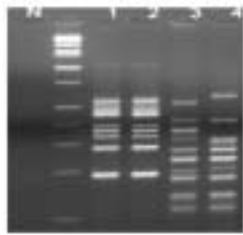
	18S	Beta-Actin	L-32	PhospholipaseA2	Transferin	Receptor	GAPDH
<b>Human</b>							
T56390	+	+	-	-	-	-	+
T56381	+	-	+	+	+	+	+
<b>Mouse</b>							
FL1321	+	+	-	-	-	-	+

Description	50 tests	100 tests
<b>Human</b>		
MPCR Kit for Human House-keeping genes set-1	T56390	T56391
MPCR Kit for Human House-keeping genes set-2	T56381	T56380
<b>Mouse</b>		
MPCR Kit for Mouse House-keeping genes set-1	FL1321	FL1320

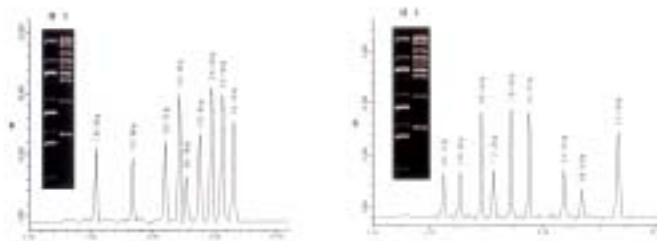
## Genetic Disease

### DMD/BMD

Duchenne or Becker Muscular Dystrophy (DMD/ BMD) are related to dystrophin gene abnormalities. This Kit is designed to rapidly detect the deletions in dystrophin gene. Two sets of MPCR primers, Set I(1) and Set II(2), are used to amplify different exons of dystrophin genes. Set I amplifies exons 8 (360 bp), 17 (416 bp), 19 (459 bp), 44 (268 bp), 45 (547 bp), 48 (506 bp), 12 (331 bp), 51 (388 bp) and 4 (196 bp) of the dystrophin gene. Set II amplifies exons 3 (410 bp), 6 (202 bp), 13 (238 bp), 43 (357 bp), 47 (181 bp), 50 (271 bp), 52 (113 bp), 60 (139 bp) and the muscle-specific promoter (535 bp) of the dystrophin gene. About 70% of DMD/BMD gene deletions can be detected by MPCR with Set I primers and 98% of DMD/BMD gene deletions can be detected by MPCR with Set I plus Set II primers.



Lane N: Negative control (without Primer)  
Lane 1: PCR using DMD-P001 primers with 1X Positive  
Lane 2: PCR using DMD-P001 primers with 1X Positive  
Lane 3: PCR using DMD-P002 Primers with 1 X Positive  
Lane 4: PCR using DMD-P003 Primers with 1X Positive



CE analysis of DMD/BMD MPCR amplicons.  
The 9 exons of dystrophin gene were amplified using Maxim's new MPCR primers under our MPCR Optimizer System.  
Left Panel : DMD/BMD set I  
Right Panel : DMD/BMD set II

Summary of genes included in each individual MPCR kit :

	exon 3	exon 4	exon 6	exon 8	exon 12	exon 13	exon 17	exon 19	exon 43	exon 44	exon 45	exon 47	exon 48	exon 50	exon 51	exon 52	exon 60	Muscle specific promoter
<b>Human</b>																		
T56160	-	+	-	+	+	-	+	+	-	+	+	-	+	-	+	-	-	-
T56180	+	-	+	-	-	+	-	-	+	-	-	+	-	+	-	+	+	+
T56200	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
T56220	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Description	50 tests	100 tests
<b>Human</b>		
MPCR Kit for Human DMD/BMD set I	T56151	T56150
MPCR Kit for Human DMD/BMD set II	T56171	T56170
MPCR Kit for Human DMD/BMD set I + II	T56191	T56190
MPCR Kit for Human DMD/BMD new set I + II	T56211	T56210

Literature :  
1. Chamberlain, J.S., et. al. Nucl. Acids Res.(1988) 16,11141-11156.  
2. Beggs, A.H., et. al., Hum. Genet. (1990) 86, 45-48.

## Multiplex PCR (MPCR)

### Apolipoprotein family

The central nervous system accounts for only 2% of the whole body mass but contains almost a quarter of the unesterified cholesterol present in the whole individual. This sterol is largely present in two pools comprised of the cholesterol in the plasma membranes of glial cells and neurons and the cholesterol present in the specialized membranes of myelin. The input of cholesterol into the central nervous system comes almost entirely from in situ synthesis, and there is currently little evidence for the net transfer of sterol from the plasma into the brain of the fetus, newborn or adult. In the steady state in the adult, an equivalent amount of cholesterol must move out of the brain and this output is partly accounted for by the formation and excretion of 24S-hydroxycholesterol. This cholesterol turnover across the brain is increased in neurodegenerative disorders such as Alzheimer's disease. Indirect evidence suggests that large amounts of cholesterol also turn over among the glial cells and neurons within the central nervous system during brain growth and neuron repair and remodeling. This internal recycling of sterol may involve ligands such as apolipoproteins E and AI, and one or more membrane transport proteins such as members of the low density lipoprotein receptor family.

Summary of genes included in each individual MPCR kit :

	18S	Apo-A	Apo-B	Apo-C	Apo-D	Apo-E	Apo-J	GAPDH
T55641	-	+	+	+	+	+	+	+
T55661	+	+	+	+	+	+	+	-

Description	50 tests	100 tests
MPCR Kit for Rat Apolipoproteins with GAPDH as internal control	T55641	T55640
MPCR Kit for Rat Apolipoproteins with 18S as internal control	T55661	T55660

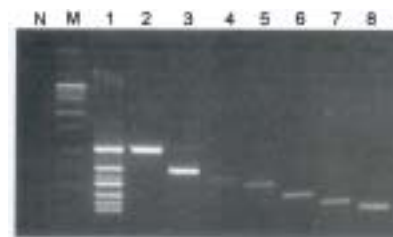
### Drug resistance

The development of resistance to chemotherapeutic agents leads to major drawbacks in the treatment of Cancer. For most cancers, the most important mechanisms of drug resistance are not known. In particular, it remains unclear which of the molecular and cellular drug resistance mechanisms identified by basic research are relevant to the clinic. Malignant melanoma cells are particularly well known for their unresponsiveness to chemotherapy ; only about 30% of tumors exhibit a transient clinical response to treatment. In our study, we investigated the molecular mechanism of acquired resistance of melanoma cells (MeWo) to the chloroethylating drug fotemustine. Using MeWo cells as a model, Interchim offers a MPCR kit to detect potential drug resistance genes.

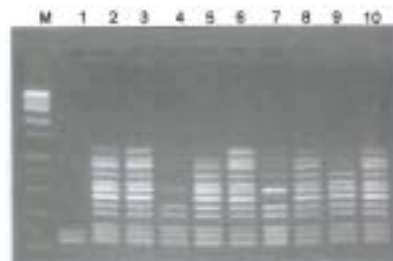
Summary of genes included in each individual MPCR kit :

	ApoD	CRYAB	CYR61	G1P2	G1P3	IFI <sup>TM</sup> 1	IFI <sup>TM</sup> 3	IL1b	PDE3A	PEPP2	PLAB	UBB
GR2691	+	+	+	+	+	+	+	+	+	+	+	+

Description	50 tests	100 tests
MPCR Kit for Human drug resistance genes, with GAPDH as internal control	GR2691	GR2690



Quality control validation of MPCR kit with individual primer pair and multiplex primer set, T55641  
 Lane N : PCR using rALPG Primers without positive (Negative)  
 Lane M : DNA M.W. Marker  
 Lane 1 : PCR using rALPG Primers with 1x positive  
 Lane 2 : PCR using Rat GAPDH Primers with 1 x positive  
 Lane 3 : PCR using Rat ApoJ Primers with 1x positive  
 Lane 4 : PCR using Rat ApoB Primers with 1x positive  
 Lane 5 : PCR using Rat ApoE Primers with 1x positive  
 Lane 6 : PCR using Rat ApoA Primers with 1x positive  
 Lane 7 : PCR using Rat ApoD Primers with 1x positive  
 Lane 8 : PCR using Rat ApoC Primers with 1x positive



cDNA are prepared from various human tissues and tested with MPCR kit, GR-2691  
 Lane M : DNA M.W. Marker  
 Lane 1-9 : PCR using hDRG1G Primers with different human cDNA  
 Lane 10 : PCR using hDRG1G Primers with 1x Positive

# Amplification Products for PCR and RT-PCR

## Multiplex PCR (MPCR)

### MPCR/Oncogenes

Cancer arises when the growth and differentiation of cells in a body tissue become uncontrolled. While no two cancers are genetically identical (even in the same tissue type), there are ways in which normal cell growth can go wrong. One of these is that a gene stimulates cell growth hyperactive ; this altered gene is known as an "oncogene".

BRCA1 was the first breast cancer susceptibility gene to be identified and cloned. In high-risk individuals, mutations in BRCA1 increase the lifetime risk of developing breast cancer 8-10 tenfold, compared to the general population. BRCA1 has intrinsic transactivation activity and is able to activate the p21 promoter. In addition, BRCA1 is linked to a number of genes involved in transcriptional regulation. Moreover, BRCA1 is essential for cellular response to DMA. Part of BRCA1's response to DMA damage may in fact be corroborated through transcriptional regulation. The expression of GADD45, a DMA damage-responsive gene, is increased immediately after induction of BRCA1. Recently, BRCA1 was shown to repress estradiol (E2)-responsive Estrogen receptor alpha (ER-alpha)-mediated transcriptional activity potentially linking the multiple functions of BRCA1 to specific tissue targets Furthermore, BRCA1 and p53 tumor suppressors have been shown to interact and cooperate to activate transcription of p53-responsive genes.

p53 is a tumor suppressor gene that induces apoptosis after irreparable cell damage and regulates the cell cycle by activating the transcription of involved genes. Inactivation or mutation of p53 leads to replication of damaged DNA thus promoting the development malignant cell clones. Hence, p53 mutations are correlated with an adverse prognosis. Overexpression of mutant p53 may be detected by immunohistochemistry and the type of mutation can be determined by sequencing. In 113 tumor samples analyzed, 37 (33%) showed p53 Overexpression.

The ras proto-oncogenes are normal cellular components. These genes encode 21 Kd proteins that bind to the inner surface of plasma membranes. The ras proteins are thought important for transduction of signals required for proliferation and differentiation. Mutation or overexpression of ras results in activation of p21. Abnormalities of p21 have been associated with a variety of human cancers including a majority of colorectal cancers. When a hormone stimulates receptors on the cell surface, for example, Ras is activated and transduces cell growth signals. In approximately 30% of human cancers, Ras is constitutively activated by mutation, resulting in uncontrolled cell growth. Usually, a single oncogene is not sufficient to promote transformation. Thus, mutations in several genes may be required to induce a transformed phenotype.

Mutations in the human P53 gene locus are a frequent genetic alteration associated with malignancy identified so far. This Kit is designed to amplify the exons 2-4, exons 5-6, exons 7-9 and the exons 10-11 of the P53 gene from genomic DNA. The PCR primers designed have similar Tm and no obvious 3'-end overlap. These mutational regions can be amplified and analyzed in a single step by using this Kit.

Summary of genes included in MPCR kit :

	Exons 2-4	Exons 5-6	Exons 7-9	Exons 10-11	
<b>Human</b>					
<b>T56851</b>	+	+	+	+	
<b>Description</b>				<b>50 tests</b>	<b>100 tests</b>
MPCR Kit for Human P53				<b>T56851</b>	<b>T56850</b>

### Ras Gene

#### Technical tip

The point mutations in the K-Ras gene occur frequently in human lung adenocarcinoma. A multiplex PCR assay has been developed to amplify codons 12, 13, and 61 of K-Ras, and codon 61 of N-Ras from genomic DNA. The PCR primers designed have similar<sup>TM</sup> and no obvious 3'-end overlap. These mutational regions can be amplified and analyzed in a single step. The point mutation can further be analysed either by SSCP or by hybridization with Ras Mutation-detecting Probes.

Summary of genes included in MPCR kit :

	K-Ras Exon 1	K-Ras Exons 2	N-Ras Exons 2		
<b>Human</b>					
<b>T56851</b>	+	+	+		
<b>Description</b>				<b>50 tests</b>	<b>100 tests</b>
MPCR Kit for Human K-Ras				<b>T56871</b>	<b>T56870</b>

# Amplification Products for PCR and RT-PCR

## Multiplex PCR (MPCR)

### MPCR/Infectious Agents

#### MPCR/HIV-I/II

Amplification of multiple regions of the retrovirus genome such as HIV-I & II is essential as they exhibit high degrees of mutation during their life cycles. It is also convenient to assay for both types in the same tube. This Kit is designed to rapidly detect HIV-I and II. Primer pairs were designed to amplify the env, gag, and pol regions of the HIV genome. This Kit will yield the 291 bp, 215 bp, 142 bp and the 105 bp PCR products from the HIV-I genome and the 291 bp PCR product from the HIV-II genome.

Summary of genes included in MPCR kit :

	env	HIV type 1GAG	HIV type 2GAG	pol
<b>Human</b>				
<b>T56351</b>	+	+	+	+
<b>Description</b>				50 tests    100 tests
MPCR Kit for HIC type I/II				T56351    T56350

#### MPCR/HPV-6/11/16/18/33

Infection with specific type of human papillomavirus (HPV) has been associated with an increasing risk of developing cervical neoplasia. HPV types 6 and 11 have been associated with relatively benign diseases, such as Condylomata Acuminata (Anogenital Warts). However, types 16, 18, 31, and 33 are strongly associated with cervical, vaginal and vulvar malignancies.

This MPCR Kit is designed to rapidly detect HPV-6, HPV-11, HPV-16, HPV-18, and HPV-33. Primers were designed to amplify the E6 region of all the above sub-types. Summary of genes included in MPCR kit :

	HPV-6	HPV-11	HPV-16	HPV-18	HPV-31	HPV-33	HPV-52	HPV-58
<b>T56411</b>	+	+	+	+	-	+	-	-
<b>FL1301</b>	+	+	+	+	+	+	+	+
<b>Description</b>						50 tests    100 tests		
MPCR Kit for Human Papillomavirus						T56411    T56410		
MPCR Kit for Human Papillomavirus set 2						FL1301    FL1300		

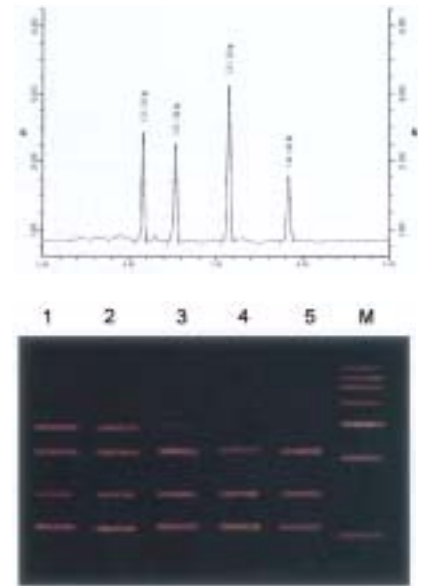
#### Sexual Transmitted Diseases

Gonococcal & Non-gonococcal urethritis remains one of the most common sexually transmitted diseases. *C. trachomatis* (CTR) and *U. urealyticum* (UU) have been recognized as etiologic agents of non-gonococcal urethritis; *N. Gonorrhoea* (NG) as an agent of. diagnosis of gonococcal & non-gonococcal diseases. Recent studies show that PCR assay provides a satisfactory diagnostic tool for the detection of NG, CTR & UU in clinical genital swab samples. PCR method is more sensitive, accurate and faster than the culturing method.

MPCR method is used here to simultaneously detect NG, CTR & UU. The kit will yield the 364 bp (CTR), 300 bp (NG) and 218 bp (UU) PCR products.

Summary of genes included in each individual MPCR kit :

	<i>C. trachomatis</i> cryptic plasmid	<i>N. Gonorrhoeae</i> cppB	<i>U. urealyticum</i> Urease
<b>T56811</b>	+	+	+
<b>Description</b>			50 tests    100 tests
MPCR Kit for Sexual transmitted diseases, CTR/UU/NG			T56811    T56810



Multiplex PCR of HIV-I & II under MPCR Buffers 1-5 (lane 1-5). CE analysis of HIV MPCR amplicons (lane 2) generated using MPCR Optimizer System.

# Amplification Products for PCR and RT-PCR

## Multiplex PCR (MPCR)

### Viruses related to Respiratory infection

Respiratory infections are common in both adults and children. Most are fairly mild, self-limiting, and confined to the upper respiratory tract (UTR). Most are probably initially viral induced. An important concept is that a wide variety of respiratory pathogens may cause one clinical syndrome, and vice versa, any one pathogen may cause a wide range of clinical diseases.  
Several spiratory viruses including Adenovirus, Parainfluenza Virus, Respiratory Syncytial Virus and Rhinovirus

Summary of genes included in MPCR kit :

	Adenovirus	Coronavirus	Influenza virus	Influenza A	Influenza B	Parainfluenza 1	Parainfluenza 2	Parainfluenza 3	Rhinovirus	RSV
<b>T57371</b>	+	+	+	-	-	-	-	-	+	+
<b>FL1181</b>	+	-	-	+	+	+	+	+	-	+

Description	50 tests	100 tests
MPCR Kit for Respiratory Infection Associated Virus Set 2	<b>T57371</b>	<b>T57370</b>
MPCR Kit for Respiratory Infection Associated Virus Set 3	<b>FL1181</b>	<b>FL1180</b>

See also MPCR/TLRs Signaling (LPS Binding Proteins)

### MPCR/H. pylori

Infection with H. pylori, an organism that causes chronic inflammation of the stomach, has been identified as a risk factor for the development of gastric cancer and peptic ulcers. H.pylori is known to chronically increase serum gastrin and may serve as a tumor promoter in all gastrin response tissues including stomach.

This Kit is designed to rapidly detect H. pylori. Primer pairs were designed to amplify the Cag A, Flagellin, UreaC and 16S rRNA gene of H.pylori. With positive control and primers provided, the Kit will yield the 358 bp (Cag A), 152 bp (Flagellin), 315 bp (UreaC) and 110 bp (16S rRNA) PCR products. Detection of different types of H.pylori from clinic samples can be greatly enhanced by amplifying and analyzing multiple regions of H.pylori genome using MPCR.

Summary of genes included in MPCR kit :

	16S	Cag A	Flagellin	Urea C
<b>T56431</b>	+	+	+	+

Description	50 tests	100 tests
MPCR Kit for H. pylori detection	<b>T56431</b>	<b>T56430</b>

### Forensic

#### Sex Identification

This Kit is designed to amplify human Y chromosom specific genes : testis-expressed protein and SRY region, and X&Y chromosome homologous region for human sex determination. The PCR primers designed have similar Tm and no obvious 3'-end overlap; The Kit will yield 799 bp, 609 bp, 690 bp and 500 bp PCR products from male sample and only 690 bp PCR product from female sample ; Human X and Y chromosome specific genes can be analyzed in a single step by this Kit.

Summary of genes included in MPCR kit :

	HYT	SRY	SXY
<b>T56971</b>	+	+	+

Description	50 tests	100 tests
MPCR Kit for Human Sex determination	<b>T56971</b>	<b>T56970</b>



Human sex identification by multiplex PCR, in which females will generate a 690 bp PCR product and males will generate 799 bp, 690 bp, 609 bp, and the 500 bp PCR products.

- A : Testis-expressed protein gene, **799 bp**
- B : SXY gene for X-chromosome, **690 bp**
- C : SRY gene, **600 bp**
- D : SXY gene for Y-chromosome, **500 bp**
- Lane 1-5 : random human patient samples.
- Lane M : GelMarker™.

Literature :

Y chromosomal testis-expressed protein: Nucleic Acids Res. 15: 8713-8724, 1987.  
Y chromosome SRY region: Nature 348: 448-450, 1990  
X&Y chromosome homologous region: Am. J. Med. Genet. 39: 472-473, 1991.

# Amplification Products for PCR and RT-PCR

## Multiplex PCR (MPCR)

### Dual PCR Optimization Kits - Applications

Dual PCR Optimization Kit provides reagents to make conventional RT-PCR quantitative and is designed to optimize the co-amplification of any specific genes alongside specially-designed housekeeping gene primers. The 6 MPCR Buffers provided in the kit ensure that MPCR will be optimized within hours. Most primers from customers should work well under our system as long as the customer primers have proper  $t_m$ , no serious 3-end overlap and to not generate the same size PCR Products as the provided housekeeping primers do.

Each kit contains 2X Dual-PCR Buffer (1,2,3,4,5,6), sterile ddH<sub>2</sub>O, a manual and one of the following housekeeping genes for kits off different species

Mouse keeping gene	Amplicon
GAPDH	563 bp
18s	489 bp
Beta Actin	474 bp
Transferin Receptor	484 bp
Phospholipase A2	483 bp
L32	143 bp

Description	Cat.#
Dual PCR Optimization Kit, Human GAPDH	T54960
Dual PCR Optimization Kit, Mouse GAPDH	T54970
Dual PCR Optimization Kit, Rat GAPDH	T54980
Dual PCR Optimization Kit, Human 18S	FL0410
Dual PCR Optimization Kit, Mouse 18S	FL0420
Dual PCR Optimization Kit, Rat 18SS	FL0430
Dual PCR Optimization Kit, Human Beta Actin	FL0440
Dual PCR Optimization Kit, Mouse Beta Actin	FL0450
Dual PCR Optimization Kit, Rat Beta Actin	FL0460
Dual PCR Optimization Kit, Human Transferin Receptor	FL0470
Dual PCR Optimization Kit, Mouse Transferin Receptor	FL0480
Dual PCR Optimization Kit, Rat Transferin Receptor	FL0490
Dual PCR Optimization Kit, Human Phospholipase A2	FL0500
Dual PCR Optimization Kit, Mouse Phospholipase A2	FL0510
Dual PCR Optimization Kit, Rat Phospholipase A2	FL0520
Dual PCR Optimization Kit, Human L32	FL0530
Dual PCR Optimization Kit, Mouse L32	FL0540
Dual PCR Optimization Kit, Rat L32	FL0550



Detection of gene expression and normalization against GAPDH or 18S expression by RT-MPCR.  
 Lane 1 : DP-10136-X : Human c-myc  
 Lane 2 : DP-10154-X : Human TGF-beta  
 Lane 3 : DP-10167-X : Human TNF-alpha  
 Lane 4 : DP-10201-X : Human DAF  
 Lane M : DNA M.W. Marker