

# Product Catalogue

- *RNAi Research Tool*
- *MicroRNA Tool*
- *RNAi Project Service*
- *RT-PCR Technology*

- 1.- **High Quality** products (all HPLC-purified > 97%), (**Additional Services** available)
- 2.- **Wide Range of Products** to help you achieve your experimental goals
- 3.- Spend **Less Money** without compromising your results
- 4.- **For all products, we guarantee the efficiency of inhibition!**

### *For Further Information*

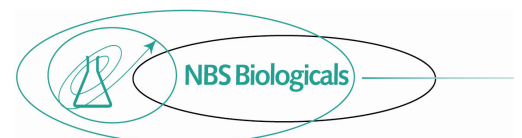
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## NBS Biologicals



**Official UK Distributor**

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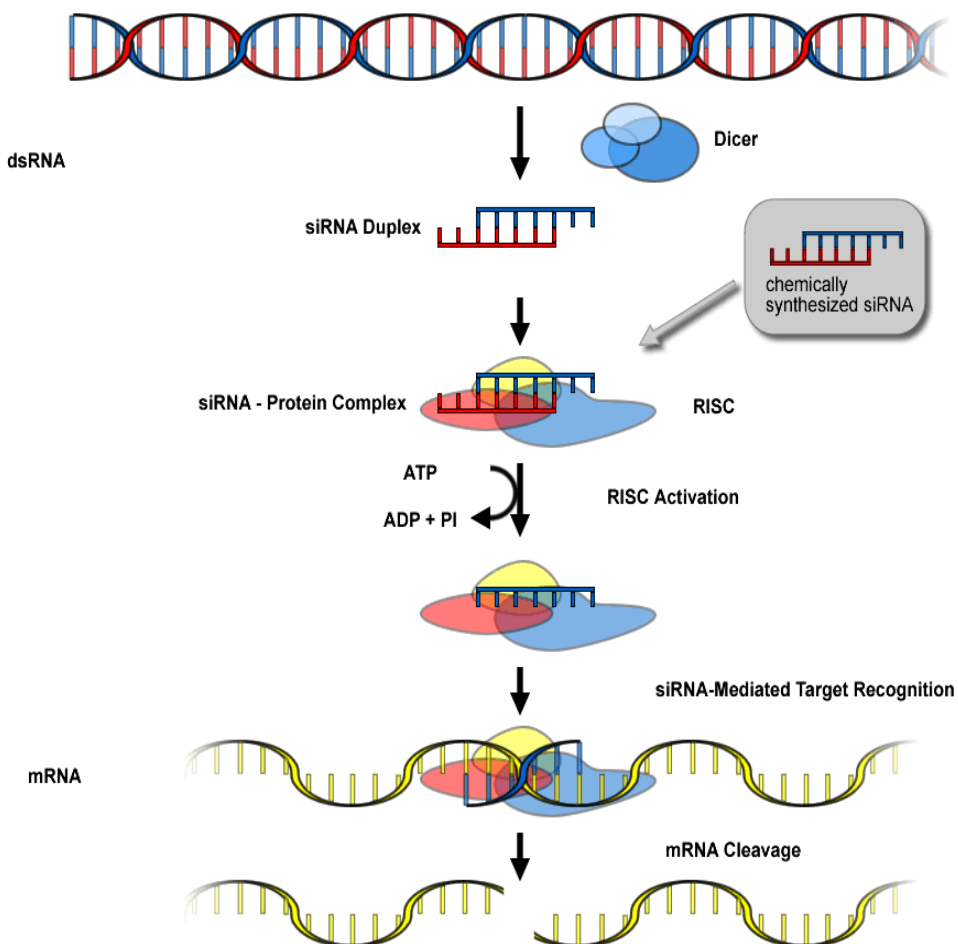
### Notice

There are products not listed in this catalogue, therefore if you don't find product(s) you are looking for (or if you have a specific request), please contact us to make inquiry.

## RNAi Introduction

### RNAi Experimental Mechanism

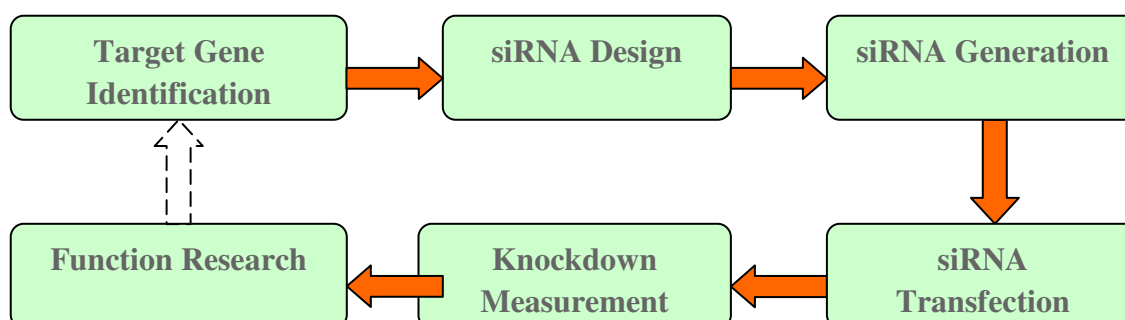
RNA interference (RNAi) phenomenon was first unknowingly observed when RNA was shown to inhibit protein expression in plants and fungi by process, then known respectively as post-transcriptional gene silencing and quelling. In 1998, Fire and Mello first observed that double-stranded RNA was the source of sequence-specific protein inhibition in *C.elegans* known as RNA interference. While the studies in *C.elegans* were encouraging, RNAi was limited in use to lower organisms because delivering long dsRNA for RNAi was non-specifically inhibitory in mammalian cells. Further studies in plants and invertebrate animals demonstrated that actual molecules that lead to RNAi were short double-stranded RNA oligonucleotides, 21 to 22 nucleotides in length, processed internally by an enzyme called Dicer. The Dicer cleavage products are referred to as short (or small) interfering RNA and are today popularly known as siRNA.



## RNAi History

<b>1998:</b>	The discovery of gene silencing by dsRNA in <i>C. Elegans</i> .
<b>2000:</b>	The realization of gene specific silencing by siRNA in mammalian cells.
<b>2001:</b>	Science hailed RNAi as one of top ten "Breakthrough of the Year".
<b>2003:</b>	RNAi was observed in vivo in mammals, inhibiting gene expression.
<b>2004:</b>	Quite a few siRNA drug candidates entered into pre-clinical stage.
<b>2004:</b>	The first siRNA drug candidate applied for Investigational New Drug (IND) through FDA.
<b>2005:</b>	The first siRNA drug went into the first phase of clinic trials, showing good results.
<b>2005:</b>	In vivo injection of chemically-modified siRNA oligo got breakthrough.
<b>2006</b>	Andrew Fire and Craig Mello won the Nobel prize for medicine for discovery of RNAi.

## RNAi Solution Workflow



## Approaches of RNAi

- Chemical synthesis
- Enzymatic synthesis
- RNase III/Dicer cleavage of long dsRNA
- Plasmid-based in vivo expression
- siRNA Expression Cassettes (SECs)
- shRNA expression vector

Chemical synthesis and shRNA expression vector are two popular approaches, detail introduction of them are as follows:

### **Chemical Synthesis**

Advantages of chemical synthesis:

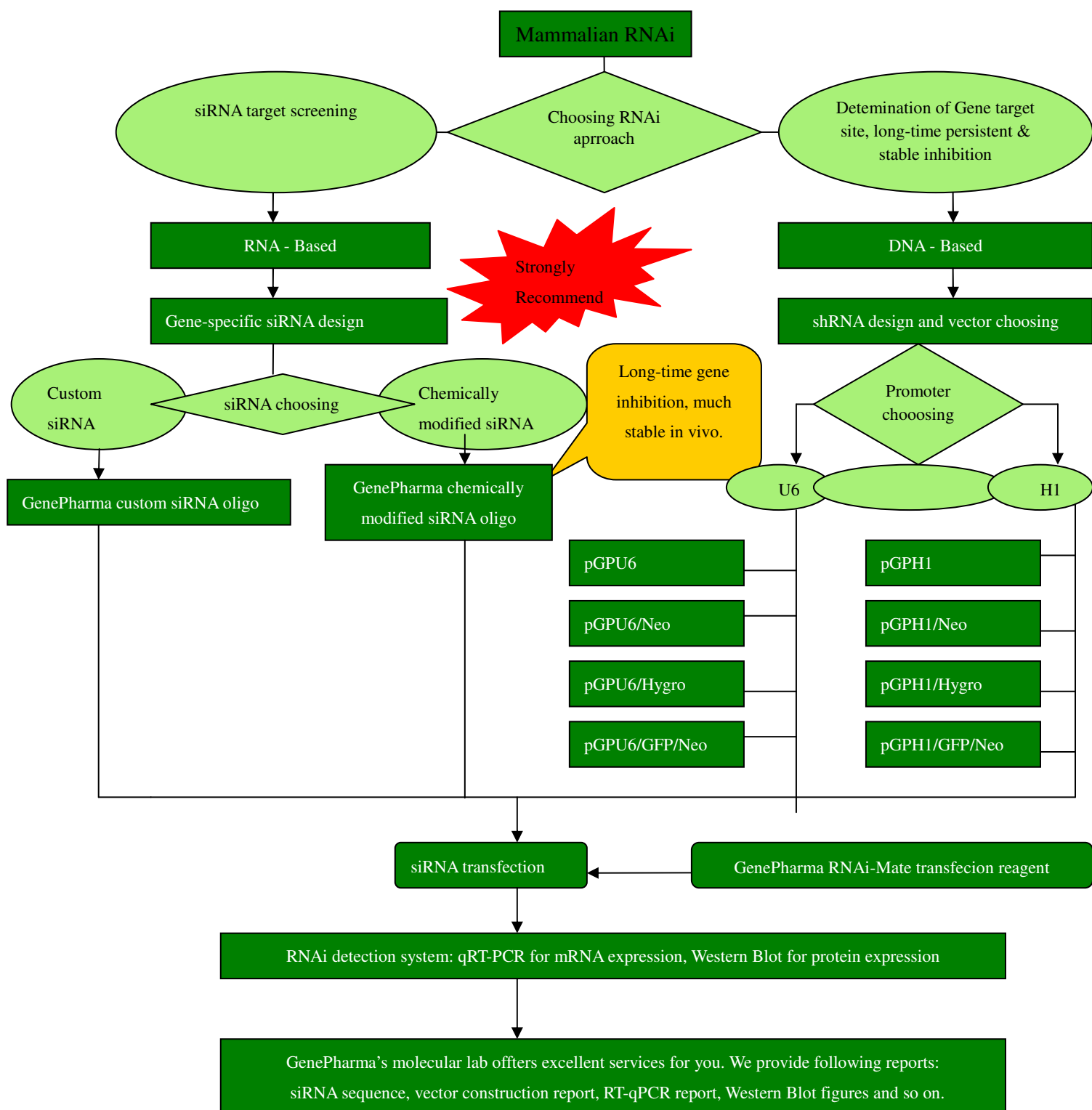
- GenePharma Company provides chemically-synthetic high-quality siRNA in accordance with customer's request
- Fast delivery - usually 4 business days
- Convenience - GenePharma can help customer design siRNA oligo for free, customers can start transfection immediately after receiving siRNA oligo
- Low price - only £65/duplex for siRNA oligo, at least one of three duplexes could achieve more than 70% suppression efficiency

### **ShRNA Expression Vector**

Using siRNA expression vectors has the advantage that the expression of target genes can be reduced for weeks or even months (Brummelkamp 2002), eclipsing the 6–10 days typically observed with in vitro prepared siRNA used for transient transfection (Byrom 2002).

The shRNA vectors employ RNA polymerase III (pol III) promoters which generate large amounts of small RNA using relatively simple promoter and terminator sequences. GenePharma's siRNA Expression vector features a human U6 RNA pol III or H1 RNA pol III promoter. These promoters are well characterised (Myslinski 2001, Kunkel 1989), and they provide high levels of constitutive expression across a variety of cell types. The terminator consists of a short stretch of uridines (usually 3–4 nt); this is compatible with the original siRNA design that terminates with a two uridine 3' overhang (Elbashir 2001).

Based on comparisons of several different RNA pol III promoters, the activities of the two promoters are likely to vary from cell type to cell type (Ilves 1996). The localization of expressed RNA is also likely to vary with cell type and with RNA pol III promoter (Ilves 1996). To optimise siRNA expression, we find it beneficial to clone hairpin siRNAs into both the pGPU6 and pGPH1 vectors and transfect them into the cells being targeted for gene knockdown. The promoter that is more effective for the siRNA and cell type will provide greater levels of gene silencing.



## Custom siRNA Oligo

### siRNA Custom Synthesis

GenePharma products cover chemically-synthetic RNA monomer, custom siRNA oligo, chemically-modified RNA oligo, fluorescent dye for biological macromolecules marker; Biosynthetic siRNA, shRNA; DNAs encoding shRNA, plasmid vector encoding shRNA; RNAi service based on chemical synthesis, RNAi service based on vector regulation; siRNA related reagents and RNA-related product sales; common molecular biology reagents and laboratory supplies sales, and so on.

GenePharma RNAi related products not only occupy a large domestic market share, but also are rising to the markets of United States, Japan, Taiwan, Singapore, Germany, Sweden, the United Kingdom, France, South Korea and other countries and regions. The company currently sells more than half of products to overseas markets.

GenePharma Company has input high-throughput MerMade-□, ABI394 syntheser and many HPLC purification equipments. HPLC purification technology, the international mainstream purification method, guarantees high-quality products.

GenePharma siRNA Characteristics	
Quality control	SiRNA oligo synthesis is completed under strictly controlled process and condition; ISO9000 Quality System Certification; Products are precisely quantitated by spectrophotometer.
Purification	HPLC purification; siRNA concentration >97%
Labeling and modification	biotin, FAM or phosphorate labeling in 3' and 5' end
Length	19~23 bp/strand
Product types	Single strand RNA lyophilised powder; Annealed dsRNA lyophilised powder
Storage and stability	Although oligonucleotides are stable in solution at 4°C for up to 2 weeks, GenePharma recommends storing siRNA solution at -20°C, and repetitive freezing and thaw should be avoided by aliquots. The recommended storage concentration is above 20 µM. GenePharma guarantees the oligonucleotide stability for 6 months under above conditions. The fluorescence-labelled RNA must be kept in dark.
Technology data sheet	Technical data sheet is delivered together with siRNA oligo, and the sheet includes oligo name, sequence, concentration, OD, the precise number of OD and nmols, T <sub>m</sub> , MW, size, extinction coefficient and purification type.
Personalised service	Aliquot under customer's request; Free design support
Delivery	1.5ml freezing tube package; Express delivery.

GenePharma's RNA synthesis products are repeatedly optimised and rigorously tested to ensure the high stability of product quality. Chemically-synthetic siRNA has following advantages: simple operation, high transfection efficiency; low toxic side effects to cells or tissues, and large-scale preparation, which makes chemically-synthetic siRNA applicable for effective fragment screening while the genetic target site is uncertain. The company's professional and technical personnel dedicate to scientific and thoughtful sequence design services.

### Custom siRNA Oligo

GenePharma custom siRNA oligos are purified by HPLC, which removes 100% of unpaired single chains. We provide low price and high quality. Researchers just need to dilute siRNA oligos into the included universal buffer, and conduct following experiments with the company's RNAi-Mate transfection kit.

GenePharma can design four various siRNA duplexes for each target gene. Customers can use one duplex alone or multiple duplexes mixed. The inhibition efficiency can be enhanced by conducting "siRNA Pool".

Cat. No.	Product information	Quantity	Purification	Price
A01002	Custom siRNA	5.0 nmol	HPLC	£46.00
A01005	Custom siRNA	12.5 nmol	HPLC	£78.00
A01010	Custom siRNA	25.0 nmol	HPLC	£142.00
A01050	Custom siRNA	125 nmol	HPLC	<i>Enquire</i>
A01100	Custom siRNA	250 nmol	HPLC	<i>Enquire</i>

*Free negative control with orders of Custom siRNA*

## Chemically-Modified siRNA Oligo

The biggest challenge of RNAi technologies is the stability of chemical synthesis. The most important goal of GenePharma chemical synthesis is to gain the best one-time experimental data. Our approach is to using the RNAi-mate transfection reagent to transfect chemically-modified siRNA into mammalian cells. Satisfied results can be gained as follows:

- Highly efficient gene knockout
- High specificity - for purpose target
- High stability in serum and medium
- Minimised side effects

### Chemically-modified siRNA Oligo V.S. Standard siRNA Oligo

Concern	Standard siRNA	Chemically-modified siRNA
siRNA degradation	The non-modified standard siRNA is easy to be degraded in cell culture process. Although it is effective in most in vitro experiments, its life expectancy is shorter in cell culture.	The GenePharma chemically-modified siRNA not only increases its life expectancy in serum and cell culture, but also strengthens its in vitro application capability.
Long time effect	Relative short time effect, under normal circumstances for approximately one week.	The GenePharma chemically-modified siRNA has long time effect, its effective time is twice as that of the standard siRNA.
In vivo activity	The standard siRNA has poor stability, usually is not applicable to vivo experiments.	The GenePharma chemically-modified siRNA has strong stability in vivo.

Cat. No.	Product information	Quantity	Purification	Price
A02002	Chemically-modified siRNA	5.0 nmol	HPLC	£59.00
A02005	Chemically-modified siRNA	12.5 nmol	HPLC	£91.00
A02010	Chemically-modified siRNA	25.0 nmol	HPLC	£154.00
A02050	Chemically-modified siRNA	125 nmol	HPLC	<i>Enquire</i>
A02100	Chemically-modified siRNA	250 nmol	HPLC	<i>Enquire</i>

## Fluorescent Dye-labelled siRNA Oligo

The siRNA oligo can be labelled in the four different ends of the double strands by multiple markers. The labelled siRNA can be observed by flow cytometry, fluorescence microscopy, and laser scanning confocal microscope, which can determine whether the transfection is effective, and optimise transfection conditions. The labelled siRNA can also be used in siRNA intracellular localization and double labeling experiments (with labelled antibody) to track those siRNA transfected cells, then the reduction of target protein expression will be integrated with the transfection.

Labeling of the anti-sense 5' end will influence the gene silencing activity, so labeling of this site is not recommended. Modification of any of other three ends has no influence on silencing activity. We recommend to modifying the 5'end of the sense strand, which is the best recognised chemical labeling locus.

Cat. No.	Product Description	Quantity	Purification	Price
A03002	Fluorescent dye-labelled siRNA	5.0 nmol	HPLC	£86.00
A03004	Fluorescent dye-labelled siRNA	10 nmol	HPLC	£102.00
A03005	Fluorescent dye-labelled siRNA	12.5 nmol	HPLC	£117.00
A03010	Fluorescent dye-labelled siRNA	25.0 nmol	HPLC	£181.00
A03050	Fluorescent dye-labelled siRNA	125.0 nmol	HPLC	<i>Enquire</i>
A03100	Fluorescent dye-labelled siRNA	250.0 nmol	HPLC	<i>Enquire</i>

## siRNA Control

In order to get correct analysis of experimental datum, a suitable control experiment is necessary. A fluorescence-labelled siRNA negative control, which has no genetic homology with human, is conducive to the optimization of transfection conditions, and also can be used as the non-specific silencing control.

SiRNA positive control is the known siRNA which can highly effectively silence specific gene, and it can be used in conventional parallel control experiment to ensure the optimised experimental conditions and the effect of gene silencing.

GenePharma provides convenient positive and negative siRNA controls for human and mouse cells RNAi experiments. The characteristics of siRNA control are as follows:

- We provide a complete set of experimental controls, which can be used to optimise the RNAi experimental conditions in human and mouse cell lines;
- Special RNAi-mate transfection reagent is provided to ensure the highly efficient transfection;
- Transfection efficiency can be monitored easily by fluorescence-labelled negative control;
- The effect of gene silencing can be identified flexibly by follow-up experiments such as quantitative PCR or western blot.

### 1. Negative Control

A negative control should be included in a completed siRNA experiment. During the siRNA primary screening, you may choose our custom negative control, which has no homologous sequence with target gene.

In order to do further study of gene function, the negative control siRNA should have the same composition as the selected siRNA sequences, but have no obvious homology with mRNA. The general method is to disorder the selected siRNA sequence, and to determine results simultaneously to ensure there is no homology with other genes in target cells.

### 2. Fluorescent Dye-labelled siRNA Negative Control

GenePharma RNAi negative control has no homology with mammalian gene. After labelled by fluorescent dye, the negative control can be easily observed under fluorescent microscope to get the transfection efficiency, and is helpful for optimizing transfection conditions. The fluorescence labelled control can be easily photographed, and has great PH tolerance, so that it is much stable in living cell.

Cat. No.	Production	Qty (nmol)	Purification	Price
B01001	Negative control siRNA	2.5	HPLC	£15.00
B02001	FAM labelled negative control siRNA	2.5	HPLC	£20.00

### 3. siRNA Positive Control

Positive control is very important for the inspection of an experimental system. In other words, when you see the expected result of siRNA positive control, you can ensure that your transfection, RNA extraction and detection methods are reliable.

Popular siRNA Positive Control	
1	LaminA/C
2	GFP22
3	Luciferase GL2
4	MAPK1
5	Beta-Actin
6	Vimentin
7	P53
8	GAPDH
9	Cyclophilin B

Cat. No.	Production	Quantity	Purification	Price
B03001	Positive Control siRNA	2.5 nmol	HPLC	£15.00

### 4. Mock Transfection

For a complete control system, Mock transfection is essential. Mock transfection can detect the toxicity of transfection reagent towards cells, the survival rate of cells, and other factors of cell transfection.

We recommend the use of our GenePharma transfection reagent - RNAi-Mate. (See Transfection Reagent part)

Cat. No.	Production	Quantity	Price
C-01	RNAi-Mate Transfection Reagent	0.1ml	£20.00

## Published and Validated siRNA

GenePharma provides customers with published and validated siRNA oligos for hundreds of genes. Those siRNA oligos have already been confirmed to inhibit corresponding gene expression effectively. Each pair of siRNA is only £46.00 (5.0 nmol, HPLC purification).

*Partial catalog* is listed below for your reference:

Cat. No.	Gene Name	Cat. No.	Gene Name
D-01	$\beta$ -actin	D-31	GalTII (galactosyltransferase II)
D-02	gamma-actin	D-32	GAS41 (1)
D-03	AIB1 (estrogen receptor coactivator)	D-33	Hec-1
D-04	Apaf-1	D-34	HPV E6
D-05	ARC21	D-35	HPV E7
D-06	ATR interacting protein	D-36	Tissue Factor (hTF)
D-07	Bcr-abl	D-37	vimentin
D-08	beta-tubulin- mouse neuronal	D-38	HtrA2
D-09	Bruton's tyrosine kinase (Btk)	D-39	keratin 18
D-10	Casein Kinase I epsilon and delta (CKI-epsilon and CKI-delta)	D-40	Kinase interacting stathmin (hKIS)
D-11	Caspase 1	D-41	lamin A
D-12	Caspase 2	D-42	lamin A/C
D-13	hCdc2	D-43	lamin B1
D-14	Cdc14A	D-44	lamin B2
D-15	cdk1	D-45	LAP2
D-16	CENP-E	D-46	Mad1
D-17	CHO1	D-47	Mammalian septin (MSF)
D-18	corin, mouse	D-48	Methyl-CpG-binding protein 2 (MeCP2)
D-19	Cyclin B1	D-49	Methyl-DpG binding domain protein 2 (MBD2)
D-20	Cyclin B2	D-50	MPS1 kinase (hMps1)
D-21	cytoplasmic dynein 1 heavy chain	D-51	Nicastrin (Nct)
D-22	DIP13-alpha (DCC interacting protein)	D-52	NuMA
D-23	Dishevelled (hDv-1 and hDv-3)	D-53	Nup153
D-24	hDv-2	D-54	P160 ROCK
D-25	Eg5	D-55	Polo-like Kinase1 (hPlk1)
D-26	emerin	D-56	Protein Kinase Receptor (PKR)
D-27	eve	D-57	hRad9
D-28	hFbw7 (cyclin E ubiquitination)	D-58	Rad17
D-29	Fortilin	D-59	Myeloid cell leukemia protein 1 (MCL1)
D-30	GalTII (galactosyltransferase II)		

## GenePharma vector-based RNAi

The siRNA expression vector with antibiotics labeling can continuously suppresses the target gene expression, lasting for several weeks or even longer.

When a validated siRNA sequence (for example, obtained by screening in siRNA synthesis method) needs to maintain gene silencing for a longer period of time, we recommend the use of shRNA vector system. GenePharma is committed to providing the most advanced and convenient shRNA related tools. The company recently introduces a new generation of shRNA expression plasmid, a highly efficient ready-to-use vector, which can produce shRNAs sustainedly in cell, so as to achieve lasting suppression of target gene expression.

### GenePharma shRNA Expression Vector System

Characteristics of shRNA Expression Vector System:

- Produces short-hairpin RNA (shRNA) to achieve RNA interference
- The method is simple, economical, and only needs to synthesise DNA oligos
- The use of cloning vector is convenient, and the vector has selectable markers
- shRNA plasmid is stable and easy to operate

### GenePharma shRNA Expression Vector characteristics:

1. The cloning vector has two cloning restriction sites BamH I and Bbs I. Bbs I is a special restriction endonuclease, it can produce asymmetrical complementary sticky ends to ensure the correct inserting direction of inserted fragments, and to prevent the self-circularization of vectors.
2. Multiple screening markers can help to establish stable transfected cell lines.  
Neo: Neomycin resistance gene  
Hygro: Hygromycin B resistance gene  
GFP: Neo: GFP report gene and the Kan/G418 resistance gene  
Reporter GFP may help detect transfection efficiency and instruct RNAi action sites.

GenePharma can construct eight kinds of RNAi vectors:

pGPU6, pGPH1, pGPU6/Neo, pGPH1/Neo,

pGPU6/Hygro, pGPH1/Hygro, pGPU6/GFP/Neo, pGPH1/GFP/Neo.

pGPU6, pGPH1 is the RNAi vector without screening marker;

pGPU6/Neo, pGPH1/Neo is the RNAi vector with Neomycin resistance screening marker;

pGPU6/Hygro, pGPH1/Hygro is the RNAi vector with Hygromycin resistance marker;

pGPU6/GFP/Neo, pGPH1/GFP/Neo is the RNAi vector with Neomycin resistance and GFP reporter.

### GenePharma shRNA Vector System

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Each set of shRNA vector system includes linear or cyclic shRNA expression vectors, the corresponding negative control vector and a GFP positive control vector. We also provide you with the overall solution.

Cat. No.	Product	Promoter	Selection marker	Quantity	Price
E-01	pGPU6	U6	--	1µg	<i>Enquire</i>
E-02	pGPH1	H1	--	1µg	<i>Enquire</i>
E-03	pGPU6/Neo	U6	Neo	1µg	<i>Enquire</i>
E-04	pGPH1/Neo	H1	Neo	1µg	<i>Enquire</i>
E-05	pGPU6/Hygro	U6	Hygro	1µg	<i>Enquire</i>
E-06	pGPH1/Hygro	H1	Hygro	1µg	<i>Enquire</i>
E-07	pGPU6/GFP/Neo	U6	Neo	1µg	<i>Enquire</i>
E-08	pGPH1/GFP/Neo	H1	Neo	1µg	<i>Enquire</i>

### GenePharma Ready-to-use shRNA Expression Vector Cloning and Construction Service

We can help you to insert the DNA fragment encoding target shRNA into the plasmid and do sequence validation. You just need to tell us the target gene sequence or Gene ID and the name of the inserted vector, and we will help you to construct the expression vector. Furthermore, we will provide you with sufficient purified expression plasmid encoding your target shRNA.

Cat. No.	Product	Promoter	Selectable Marker	Quantity	Price
F-03	pGPU6/Neo	U6	Neo	50µg	£78.00
F-04	pGPH1/Neo	H1	Neo	50µg	£78.00
F-05	pGPU6/Hygro	U6	Hygro	50µg	£78.00
F-06	pGPH1/Hygro	H1	Hygro	50µg	£78.00
F-07	pGPU6/GFP/Neo	U6	Neo	50µg	£78.00
F-08	pGPH1/GFP/Neo	H1	Neo	50µg	£78.00



## RNAi Detection Related Products

### Real-Time Quantitative PCR Primer and Probes

GenePharma sells primers and probes on a global scale, with the capacity of producing high-quality DNA and RNA oligos. Its siRNA oligos are also sold to the United States, Japan, Taiwan, Singapore, Germany, Sweden, the United Kingdom, France, Korea and others. GenePharma primers and probes have the following characteristics:

- **Oligo Quality:** The synthesis efficiency, especially the coupling efficiency, is the most important factor impacting the oligonucleotide quality, even if it is subsequently purified. Our patented automated synthesis system provides superior coupling efficiency, enabling us to offer high-quality oligonucleotides.
- **Deprotected and Desalted Purification:** This process is required to remove the by-products of synthesis, making our oligonucleotides suitable for PCR and sequencing. However, in order to make oligonucleotides suitable for more stringent applications, such as site-directed mutagenesis and cloning, additional purification may be required to remove truncated failure (N-x) product. Purification can be achieved by HPLC.
- **Synthesis Yield:** we guarantee the total final yield of an oligonucleotide as a minimum number of OD units, rather than providing the scale of synthesis. The scale of synthesis is only the starting point for synthesis, as the post-synthesis amount can vary according to oligo length, sequence, purification, modifications and coupling efficiencies.

### Fluorescent Probes for Real-Time Quantitative PCR

GenePharma provides accurate and reliable results. In order to make your real-time quantitative PCR results accurate and reliable, please select the following sequence-specific fluorescence probes:

- Taqman Probe
- Double Labelled Fluorogenic Probe
- Molecular Beacons

All of our fluorescence probes can be purified by PAGE or HPLC on request. The quality of each probe is inspected by PAGE system or mass spectrometry.

Catalog #	Quantity (nmol)	Price	
		Taqman Probes	Molecular Beacons
H-01	5 nmol	<i>Enquire</i>	<i>Enquire</i>
H-02	12.5 nmol	<i>Enquire</i>	<i>Enquire</i>
H-03	25 nmol	<i>Enquire</i>	<i>Enquire</i>
H-04	125 nmol	<i>Enquire</i>	<i>Enquire</i>
H-05	250 nmol	<i>Enquire</i>	<i>Enquire</i>

### TaqMan Probe

TaqMan probe is an oligonucleotide with a reporter fluorophore attached to the 5' end and a quencher fluorophore attached to the 3' end. Once the TaqMan probe has bound to its specific target sequence, the quencher fluorophore in 3' end reduces the fluorescence emission from the reporter fluorophore in 5' end because of their proximity. During PCR, the probe anneals specifically between the forward and reverse primer to an internal region of the PCR product. The polymerase then carries out the extension of the primer and replicates the template to where the TaqMan probe is bound. The 5' exonuclease activity of the polymerase cleaves the probe, releasing the reporter molecule away from the close vicinity of the quencher. The fluorescence of the reporter fluorophore, as a result emits. With the increase of amplification cycles, the release of the fluorophore continues to accumulate. The accumulated fluorescence is detected by a computer and shown on a graph display. The commonly used fluorophores are FAM, TET, VIC, HEX.

### Molecular Beacons

Molecular Beacons are a single strand fluorescence probe labelled at both ends. Since the 4-6 bases of both ends are complementary, it composes a hairpin structure. A reporter fluorophore is labelled at 5'end and a quencher fluorophore is labelled at 3'end. The ring of the hairpin is a single-stranded DNA, which complements each other with the target sequence. The separation of the reporter and the quencher fluorophore leads the emission of natural fluorescence from the reporter.

During the annealing step of real-time quantitative PCR, the PCR machine launches  $h\nu_1$  ray to active fluorescence probes. Molecular Beacons hybridises to a target DNA sequence to lead the distortion of hairpin structure, which causes the reporter at 5' end to separate from the quencher at 3'end. Then the quencher fluorophore can not absorb energy from the reporter, therefore, the reporter would emit fluorescence, so the real-time quantitative PCR instrument can detect the significantly increase of radiation energy  $h\nu_2$ . The detected fluorescence signals are proportional to the quantity of target DNA.

## Dual-labelled Fluorogenic Probes

Dual-labelled fluorogenic probe is a highly sensitive and specific fluorescence probe used in real-time quantitative PCR. It has simple design and can be labelled with wide range of fluorophores, so it can be applied for almost all the real-time quantitative PCR and diversified analysis systems.

A dual-labelled fluorogenic probe is a single strand oligonucleotide labelled at both ends, which means a reporter fluorophore at 5' end and a quencher fluorophore at 3' end. The quencher fluorophore inhibits the emission of natural fluorescence from the reporter fluorophore by the Forster Resonance Energy Transfer (FRET). During the extending step of real-time quantitative PCR, the PCR machine launches the UV ray to activate probes. The core is to utilise the 3'-5' exonuclease activity of the Taq polymerase to cleave the probe to produce fluorescent signals. Since probes specifically combine with DNA templates, the intensity of fluorescent signals indicates the quantity of templates.

## SYBR Green I

SYBR Green I is a highly sensitive fluorescent stain for detecting dsDNA and oligonucleotides in agarose and polyacrylamide gels. Because SYBR Green fluorescent signal is greatly enhanced when the dye is bound to nucleic acids, gels stained with SYBR Green I exhibit an excellent signal-to-noise ratio with no background fluorescence. For maximum performance, gels should be poststained. SYBR Green I is ideal for detecting small amounts of DNA in low copy/target number PCR products, apoptosis studies, and heteroduplex analysis.

## RNAi Services

In addition to the current applications of RNAi, thought leaders in the field foresee expanded utility of this new technology in research, therapy and diagnosis. In academic and pharmaceutical fields, siRNAs are envisioned to serve as invaluable tools for elucidating the functions of roughly 10,000 human genes, whose roles in cellular homeostasis have not been determined yet. In some instances, understanding of these uncharacterised genes will be achieved by application of RNAi technologies on each function-unknown gene. Furthermore, an increasing number of researchers are using RNAi in broad phenotypic screens to identify new genes involved in known biological function.

RNAi has emerged as a powerful new technology. Like all other new technologies, RNAi has a learning curve associated with its successful application. The professional technical assistance from GenePharma's RNAi service team can help clients achieve the maximal value of RNAi technology and avoid some common experimental errors. Our research team will work with you to develop much more extensive and effective solutions.

Our RNAi service includes experimental design, reagent validation, custom target ID, and validation discovery projects. Many years contact with several world-leading pharmaceutical companies enhances our experience. GenePharma knows how to help you make rapid progress in gene regulation experiments. Your success is our success.

### The RNAi service includes two aspects:

- Chemically-synthetic RNAi service
- Vector-based RNAi service

#### 1. Chemically-synthetic siRNA service

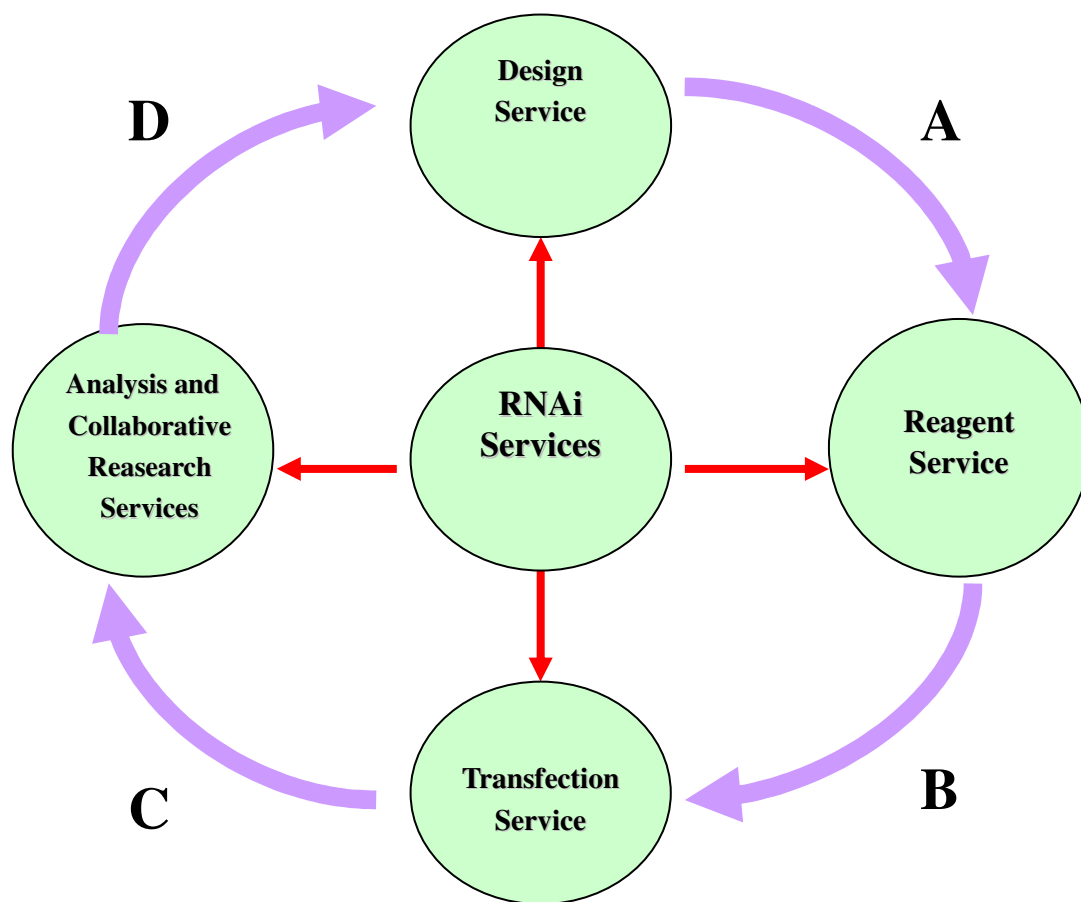
- **RNAi design:** customer provides Gene Name, GI Number, Accession Number, or Nucleotide Sequence.
- **Measure of gene suppression:** the mRNA expression is detected by RT-PCR; the protein expression is detected by Western Blot.
- **Reports:** siRNA sequence, RT-PCR and Western Blot.

#### 2. Vector-based RNAi Service

- **shRNA design:** customer provides Gene Name, GI Number, Accession Number, or Nucleotide Sequence.
- **Selection of shRNA expression vector:**
  - I. pGPU6/GFP/Neo
  - II. pGPH1/GFP/Neo
- **Measure of gene suppression:** the mRNA expression is detected by RT-PCR; the protein expression is detected by Western Blot.
- **Reports:** shRNA sequence, sequencing report of the constructed vector; RT-PCR report, Western Blot picture and so on.

**Price:**

The price is based on the requirements of the specific experiment.



## RNAi Set Service

RNAi technologies are becoming mature. The inhibition of gene expression by chemically synthetic siRNA becomes the rapid and effective method. We recently promote RNAi set service as follows:

As long as you provided gene sequence, Gene ID or Accession Number, we would design for you for free. The price for 4 duplexes of siRNA is only £300, and we guarantee that at least one duplex of them can effectively inhibit corresponding gene expression in the inhibition efficiency of more than 70%. If there is no effective siRNA fragment among the first 4 duplexes, Genepharma will design and synthesise one more time for you for free!

GenePharma RNAi SuperSilencing Sets			
Set Component	Duplex	Purification	Quantity
siRNA oligos for corresponding gene	4	HPLC	10 nmol
Negative control	1	HPLC	2.5 nmol
FAM-labelled siRNA control	1	HPLC	2.5 nmol
Positive control (GFP or GAPDH)	1	HPLC	2.5 nmol

Cat. No.	Product Description	Quantity	Price
L-01	Pre-designed siRNAs	3 x 5 nmol	£220.00
L-02	Pre-designed siRNAs	4 x 50 ug	£302.00

## MicroRNA Related Product

### MicroRNA Bio-synthesis and Mechanism

MicroRNA (miRNA) is a class of non-coding RNA with regulatory function found in eukaryotes in recent years, and it is mainly involved in the post-transcriptional gene regulation. *Lin-4* and *let-7* (~22nt) are first discovered RNA which controls the developmental time of *Caenorhabditis elegans*, but does not encode protein. After the discovery of *Lin-4* and *let-7*, some similar small RNAs were cloned from *Caenorhabditis elegans*, *Drosophila melanogaster*, and human cells. Those 19-25nt RNA, including *lin-4*, *let-7*, are named microRNA. The regulatory function of miRNA is very important, and it recently has been found to play important roles in the cell proliferation, cell death and fat metabolism in *Drosophila*, the formation of polar nematodes in *elegans*, and the differentiation of hematopoietic stem cells in mammals. In plants, miRNA also participates in the development of leaves and flowers.

The process of miRNA bio-synthesis in mammals, especially in human, has already been initially clarified:

First the primary transcription product of miRNA gene (pri-miRNA) is cut by RNaseIII Drosha to produce the precursor miRNA (pre-miRNA) in the nucleus. After the initial cutting, the pre-miRNA is transferred from the nucleus to the cytoplasm by transport protein exportin-5, and then is further cut by another RNaseIII Dicer to produce mature miRNA. These mature miRNA combine with other proteins to compose RNA-induced Silencing Complex (RISC), which lead to the degradation of mRNA or the inhibition of the translation.

### 1. miRNA Synthesis Service

GenePharma miRNA are small, single stranded, chemically-synthetic and optimised nucleic acids designed to mimic endogenous mature microRNA (miRNA) molecules in cells. GenePharma miRNA are designed to directly enter the miRNA processing pathway and, after processing, are treated identically to endogenous miRNA within the cell. You can:

- Control specific miRNA activity
- Tightly regulate miRNA cellular levels
- Achieve optimal delivery efficiency with minimal cytotoxicity

MiRNA enables up-regulation of miRNA activity for miRNA functional analysis. Specific experimental designs include:

- miRNA target site identification and validation
- Screening for miRNAs that regulate the expression of a gene
- Screening for miRNAs that affect a cellular process

MiRNA-related cellular functions can be further investigated using GenePharma miRNA inhibitors, which enable loss-of-function experiments through reduction of miRNA activity.

GenePharma provides different lengths and forms of customer-defined miRNA. It can also provide the miRNA sequence from Sanger miRNA database based on the customer's need. (<http://microrna.sanger.ac.uk/sequences>)

Cat. No.	Product Description	Quantity	Price
M-01	miRNA mimics	5.0 nmol	£46.00
M-02	miRNA inhibitors	5.0 nmol	£40.00
M-03	Negative control	2.5 nmol	£12.00
M-05	FAM-labelled mimic negative control	2.5 nmol	£20.00

## 2. miRNA Inhibitor Synthesis Service

GenePharma miRNA inhibitors are chemically-modified and optimised nucleic acids designed to specifically target the microRNA (miRNA) molecules in cells. Endogenous microRNAs are small, regulatory RNAs that are expressed in animals and plants that affect the translation of target mRNAs. The mature 17-24 nucleotide, single-stranded miRNAs specifically target a protein complex to regulate translation at the level of mRNA. The miRNA inhibitors are sequence-specific and chemically-modified to specifically target and knockdown individual miRNA molecules. With the Anti-miR miRNA inhibitors, you can:

- Control specific miRNA activity
- Tightly regulate miRNA cellular levels
- Achieve optimal delivery efficiency with minimal cytotoxicity

Use of the miRNA inhibitors will enable miRNA functional analysis for down-regulation of miRNA activity. Specific experimental designs include:

- miRNA target site identification and validation
- Screening for miRNAs that regulate the expression of a gene
- Screening for miRNAs that affect a cellular process

Cellular functions identified by miRNA inhibitors can be further investigated with the GenePharma miRNA Molecules, which increase miRNA concentration for gain-of-function experiments.

Cat. No.	Product Description	Quantity	Price
M-02	miRNA inhibitors	5 nmol	£40.00
M-06	FAM-labelled inhibitor negative control	2.5 nmol	£26.00

### NBS Biologicals Ltd

## Fluorescence Real-Time Quantitative PCR Related products

### Real Time Quantitative PCR

Real-time quantitative PCR (RT-qPCR) is an innovative and reliable technique for quantitative analysis of gene expression, mutation detection, allele discrimination and single nucleotide polymorphisms (SNP) genotyping. Real-time quantitative PCR was developed to overcome the basic weakness of the classical PCR technology: whereas PCR can indicate the presence of a particular nucleic acid in a sample after a completed PCR amplification, it cannot directly quantify the amount of amplification.

Real-time quantitative PCR systems determine the amount of amplified product by measuring the quantity of a fluorescent dye. This dye, upon excitation, emits a light or signal that increases in intensity in direct proportion to the amount of amplified PCR product and, therefore, quantifies the amount of target DNA. The assays can be directly performed in a sealed tube without any purification or separation step, avoiding all risks of contamination and post-PCR handling.

Real-time quantitative PCR systems also enable mutation detection via melting-curve analysis, as each double-stranded DNA product has its own specific melting temperature ( $T_m$ ). Melting-curve data enables the researcher to differentiate between specific PCR products and non-specific PCR products, such as primer-dimers.

### Sequence-specific Probes and Non-Sequence-Specific Probes

Detection by real-time quantitative PCR can be sequence-specific or non-sequence specific, and the method chosen will affect the performance of your real-time quantitative PCR results. For instance, SYBR Green I, a non-sequence-specific reagent, can bind to any double-stranded DNA including primer-dimers and other non-specific reaction products, and so may lead to an over-estimation of the amount of target DNA. However, sequence-specific probes, such as Taqman probe, dual-labelled fluorescence probe, or Molecular Beacons, bind only to the target template and therefore achieve accurate and reliable quantification of the amount of target DNA.

### Design and Synthesis Service of RT-PCR Primers

GenePharma provides design of primer or probe for free.

We design primers by using of optimised primer design techniques and latest database resources, simultaneously utilizing all kinds of bioinformatics knowledge and skills to select the best primers. You may get the best experimental results by using of primers and RT-PCR reagents provided by our company in our recommended standard reaction conditions.

Service for primer design has following characteristics:

- Not easy to form primer-dimer;
  - Primers are normally designed crossing exon junction, which makes it hard to amplify genomic DNA;
  - The sequence of primer does not contain known SNP site (Confirmed by dbSNP);
  - The specificity is confirmed through homology search;
  - Choosing the design region under experimental purposes;
  - Normally, 1 - 3 pairs of corresponding primers are provided for one target gene.
- 1) Design according to the full sequence of target gene;
  - 2) Design among the 1,500 bases at 5' end;
  - 3) Design among the 1,500 bases at 3' end.

Reporter Fluorophore at 5' End	Quencher Fluorophore at 3' End
6-FAM™, HEX™, TET™, JOE™, TAMRA™, ROX™, Fluorescein, Cy™3, Cy5, Cy5.5, Texas Red®, Rhodamine, Rhodamine Red™, Rhodamine Green™, 6-CarboxyRhodamine 6G, Oregon Green® 488, Oregon Green 500 or Oregon Green 514	TAMRA, DABCYL, BHQ-1 or Q-2

**Customer must provide the following information:**

- 1) Biology species information (such as Human, Mouse, Rat);
- 2) Target gene information (GeneBank Acc, GeneID, key word);
- 3) Primer design region (full sequence, 5' end sequence, 3' end sequence);
- 4) Primers, including SYBR Green I, Taqman probes and molecular beacons primers.

**Real Time PCR Detection Services**

Services include:

- Qualitative Analysis
- Absolute quantification
- Relative quantification (mRNA expression analysis)
- Confirmation of RNAi effect (siRNA screening)

Detection methods: SYBR Green I, Taqman probe, Molecular Beacons. If the expression of target gene is very low, try you best to provide us with a higher concentration of Total RNA.

Service contents: primer design, production of standard curve, Real Time PCR reaction and quantitative analysis.

**Service requirements:** Please send us sufficient and purified Total RNA (concentration in more than 100ng/ µl, volume in more than 20 µl) for mRNA expression analysis. Additional RNA extraction fee will be charged if the raw materials are cells or tissues. Simultaneously the materials should be kept fresh. The mammalian cell number should be above 10<sup>6</sup>, and the mammalian tissue weight should be above 5g.

## GENEPHARMA PRODUCTS INDEX

Code	Description	Pack Size	Price
A01002	Custom siRNA + 1 OD free siRNA negative control	5.0 nmol	£46.00
A01005	Custom siRNA	12.5 nmol	£78.00
A01010	Custom siRNA	25.0 nmol	£142.00
A01050	Custom siRNA	125.0 nmol	<i>Enquire</i>
A01100	Custom siRNA	250.0 nmol	<i>Enquire</i>
A02002	Chemically-modified siRNA	5.0 nmol	£59.00
A02005	Chemically-modified siRNA	12.5 nmol	£91.00
A02010	Chemically-modified siRNA	25 nmol	£154.00
A02050	Chemically-modified siRNA	125 nmol	<i>Enquire</i>
A02100	Chemically-modified siRNA	250 nmol	<i>Enquire</i>
A03002	Fluorescent dye labelled siRNA	5.0 nmol	£86.00
A03004	Fluorescent dye labelled siRNA	10.0 nmol	£102.00
A03005	Fluorescent dye labelled siRNA	12.5 nmol	£117.00
A03010	Fluorescent dye labelled siRNA	25.0 nmol	£181.00
A03050	Fluorescent dye labelled siRNA	125.0 nmol	<i>Enquire</i>
A03100	Fluorescent dye labelled siRNA	250.0 nmol	<i>Enquire</i>
B01001	Negative control siRNA	2.5 nmol	£15.00
B01002	FAM labelled negative control siRNA	2.5 nmol	£20.00
B01003	Positive control siRNA	2.5 nmol	£15.00
C-01	RNAi-Mate Transfection Reagent	0.1mL	£20.00
D-01	beta-actin	5.0 nmol	£46.00
D-02	gamma-actin	5.0 nmol	£46.00
D-03	AIB1 (estrogen receptor coactivator)	5.0 nmol	£46.00
D-04	Apaf-1	5.0 nmol	£46.00
D-05	ARC21	5.0 nmol	£46.00
D-06	ATR interacting protein	5.0 nmol	£46.00
D-07	Bcr-ab1	5.0 nmol	£46.00
D-08	beta-tubulin-mouse neuronal	5.0 nmol	£46.00
D-09	Bruton's tyrosine kinase (Btk)	5.0 nmol	£46.00
D-10	Casein kinase I epsilon and delta (CKI-epsilon and CKI-delta)	5.0 nmol	£46.00
D-11	Caspase 1	5.0 nmol	£46.00
D-12	Caspase 2	5.0 nmol	£46.00
D-13	hCdc2	5.0 nmol	£46.00
D-14	Cdc14A	5.0 nmol	£46.00
D-15	cdk1	5.0 nmol	£46.00
D-16	CENP-E	5.0 nmol	£46.00
D-17	CHO1	5.0 nmol	£46.00
D-18	corin, mouse	5.0 nmol	£46.00

D-19	Cyclin B1	5.0 nmol	<b>£46.00</b>
D-20	Cyclin B2	5.0 nmol	<b>£46.00</b>
D-21	cytoplasmic dynein 1 heavy chain	5.0 nmol	<b>£46.00</b>
D-22	DIP13-alpha (DCC interacting protein)	5.0 nmol	<b>£46.00</b>
D-23	Dishevelled (hDv-1 and hDv-3)	5.0 nmol	<b>£46.00</b>
D-24	hDv-2	5.0 nmol	<b>£46.00</b>
D-25	Eg5	5.0 nmol	<b>£46.00</b>
D-26	emerin	5.0 nmol	<b>£46.00</b>
D-27	eve	5.0 nmol	<b>£46.00</b>
D-28	hFbw7 (cyclin E ubiquitination)	5.0 nmol	<b>£46.00</b>
D-29	Fortilin	5.0 nmol	<b>£46.00</b>
D-30	GalTII (galactosyltransferase II)	5.0 nmol	<b>£46.00</b>
D-31	GalTII (galactosyltransferase II)	5.0 nmol	<b>£46.00</b>
D-32	GAS41 (1)	5.0 nmol	<b>£46.00</b>
D-33	Hec-1	5.0 nmol	<b>£46.00</b>
D-34	HPV E6	5.0 nmol	<b>£46.00</b>
D-35	HPV E7	5.0 nmol	<b>£46.00</b>
D-36	Tissue Factor (hTF)	5.0 nmol	<b>£46.00</b>
D-37	vimentin	5.0 nmol	<b>£46.00</b>
D-38	HtrA2	5.0 nmol	<b>£46.00</b>
D-39	Keratin 18	5.0 nmol	<b>£46.00</b>
D-40	Kinase interacting stathmin (hKIS)	5.0 nmol	<b>£46.00</b>
D-41	lamin A	5.0 nmol	<b>£46.00</b>
D-42	lamin A/C	5.0 nmol	<b>£46.00</b>
D-43	lamin B1	5.0 nmol	<b>£46.00</b>
D-44	lamin B2	5.0 nmol	<b>£46.00</b>
D-45	LAP2	5.0 nmol	<b>£46.00</b>
D-46	Mad1	5.0 nmol	<b>£46.00</b>
D-47	Mammalian septin (MSF)	5.0 nmol	<b>£46.00</b>
D-48	Methyl-CpG-binding protein 2 (MeCP2)	5.0 nmol	<b>£46.00</b>
D-49	Methyl-DpG-binding domain protein 2 (MBD2)	5.0 nmol	<b>£46.00</b>
D-50	MPS1 kinase (hMps1)	5.0 nmol	<b>£46.00</b>
D-51	Nicastrin (Nct)	5.0 nmol	<b>£46.00</b>
D-52	NuMA	5.0 nmol	<b>£46.00</b>
D-53	Nup153	5.0 nmol	<b>£46.00</b>
D-54	P160 ROCK	5.0 nmol	<b>£46.00</b>
D-55	Polo-like Kinase1 (hP1k1)	5.0 nmol	<b>£46.00</b>
D-56	Protein Kinase Receptor (PKR)	5.0 nmol	<b>£46.00</b>
D-57	hRad9	5.0 nmol	<b>£46.00</b>
D-58	Rad17	5.0 nmol	<b>£46.00</b>
D-59	Myeloid cell leukemia protein 1 (MCL1)	5.0 nmol	<b>£46.00</b>
E-01	pGPU6	1 ug	<b>Enquire</b>
E-02	pGPH1	1 ug	<b>Enquire</b>

E-03	pGPU6/Neo	1 ug	<b>Enquire</b>
E-04	pGPH1/Neo	1 ug	<b>Enquire</b>
E-05	pGPU6/Hygro	1 ug	<b>Enquire</b>
E-06	pGPH1/Hygro	1 ug	<b>Enquire</b>
E-07	pGPU6/GFP/Neo	1 ug	<b>Enquire</b>
E-08	pGPH1/GFP/Neo	1 ug	<b>Enquire</b>
F-03	pGPU6/Neo	50 ug	<b>£78.00</b>
F-04	pGPH1/Neo	50 ug	<b>£78.00</b>
F-05	pGPU6/Hygro	50 ug	<b>£78.00</b>
F-06	pGPH1/Hygro	50 ug	<b>£78.00</b>
F-07	pGPU6/GFP/Neo	50 ug	<b>£78.00</b>
F-08	pGPH1/GFP/Neo	50 ug	<b>£78.00</b>
L-01	Pre-designed siRNAs	3 x 5 nmol	<b>£220.00</b>
L-02	Pre-designed siRNAs	4 x 50 ug	<b>£302.00</b>
M-01	miRNA mimics	5.0 nmol	<b>£46.00</b>
M-02	miRNA inhibitors	5.0 nmol	<b>£40.00</b>
M-03	Negative control	2.5 nmol	<b>£12.00</b>
M-05	FAM-labelled mimic negative control	2.5 nmol	<b>£20.00</b>
M-06	FAM-labelled inhibitor negative control	2.5 nmol	<b>£26.00</b>
M-07	Mimic libraries	Varies	<b>Enquire</b>
M-08	Inhibitor libraries	Varies	<b>Enquire</b>

**GENEPHARMA PUBLICATIONS:****GenePharma Published Articles List 2008-2009****1. Carcinogenesis, 2008, 29(11):2126-2131.**

A functional polymorphism in the miR-146a gene is associated with the risk for hepatocellular carcinoma

*Teng Xu1, Ying Zhu1, Qing-Kun Wei, Yunfei Yuan, Fan Zhou, Yi-Yuan Ge, Jian-Rong Yang, Hang Su and Shi-Mei Zhuang\**

**2. Toxicological Sciences, 2008,105(2):286-294.**

Silencing of N-Ras Gene Expression Using shRNA Decreases Transformation Efficiency and Tumor Growth in Transformed Cells Induced by Anti-BPDE

*Lanlan Zhou\*, Yiguo Jiang\*, Aijun Tan, Anne R. Greenlee, Yuelan Shen\*, Linhua Liu\* and Qiaoyuan Yang\**

**3. Carcinogenesis, 2008,29(12):2369-2376.**

Apigenin inhibited migration and invasion of human ovarian cancer A2780 cells through focal adhesion kinase

*Xiao-Wen Hu, Dan Meng and Jing Fang\**

**4. J. Biol. Chem., 2008, 283 ( 47 ) : 32660-32668.**

CHP2 Activates the Calcineurin/Nuclear Factor of Activated T Cells Signaling Pathway and Enhances the Oncogenic Potential of HEK293 Cells\*

*Guo-Dong Li, Xi Zhang, Rong Li, Yue-Dan Wang, Yan-Li Wang, Ke-Jun Han, Xiao-Ping Qian, Cheng-Gang Yang, Ping Liu, Qun Wei, Wei-Feng Chen, Jun Zhang, and Yu Zhang*

**5. RNA , 2008, 14: 2348-2360.**

MicroRNA miR-21 overexpression in human breast cancer is associated with advanced clinical stage, lymph node metastasis and patient poor prognosis

*Li-Xu Yan, Xiu-Fang Huang, Qiong Shao, MA-Yan Huang, Ling Deng, Qiu-Liang Wu, Yi-Xin Zeng, and Jian-Yong Shao*

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Rho-GDP dissociation inhibitor alpha downregulated by low shear stress promotes vascular smooth muscle cell migration and apoptosis: a proteomic analysis

*Ying-Xin Qi, Ming-Juan Qu, Ding-Kun Long, Bo Liu, Qing-Ping Yao, Shu Chien and Zong-Lai Jiang,\**

**7. MBC, 2008, 19 ( 9 ) : 3691-3700**

E2F6 Inhibits Cobalt Chloride-Mimetic Hypoxia-induced Apoptosis through E2F1

*Wei-Wei Yang\*, Bo Shu\*, Yi Zhu, and Huang-Tian Yang\**

**8. Am J Physiol Renal Physiol, 2008, 295: F202-F214**

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HSP72 attenuates renal tubular cell apoptosis and interstitial fibrosis in obstructive nephropathy

*Haiping Mao,\* Zhilian Li,\* Yi Zhou, Zhijian Li, Shougang Zhuang, Xin An, Baiyu Zhang, Wei Chen, Jing Nie, Zhiyong Wang, Steven C. Borkan, Yihan Wang, and Xueqing Yu*

**9.Molecular Cancer Therapeutics,2008,7:1440-1449.**

Chk1 and Chk2 are differentially involved in homologous recombination repair and cell cycle arrest in response to DNA double-strand breaks induced by camptothecins

*Min Huang, Ze-Hong Miao, Hong Zhu, Yu-Jun Cai<sup>1</sup>, Wei Lu and Jian Ding*

**10.FASEB Journal. 2008,22:2809-2820.**

Voltage-dependent anion channel 1 is involved in endostatin-induced endothelial cell apoptosis

*Shaopeng Yuan, Yan Fu, Xiaofeng Wang, Hubing Shi, Yujie Huang, Xiaomin Song, Ling Li, Nan Song and Yongzhang Luo*

**11.The Journal of Cell Biology,2008,180(6):1087-1100.**

Nuclear Dvl, c-Jun,  $\beta$ -catenin, and TCF form a complex leading to stabilization of  $\beta$ -catenin–TCF interaction

*Xiao-qing Gan<sup>1</sup>, Ji-yong Wang, Ying Xi, Zhi-li Wu, Yi-ping Li, and Lin Li*

**12.Mol Pharmacol,2008,73:824-832.**

The Telomeric Protein TRF2 Is Critical for the Protection of A549 Cells from Both Telomere Erosion and DNA Double-Strand Breaks Driven by Salvicine

*Yong-Wei Zhang, Zhi-Xiang Zhang, Ze-Hong Miao, and Jian Ding*

**13. Mol Cancer Ther, 2007,6(9):2429–40.**

Gambogic acid inhibits the catalytic activity of human topoisomerase II by binding to its ATPase domain

*Yuxin Qin, Linghua Meng, Chaoxin Hu, Wenhua Duan, Zhili Zuo, Liping Lin, Xiongwen Zhang and Jian Ding*

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Functional characterization of human PFTK1 as a cyclin-dependent kinase

*Fang Shu, Shun Lv, Yan Qin, Xinlu Ma, Xin Wang, Xiaozhong Peng, Ying Luo, Bing-e Xu, Xiaoqing Sun, and Jun Wu*

**15.Carcinogenesis, 2008,29(12):2289-2297.**

Analysis of ABCG2 expression and side population identifies intrinsic drug efflux in the HCC cell line MHCC-97L and its modulation by Akt signaling

*Chen Hu, Hong Li, Jinjun Li,\* , Zheng Zhu, Shengyong Yin, Xiangfang Hao, Ming Yao, Shusen Zheng and Jianren Gu*

**16.Journal of Endocrinology, 2008,199:407-416.**

TRIB3 is implicated in glucotoxicity- and oestrogen receptor-stress-induced  $\beta$ -cell apoptosis  
*Bo Qian, Haiyan Wang, Xiuli Men, Wenjian Zhang, Hanqing Cai, Shiqing Xu, Yaping Xu, Liya Ye, Claes B Wollheim and Jinning Lou*

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Poly(ADP-ribose) polymerase-1 down-regulates BRCA2 expression through the BRCA2 promoter

*Jinhua Wang, Chunjing Bian, Jing Li, Fergus J. Couch, Kangjian Wu, and Robert Chunhua Zhao*

*Center of Excellence in Tissue Engineering, Peking Union Medical college (PUMC), Beijing, Beijing 100005*

#### **18.PNAS ,2008,105(44):17181-17186.**

TrkB-mediated activation of geranylgeranyltransferase I promotes dendritic morphogenesis

*Xiu-Ping Zhou, Kong-Yan Wu, Bin Liang, Xiu-Qing Fu, and Zhen-Ge Luo*

*Institute of Neuroscience, State Key Laboratory of Neuroscience, Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences, Shanghai 200031, China*

#### **19.J. Biol. Chem, 10.1074**

Glutamate acting on NMDA receptors attenuates IGF-1 receptor tyrosine phosphorylation and its survival signaling properties in rat hippocampal neurons

*Wen-Hua Zheng and Rémi Quirion*

#### **20.Cardiovascular Research, 2008,80(2):299-308.**

Insulin-like growth factor-I induces reactive oxygen species production and cell migration through Nox4 and Rac1 in vascular smooth muscle cells

*Dan Meng, Dan-Dan Lv and Jing Fang\**

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miR-16 family induces cell cycle arrest by regulating multiple cell cycle genes

*Qin Liu, Hanjiang Fu, Fang Sun, Haoming Zhang, Yi Tie, Jie Zhu, Ruiyun Xing, Zhixian Sun and Xiaofei Zheng\**

#### **22.Journal of Virology, 2008, 82(14):6889-6901.**

Functional Domains and the Antiviral Effect of the Double-Stranded RNA-Dependent Protein Kinase PKR from *Paralichthys olivaceus*

*Rong Zhu, Yi-Bing Zhang, Qi-Ya Zhang, and Jian-Fang Gui\**

#### **23.J. Biol. Chem.,2008,283(25):17175-17183.**

Aldose Reductase Regulates Hepatic Peroxisome Proliferator-activated Receptor Phosphorylation and Activity to Impact Lipid Homeostasis\*

*Longxin Qiu, Xiaochun Wu, Jenny F. L. Chau, Irene Y. Y. Szeto, Wing Yip Tam, Zongsheng Guo, Sookja K. Chung, Peter J. Oates, Stephen S. M. Chung, and James Y. Yang*

#### **24.J. Biol. Chem., 2008,283(7):4022-4030.**

DJ-1 Decreases Bax Expression through Repressing p53 Transcriptional Activity\*

*Jun Fan, Haigang Ren, Nali Jia, Erkang Fei, Tian Zhou, Peng Jiang, Mian Wu, and Guanghui Wang<sup>1</sup>*

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Quantitative Phosphoproteome Profiling of Wnt3a-mediated Signaling Network indicating the Involvement of Ribonucleoside-diphosphate Reductase M2 Subunit Phosphorylation at Residue Serine 20 in Canonical Wnt Signal Transduction\*,S

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*Hubing Shi, Yujie Huang, Hao Zhou, Xiaomin Song, Shaopeng Yuan, Yan Fu, and Yongzhang Luo*

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Inhibition of hepatitis B virus replication by various RNAi constructs and their pharmacodynamic properties

*Jinliang Peng, Yonggang Zhao, Junhua Mai<sup>1</sup>, Weng Ka Pang<sup>1</sup>, Xiaohui Wei, Peizuo Zhang and Yuhong Xu*  
2005 *J Gen Virol* 86 (2005), 3227-3234

Low K<sup>+</sup> Promotes NF-KB/DNA Binding in Neuronal Apoptosis Induced by K<sup>+</sup> Loss

*Yanmei Tao, Dong Yan, Qiaoyun Yang, Rui Zeng, and Yizheng Wang*  
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Microtubule affinity-regulating kinase 2 functions downstream of the PAR-3/PAR-6/atypical PKC complex

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*Y.M.Chen, Q.J. Wang, H.S.Hu, P.C.Yu, J.Zhu, G.Drewes, H.Piwnicka-Worms, and Z.G. Luo*  
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Lysophosphatidic Acid Is Constitutively Produced by Human Peritoneal Mesothelial Cells and Enhances

Adhesion, Migration, and Invasion of Ovarian Cancer Cells

*Juan Ren, Yi-jin Xiao, Lisam Shanjukumar Singh, Xiaoxian Zhao, Zhenwen Zhao, Li Feng, Tyler M. Rose, Glenn D. Prestwich and Yan Xu*  
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Ouyang M, Shen X.

*Institute of Biophysics, Chinese Academy of Science, Graduate School of the Chinese Academy of Sciences, Beijing, China*

*J Neurochem. 2006 Apr;97(1):234-44.*

E2F6 negatively regulates ultraviolet-induced apoptosis via modulation of BRCA1

w-w Yang, Z-H Wang, Y Zhu and H-T Yang

*Nature, Cell Death and Differentiation, 2006, 11.10*

Up-regulation of DLK1 as an imprinted gene could contribute to human hepatocellular carcinoma

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