

# cDNA Clones, Vectors and Gene Synthesis

## Your complete molecular biology solutions



### ORF Clones

TrueClone ■ TrueORF ■ PrecisionShuttle ■ TrueORF Gold

### Non-protein Coding Clones

miRNA plasmids ■ 3'-UTR reporter plasmids ■ shRNA plasmids

### Gene Synthesis: Clone by Design

Any variant ■ Any species ■ Any vector

# OriGene Clone Offering Overview

Comprehensive. Quality. Fast Delivery.

When you need a DNA clone, be it a cDNA clone or a clone of non-coding sequence, OriGene is your best choice. Our 100,000 ready-to-ship cDNA clones offer a quick and cost-saving solution. With the acquisition of Blue Heron, the leading gene synthesis company, OriGene has gained the capacity to create customized DNA clones of any species and any design.

cDNA clones for protein expression				Clones with non-coding sequences		
	TrueClone (untagged)	TrueORF (tagged)	Gene synthesis	Gene synthesis	miRNA plasmids	3'-UTR reporter plasmids
<b>Main utility</b>	Protein Expression in native form	Tagged protein expression	Customize	Customize	miRNA over expression	Target validation for miRNA
<b>Expression host</b>	Mammalian	Mammalian Shuttle to 60 vectors	Customize	Customize	Mammalian	Mammalian
<b>Species</b>	Human/Mouse	Human/Mouse	Any species, any sequence	Any species, any sequence	Human/Mouse	Human

## HOW TO FIND A CLONE

**Search:** A search box is located at the top of every page of the OriGene website and the following terms can be used.

- NCBI Accession Number (eg. NM\_000044)
- Gene symbol of the gene (eg. VEGF)
- Gene name (Caspase 8)
- Clone description (eg. androgen receptor, kinase deficient mutant)

**Browse:** On the clone collection page, [www.origene.com/cdna/clone\\_set.aspx](http://www.origene.com/cdna/clone_set.aspx), genes can also be browsed by gene family or pathway. A few popular categories are listed below as examples.

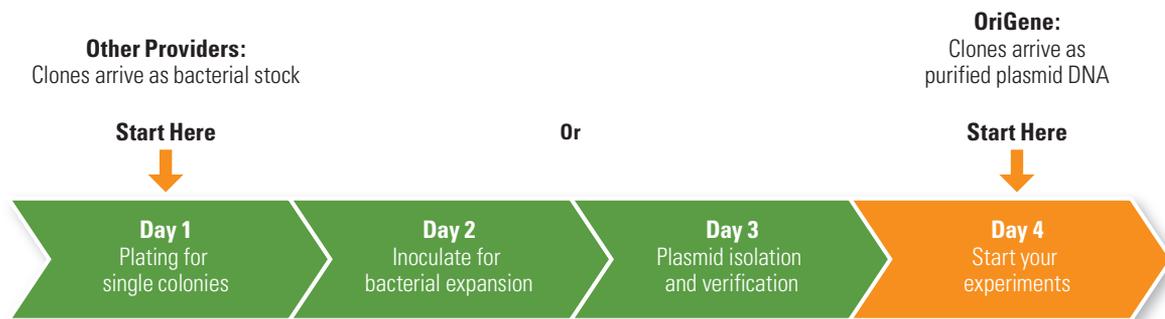
- Protein Kinase
- Phosphotase
- GPCR
- Secreted
- Wnt Pathway
- Angiogenesis
- Notch Pathway
- Tumor Metastasis

# Why Should You Choose OriGene's cDNA Clones?

## Quality! Selection! Delivery!

### FEATURES

- Comprehensive: Genome wide coverage for human and mouse
- Versatile: Untagged or tagged clones (>60 tagging options)
- Expression validation
- Transfection-ready DNA: Plasmids are purified with ion-exchange columns
- Pathway focused cDNA clone sets



### For protein-coding ORF sequences, there are two types of clones

- TrueClones: Library-based, full-length cDNA clones that usually contain native 5' and 3' untranslated regions in a CMV mammalian expression vector
- TrueORF Clones: Tagged open reading frame (ORF) clones in OriGene's CMV based PrecisionShuttle Entry vector. The ORF insert can be easily shuttled with a simple digestion/ligation reaction into a wide variety of tagged destination vectors.

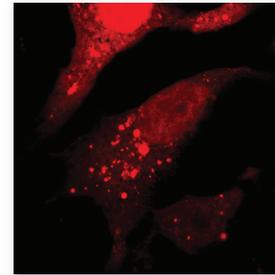
### For non-protein coding sequences, OriGene offers

- miRNA expression clones
- shRNA clones (See RNAi brochure or [www.origene.com/RNAi/](http://www.origene.com/RNAi/))
- 3'-UTR reporter clones

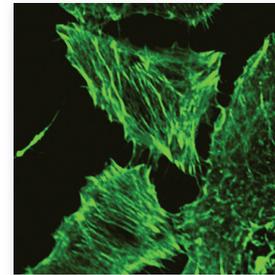


## TrueORFS ARE EXCELLENT FOR

- Mammalian overexpression of tagged proteins (over 60 combination of tags available)
- Purification of the overexpressed protein
- Protein interaction and localization studies (e.g. organelle markers)
- Detection and cellular imaging of the exogenously introduced protein
- Tagged protein expression in a cell-free system (eg. TNT)



Autophagosome RC100005

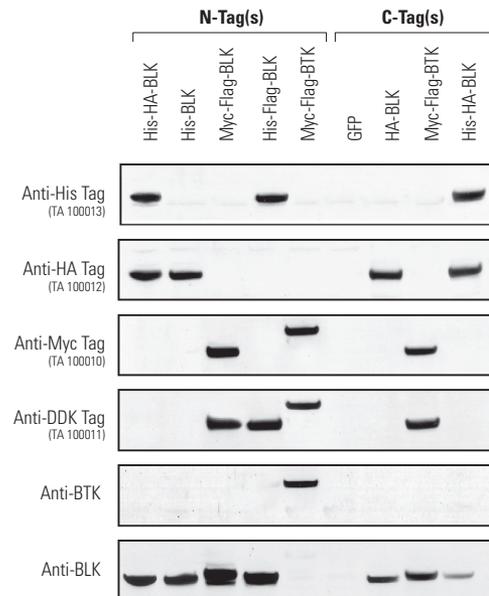


Cytoskeleton RC100002

## TrueORF ADVANTAGES

- **Convenience:** TrueORFs provide an instant solution for tagged protein expression
- **Flexibility:** TrueORF can be shuttled into multiple destination vectors.
- **Accuracy:** TrueORFs have verified and guaranteed insert sequences
- **Proven:** TrueORFs have been rigorously tested for expression of the target proteins and their tags.

Over 15,000 TrueORF have passed our protein expression validation.



Western blot analysis of HEK293 cell lysate over-expressing BLK and BTK tagged with indicated epitopes.

# PrecisionShuttle System

## Tagged protein expression made simple

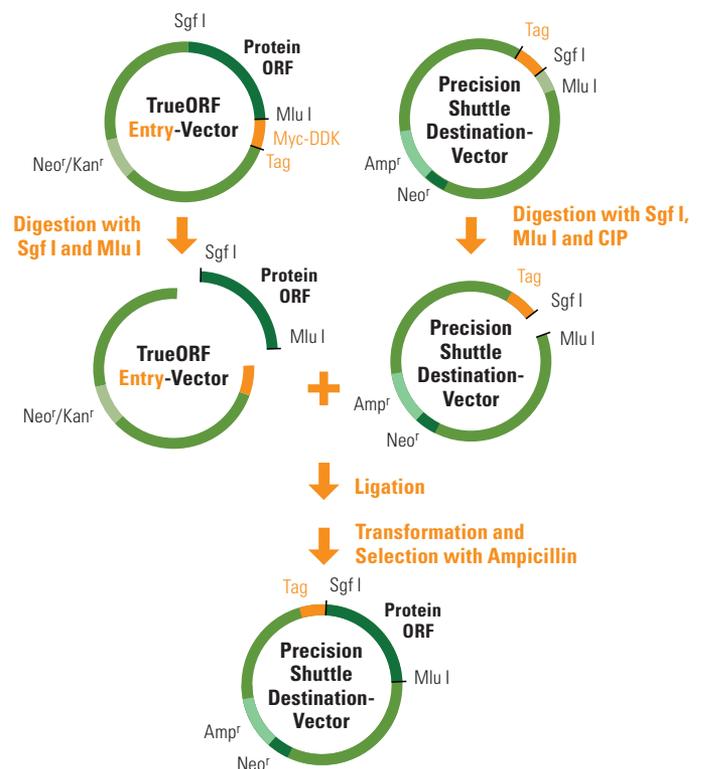
To accommodate diverse tagging needs, OriGene devised the novel PrecisionShuttle™ system to allow easy subcloning of an ORF from one tagged vector to another. The TrueORF Entry Vector contains C-terminal tags of Myc and DDK®. A large panel of destination vectors are available so you can express an ORF with different tags or with tags at different ends of the protein. The key in the PrecisionShuttle system is the utilization of two rare-cutting restriction endonucleases, Sgf I and Mlu I.

### PRECISIONSHUTTLE VS. RECOMBINATION SHUTTLE SYSTEM (E.G. GATEWAY® SYSTEM):

PrecisionShuttle™	Gateway®
Functional Entry vector	Entry vector <b>NOT</b> for expression
One-step subcloning	Multi-step subcloning
Restriction enzymes-based	Recombination-based
Low cost	Expensive
No IP restriction	Conditional licensing
Inserts >18Kb are readily shuttled	Unstable plasmid when insert >5Kb
2 aa linker appended	>10aa linker appended

Gateway is a registered trademark of Life Technology.

### SCHEMATIC OF THE PRECISION SHUTTLE SYSTEM



# PrecisionShuttle™ Vectors

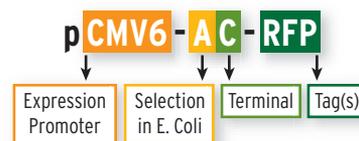
## Entry and Destination

PrecisionShuttle Entry Vector	Cell Selection
pCMV6-Entry (C-terminal Myc and DDK Tagged)	Neomycin

PrecisionShuttle Destination Vector	Mammalian Selection
pCMV6-AC-His	Neomycin
pCMV6-AC-Myc	Neomycin
pCMV6-AC-HA	Neomycin
pCMV6-AC-DDK	Neomycin
pCMV6-AC-Myc-His	Neomycin
pCMV6-AC-Myc-DDK	Neomycin
pCMV6-AC-HA-His	Neomycin
pCMV6-AC-DDK-His	Neomycin
pCMV6-AC-GFP	Neomycin
pCMV6-AN-His	Neomycin
pCMV6-AN-Myc	Neomycin
pCMV6-AN-HA	Neomycin
pCMV6-AN-DDK	Neomycin
pCMV6-AN-His-Myc	Neomycin
pCMV6-AN-Myc-DDK	Neomycin
pCMV6-AN-His-HA	Neomycin
pCMV6-AN-His-DDK	Neomycin
pCMV6-AN-GFP	Neomycin
pCMV6-AC	Neomycin
pTUNE Inducible	Neomycin
pCMV6-A-BSD	Blasticidin
pCMV6-A-EM7-BSD	Blasticidin
pCMV6-A-Hygro	Hygromycin
pCMV6-A-Puro	Puromycin
pCMV6-A-GFP	-
pCMV6-AC-IRES-GFP	Neomycin
pEX-N-His-GST	-
pEX-N-GST	-
pEX-N-His	-
pEX-C-His	-
pEX-1	-
pCMV6-AN-RFP	Neomycin

PrecisionShuttle Destination Vector	Mammalian Selection
pCMV6-AC-RFP	Neomycin
pCMV6-AN-YFP	Neomycin
pCMV6-AC-YFP	Neomycin
pCMV6-AC-FP602	Neomycin
pCMV6-AC-FP635	Neomycin
pCMV6-AC-mKate	Neomycin
pCMV6-AC-mGFP	Neomycin
pCMV6-AC-mRFP	Neomycin
pCMV6-AC-mYFP	Neomycin
pCMV6-AC-mBFP	Neomycin
pCMV6-AC-mCFP	Neomycin
pCMV6-AN-FP602	Neomycin
pCMV6-AN-FP635	Neomycin
pCMV6-AN-mKate	Neomycin
pCMV6-AN-mGFP	Neomycin
pCMV6-AN-mRFP	Neomycin
pCMV6-AN-mYFP	Neomycin
pCMV6-AN-mBFP	Neomycin
pCMV6-AN-mCFP	Neomycin
pCMV6-AC-FC	Neomycin
pCMV6-AC-FC-S	Neomycin
pCMV6-AN-FC	Neomycin
pCMV6-AN-FC-S	Neomycin
pCMV6-AC-3DDK	Neomycin
pCMV6-AN-3DDK	Neomycin
pCMV6-AC-IRES-GFP-Puro	Puromycin
pTUNE-GFP	Neomycin
pCMV6-AN-GFP-C-His	Neomycin

## UNDERSTAND A VECTOR BY ITS NAME



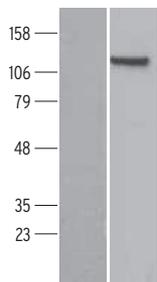
# TrueORF Gold Clones

## Expression-validated cDNA Clones



### TESTED INDIVIDUALLY BY WESTERN BLOT

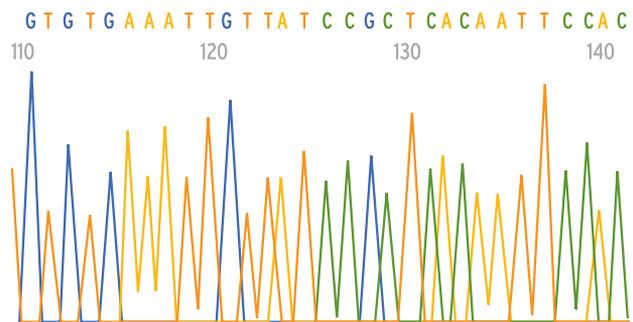
Each TrueORF Gold clone has been used to transfect human cell lines for protein expression. OriGene has produced over 15,000 over-expression lysates from TrueORF transfected HEK293 cells and subsequently purified over 6,000 human proteins.



HEK293 were transfected with L) empty vector R) TrueORF for Myc/DDK-tagged hTERT (Cat# RC217436). The lysates were analyzed using anti-DDK antibody to show over-expression of hTERT.

### SEQUENCE VERIFIED

Each TrueORF Gold clone's sequence information is online, downloadable as chromatogram files. No more worrying about mutations, deletions, or frameshift when using TrueORF Gold.



### TRANSFECTION READY

No need for subcloning, no need for plasmid preparation; TrueORF Gold clones are expression ready and supplied as 10ug transfection-ready DNA.

### EASILY SHUTTLED INTO 60 VECTORS

OriGene has prepared over 60 destination vectors with matching cloning sites allowing for easy transfer of the insert using a simple cut and paste procedure.

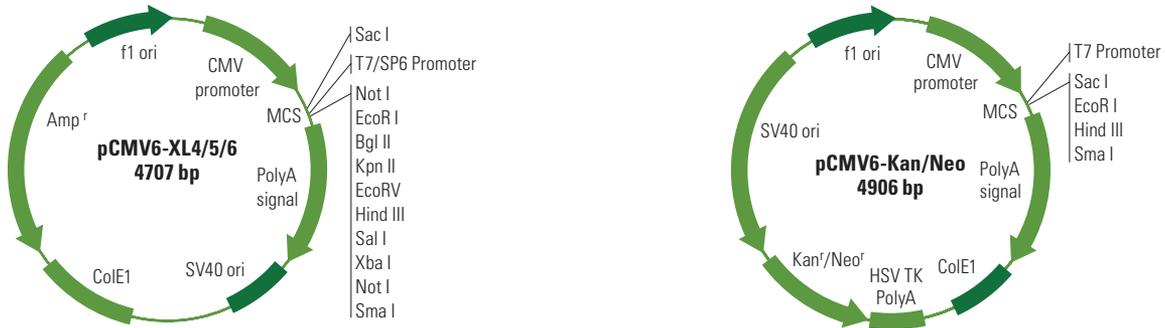
- Fluorescent-protein tagging vectors (27)
- Epitope-tagging vectors (23)
- Selection markers (8)
- Inducible vectors (2)
- Bacterial expression vectors (5)

### NEXT-DAY SHIPMENT

# TrueClone™

## Authentic full-length cDNA clones for expression and functional studies of a native protein

OriGene's TrueClones cover both human and mouse genomes. The vectors for the two species differ slightly.



All TrueClones are unidirectionally cloned in the EcoR I and Sal I restriction sites. The Sal I site is destroyed during cloning, and cannot be reused. The insert can be liberated by a simple digestion with Not I.

All mouse TrueClones are cloned unidirectionally between two sites in the MCS. Please contact OriGene's technical support professionals for details.

### TrueCLONES ARE EXCELLENT FOR

- Overexpression of the native protein in mammalian cells
- Functional studies of native protein
- Quantitative PCR templates
- Hybridization-based detection probes, such as Northern blots or FISH assays
- Protein expression in cell-free systems (eg. TNT)

### TrueCLONE ADVANTAGES

- Cost-effective and time-saving alternative to de novo cloning
- Expression-ready and transfection-ready
- Authentic cDNAs representing native transcripts
- Consistent vector system facilitates high-throughput screening

# Pathway-focused cDNA Clone Sets

For researchers who wish to obtain an entire gene family or a pathway-focused cDNA clone collection, OriGene offers pre-made clone sets. Clone sets are ideal for high throughput screening or archiving. OriGene discounts the order considerably according to the number of clones in the set ordered.

## PRE-MADE CLONE SETS

Cat #	Description	Price (subject to change)
TCAC105	Transmembrane Set (3,890)	\$300K
TCAC106	Access Set 10,000 (10,000)	\$250K
TCAC107	Access Protein Kinase Set (315)	\$25K
TCAC108	Access Phosphatase Set (137)	\$15K
TCAC109	Access GPCR Set (215)	\$20K

## CLONE SETS FOR CUSTOMIZED ASSEMBLY

OriGene's website lists over 100 commonly studied pathways, gene families and research focuses so that the customer can assemble their own clone collection of interest with ease. We will work with you to make your own custom set – contact us at sales@origene.com.

### Sample collections

Clone Sets	TrueORF (Myc-DDK Tagged)	TrueClone (Untagged)
GPCR	269	376
Kinase-deficient mutant	N/A	337
Protein Kinase	422	973
Secreted	1087	1259
Transmembrane	3309	4372
Angiogenesis	341	534

Clone Sets	TrueORF (Myc-DDK Tagged)	TrueClone (Untagged)
Apoptosis	1498	2315
Breast Cancer	319	507
Cytokines	203	241
Human Stem Cell	246	339
Human Tumor Metastasis	94	154
Notch	92	144
Wnt Pathway	287	386

More on website

# MicroRNA Expression Plasmids

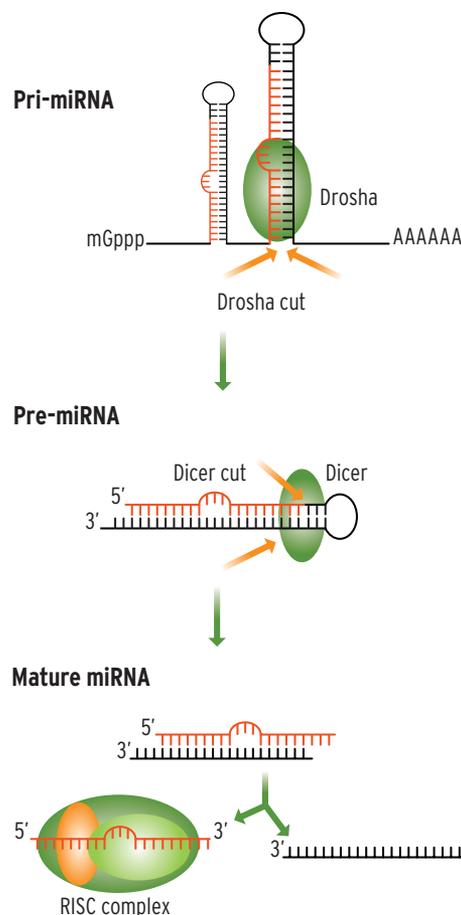
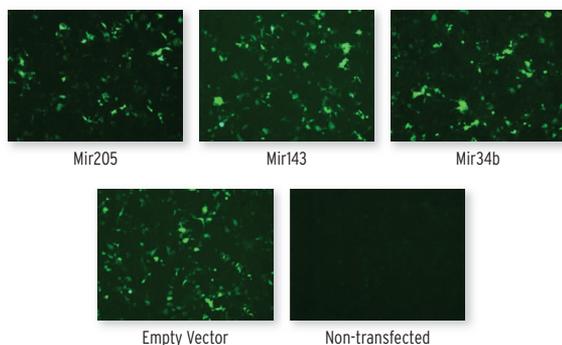
## Comprehensive coverage for both human and mouse

OriGene provides clones for over-expression of microRNA of your choice. OriGene's microRNA precursor contains pre-miRNA (60-70nt) with 250-300 nts up- and down-stream of flanking sequence. It was amplified from human genomic DNA and cloned into OriGene's pCMV6-Mir Vector. Upon transfection, the cellular machinery will process the CMV-driven expression of miRNA precursor into mature miRNA and cellular function can be analyzed.

### FEATURES & BENEFITS

- Genome wide miRNA coverage – 652 human and 486 mouse
- Sequence confirmation of the precursor microRNA
- GFP for transfection monitoring
- Neomycin selection for stable cell establishment

### GFP transfection of microRNA expression plasmids in HEK293 cells



### miRNA EXPRESSION PLASMIDS

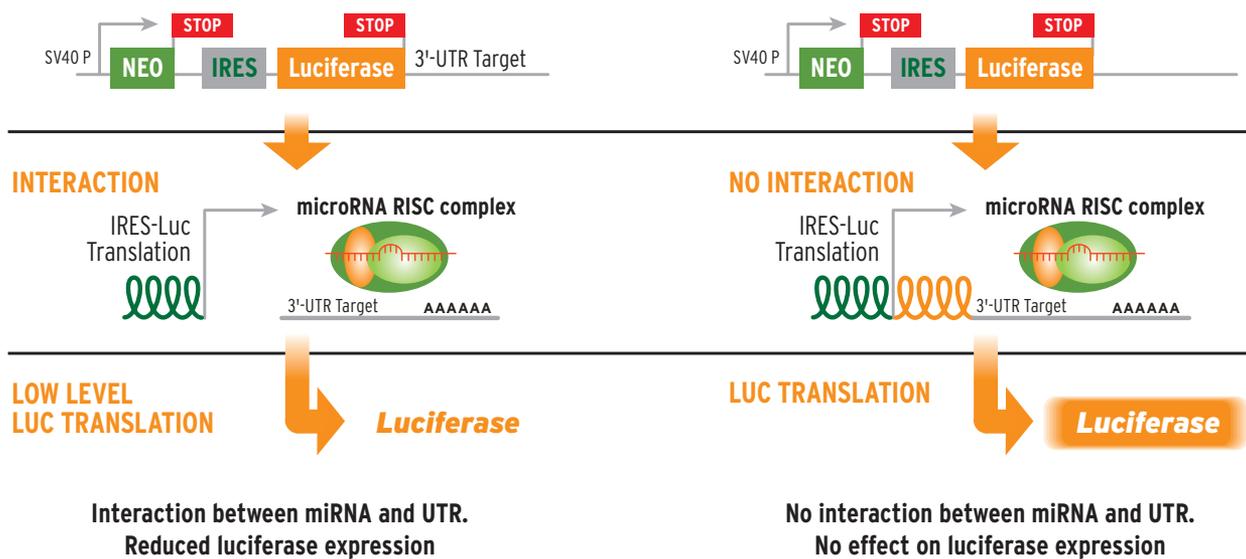
Sold individually as 10ug transfection-ready DNA or can be purchased as following sets

Catalog No.	Description
SC410001	Mouse miRNA expression plasmid set (486 vectors, 10ug each in 2-D bar coded tubes)
SC420001	Human miRNA expression plasmid set (652 vectors, 10ug each in 2-D bar coded tubes)
SC410002	Mouse miRNA expression plasmid set (486 vectors, 2ug each in 96-well plates)
SC420002	Human miRNA expression plasmid set (652 vectors, 2ug each in 96-well plates)

# 3'-UTR Reporter Clones for miRNA Target Validation

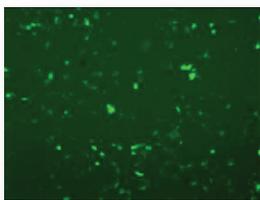
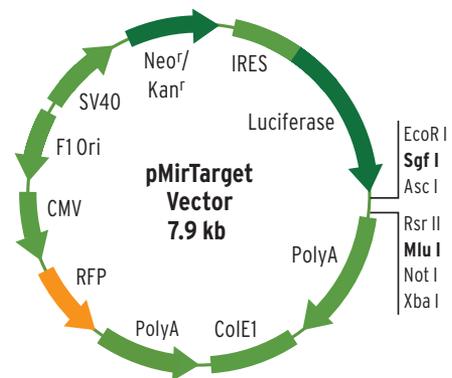
## Luciferase reporter assays for Human

The 3'-UTR plasmids provide quantitative assessment of the inhibitory effects between miRNAs and their potential target genes. The 3'-UTR sequence of a gene was cloned downstream of the firefly luciferase gene. The chimeric transcript level is regulated by its interaction with miRNA(s), which results in varied luciferase activity quantifiable by a colorimetric assay. MicroRNAs and their 3'-UTR targets can be assayed for endogenous microRNA activity or for overexpressed microRNA in a co-transfection experiment.



### FEATURES & BENEFITS

- Genome wide coverage (>20,000 human gene)
- Firefly luciferase as the easy-to-assay reporter
- RFP for transfection monitoring
- High sensitivity from IRES-driven translation of the expression cassette



pCMV - Mir + Mir205 target



pCMV - Mir205 + Mir205 target

OriGene has used a new design adapted from C.P.Petersen et al. 2006, to dramatically increase the sensitivity of detection by decreasing the 3'UTR-luciferase reporter expression to a very low level.

# Organelle Marker Plasmids

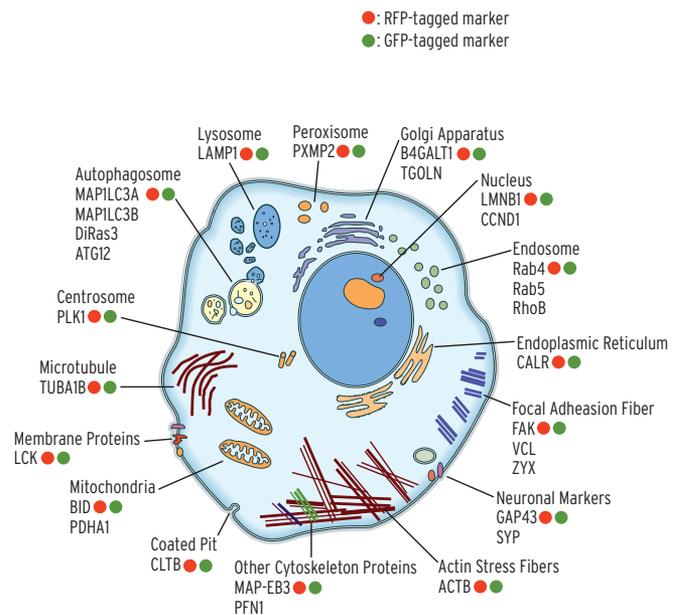
Label subcellular structures with a simple transfection

## PRODUCT DESCRIPTION

- GFP- or RFP-tagged human cDNA clones for organelle-specific marking
- Individually validated by confocal microscopy for correct labeling
- Enable labeling of live or fixed cells without chemical or antibodies

## APPLICATIONS

- Direct organelle marking
- Monitoring of protein trafficking
- Study organelle morphology and dynamics
- Protein co-localization with organelles
- Fraction tracking during enrichment or purification



\$480 each, provided as 10ug purified transfection-ready plasmids.

Cat#	Organelle	Symbol
RC100004(G)/RC100036(R)	Autophagosome	ATG12
RC100011(G)/RC100043(R)	Autophagosome	Di-Ras3
RC100020(G)/RC100052(R)	Autophagosome	MAP1LC3A
RC100021(G)/RC100053(R)	Autophagosome	MAP1LC3B
RC100023(G)/RC100055(R)	Centrosome	PLK1
RC100010(G)/RC100042(R)	Coated pit	CLTB
RC100002(G)/RC100034(R)	Cytoskeleton	ACTB
RC100019(G)/RC100051(R)	Cytoskeleton	MAP-EB3
RC100022(G)/RC100054(R)	Cytoskeleton	PFN1
RC100030(G)/RC100062(R)	Cytoskeleton	TUBA1B
RC100008(G)/RC100040(R)	Endoplasmic reticulum	CALR
RC100025(G)/RC100057(R)	Endosome	Rab4
RC100026(G)/RC100058(R)	Endosome	Rab5
RC100027(G)/RC100059(R)	Endosome	RhoB
RC100012(G)/RC100044(R)	Focal adherin fiber	FAK

Cat#	Organelle	Symbol
RC100031(G)/RC100063(R)	Focal adherin fiber	VCL
RC100032(G)/RC100064(R)	Focal adherin fiber	ZYX
RC100005(G)/RC100037(R)	Golgi apparatus	B4GalT1
RC100029(G)/RC100061(R)	Golgi apparatus	TGOLN
RC100016(G)/RC100048(R)	Lysosome	LAMP1
RC100006(G)/RC100038(R)	Mitochondria	PDHA1
RC100007(G)/RC100039(R)	Mitochondria	BID
RC100013(G)/RC100045(R)	Neuronal axis	GAP43
RC100009(G)/RC100041(R)	Nucleus	CCND1
RC100018(G)/RC100050(R)	Nucleus	LMNB1
RC100024(G)/RC100056(R)	Peroxisome	PXMP2
RC100017(G)/RC100049(R)	Plasma membrane	LCK
RC100028(G)/RC100060(R)	Synaptic vesicles	SYP

# Gene Synthesis from Blue Heron



OriGene acquired Blue Heron, the gene synthesis expert, to be able to offer a complete solution for gene research.

Blue Heron has been the gold standard in gene synthesis since 1999. Its superior technology and outstanding quality are demonstrated in a series of innovative achievements.

- The first company to synthesize a 52KB gene (2007)
- The primary supplier for the 1st bacterial genome (2008)
- The sole DNA source for the 1st synthetic cell by J. Craig Venter Inst. (2010)

With Blue Heron's gene synthesis capabilities, OriGene is now a one-stop shop for all of your cDNA needs. Our combined strengths provide our customers with broader coverage, quicker delivery and better service. We are 100% committed to serving you with high quality standards under strict confidentiality.

## WHY TRUST BLUE HERON WITH YOUR GENE SYNTHESIS PROJECT?

### ■ **Get Any Gene**

Our proprietary technology can synthesize more challenging genes than any other vendor.

### ■ **Fast**

Most genes are delivered within 2-4 weeks.

### ■ **Guaranteed Quality**

Each gene will match the exact sequence you order.

### ■ **Secure and Confidential**

Order and communicate via a secure, dedicated website.

### ■ **No Claim to Your Inventions**

You own full right and title to the products delivered and retain IP rights.

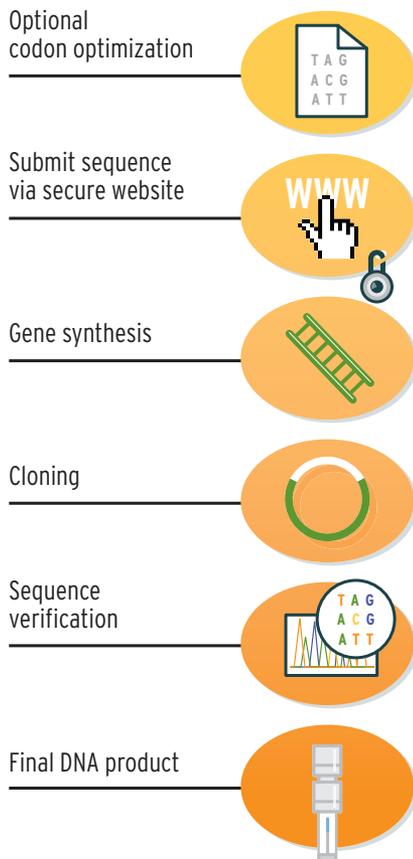
### ■ **Optional, Free Sequence Optimization**

Convert your amino acid sequence into the optimal nucleotide sequence for your host organism to improve protein expression

## ORDER AND SYNTHESIS OVERVIEW

- Free, optional-codon optimization of amino acid sequence
- Submit DNA sequence
- GeneMaker: synthesizes, clones and sequence verifies the order
- Purified plasmid DNA and bacterial stab shipped via overnight delivery
- Sequence and trace data posted to the customer's secure web site

### GENE MAKER™



## APPLICATIONS

- **Proteins**
  - Protein expression
  - Codon optimized DNA for improved protein expression
  - Recombinant antibodies
  - Functional peptides
  - Protein mutagenesis
  - Mutations to study protein folding
  - Protein purification service
- **Immunology**
  - Recombinant antibodies
  - Humanizing antibodies
- **Gene Variants & Variant Libraries**
  - Point mutations, SNPs
  - Comprehensive codon substitution libraries
  - Mutant libraries
- **Custom Vectors**
  - Reshuffled vector sites
  - Multi-resistance vector
  - Specialized cassette drop-in vectors
  - Custom designed vectors
  - PrecisionShuttle system
- **Genomics**
  - Functional genomics
  - Synthetic chromosomes & genomes
  - Clone sets & collections
- **Limitless Possibilities**
  - Combinations of naturally-occurring DNA and synthetic constructs
  - Completely novel sequences not available in nature
  - Complete flexibility in point or regional deletion/addition mutations
  - Engineered DNA sequences for synthetic biology studies

# OriGene, Your Partner in Gene Research and Beyond

## KEY TECHNOLOGIES AND PRODUCTS

- Full-length cDNA clones, ORF clones in expression-ready vectors
- Gene synthesis: research specific gene design
- RNAi research reagents: shRNA, siRNA, and miRNA function and detection
- SYBR Green qPCR assays for mRNA and miRNA detection, primer panels
- Recombinant human proteins and over-expression lysates
- TrueMAB™ monoclonal antibodies
- Luminex multiplex immunoassays
- Cancer tissue biorepository, TMA, RPPA, and TissueScan qPCR arrays
- UltraMAB™ validated IHC antibodies



### OriGene USA

9620 Medical Center Drive, Suite 200  
Rockville, MD 20850  
1.301.340.3188  
[www.origene.com](http://www.origene.com)

### OriGene Gene Synthesis

Blue Heron Biotech  
22310 20th Avenue SE #100  
Bothell, WA 98021 USA  
1.425.368.5000  
[www.blueheronbio.com](http://www.blueheronbio.com)

### OriGene CHINA

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