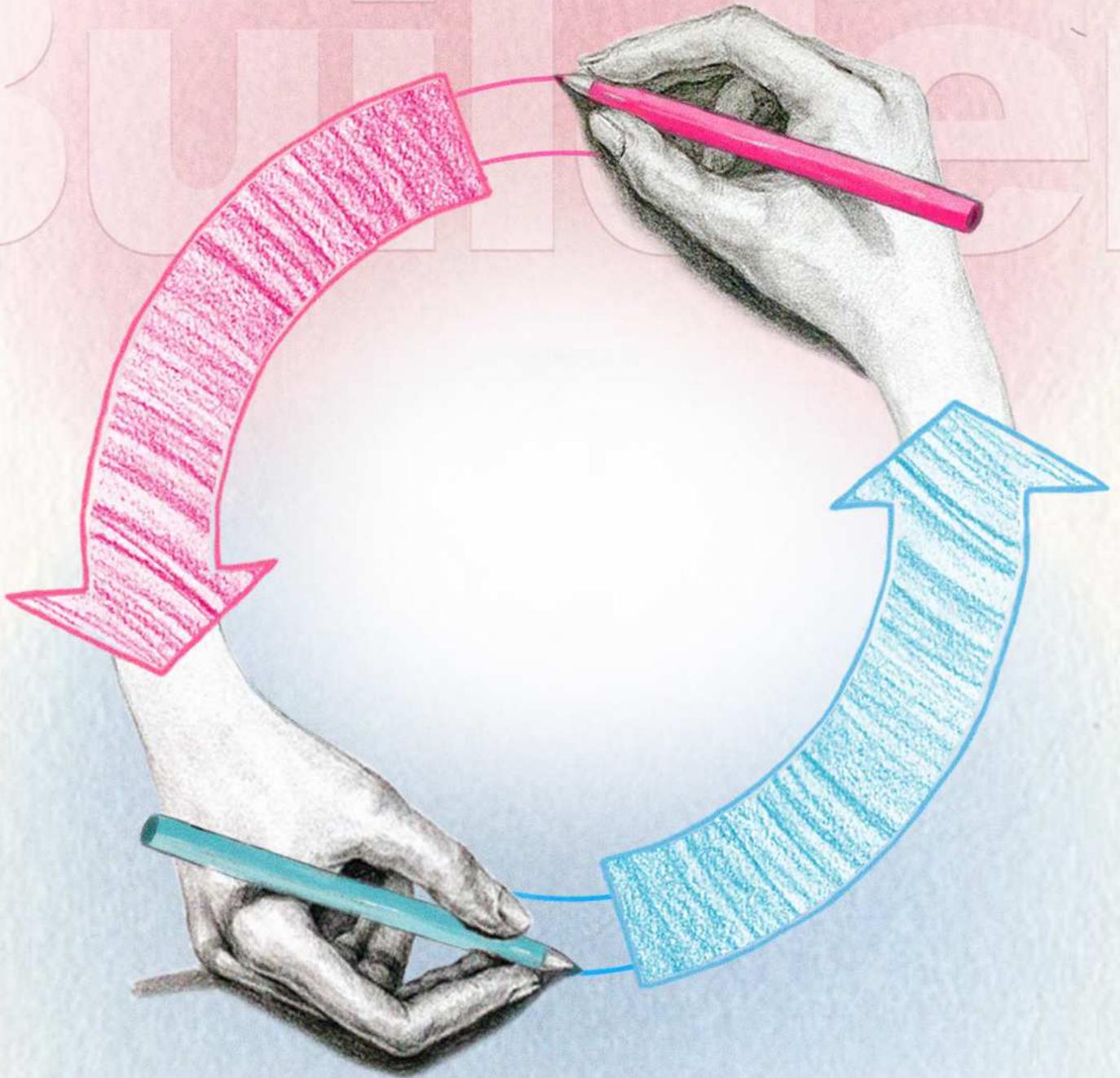




VectorBuilder.com

A revolutionary platform for all your vector & virus needs



you DESIGN it, we CLONE it

Vector Construction | Virus Packaging | Library Construction | BAC Recombineering

What is VectorBuilder?

As a global pioneer in custom DNA vectors and recombinant viruses, VectorBuilder's revolutionary online-to-offline (O2O) platform provides a powerful one-stop solution to all the vector and virus needs in the life sciences. VectorBuilder has a wide spectrum of offerings, including:

- **Vector design**
- **Custom cloning**
- **Virus packaging**
- **Library construction**
- **BAC recombineering**
- **Mutagenesis**
- **Stable cell line generation**

Additionally, our state-of-the-art GMP facility will be fully operational by the end of 2020 for clinical and commercial manufacturing of gene and cell therapy vectors (*see page 32 for detailed information*).

Our Mission

A vector is just a research reagent. Yet most of us know the pain of spending countless hours toiling in the lab trying to clone a vector, often unsuccessfully, while putting our research on hold. The founders of VectorBuilder believe this to be a colossal waste of human potential, as scientists should spend their time and intellect on interesting experiments rather than creating a reagent.

The solution is VectorBuilder, an innovative online platform that allows researchers to focus on their real research. At VectorBuilder you can easily design your desired vectors in fully annotated forms for free and outsource the tedious vector cloning and virus packaging to us.

Our mission is to make life sciences research easier, faster, and more cost-effective. We pride ourselves on our:

- **Unique web-based platform** that combines vector designing, ordering, and data management into a single integrated workflow
- **Extensive experience** working with wide-ranging customer needs in vector cloning and virus packaging
- **Robust and superior quality** of products and services while maintaining rapid turnaround and affordable prices
- **White-glove customer care** supported by a PhD-level service team with decades of collective experience
- **Strong R&D capability** to develop novel vector systems and optimize existing technologies

Remember, vectors are just complex reagents. Let VectorBuilder work on creating them while you focus on theory generation and more important downstream experiments.

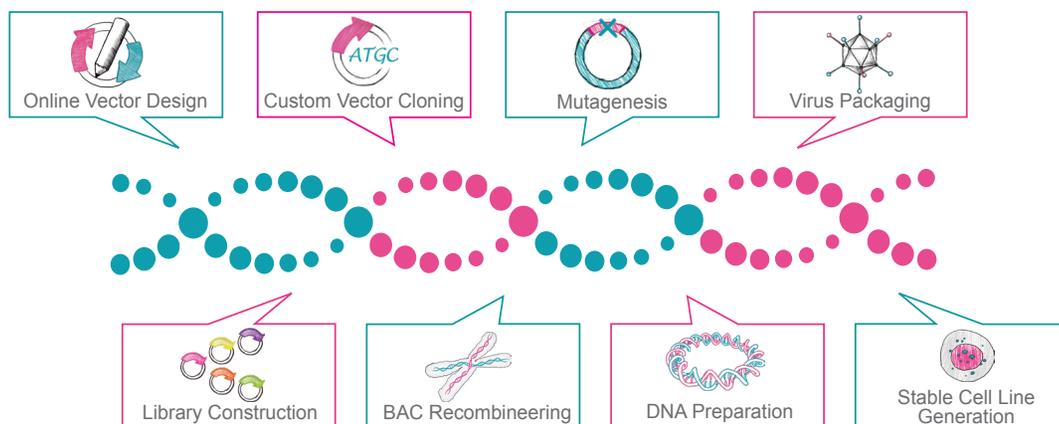
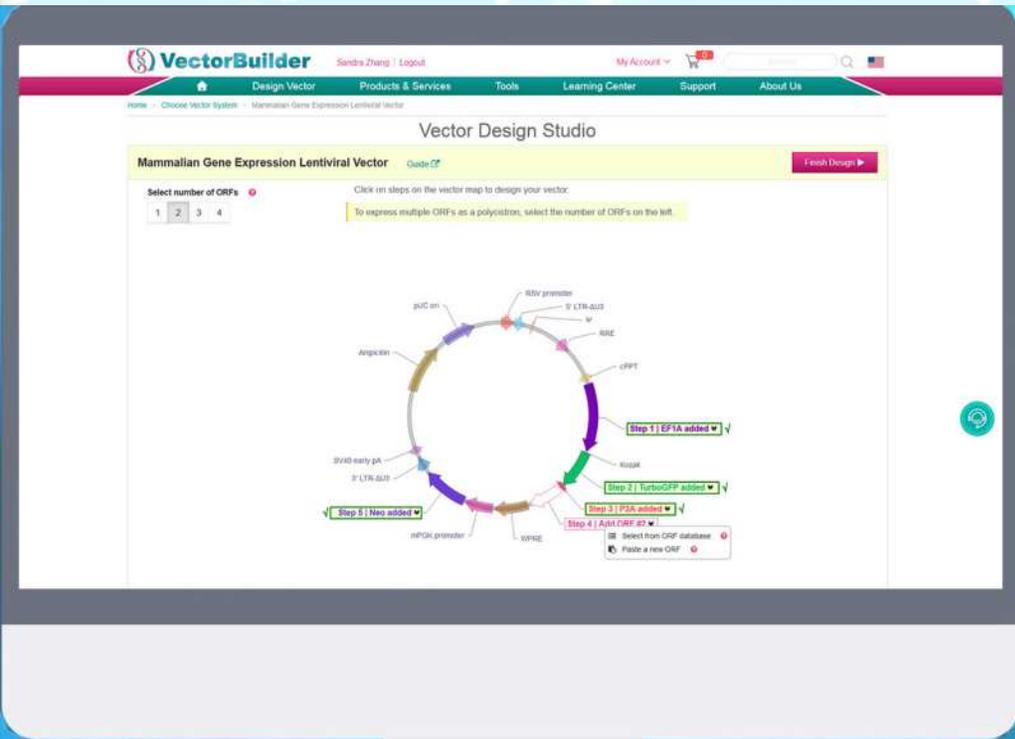


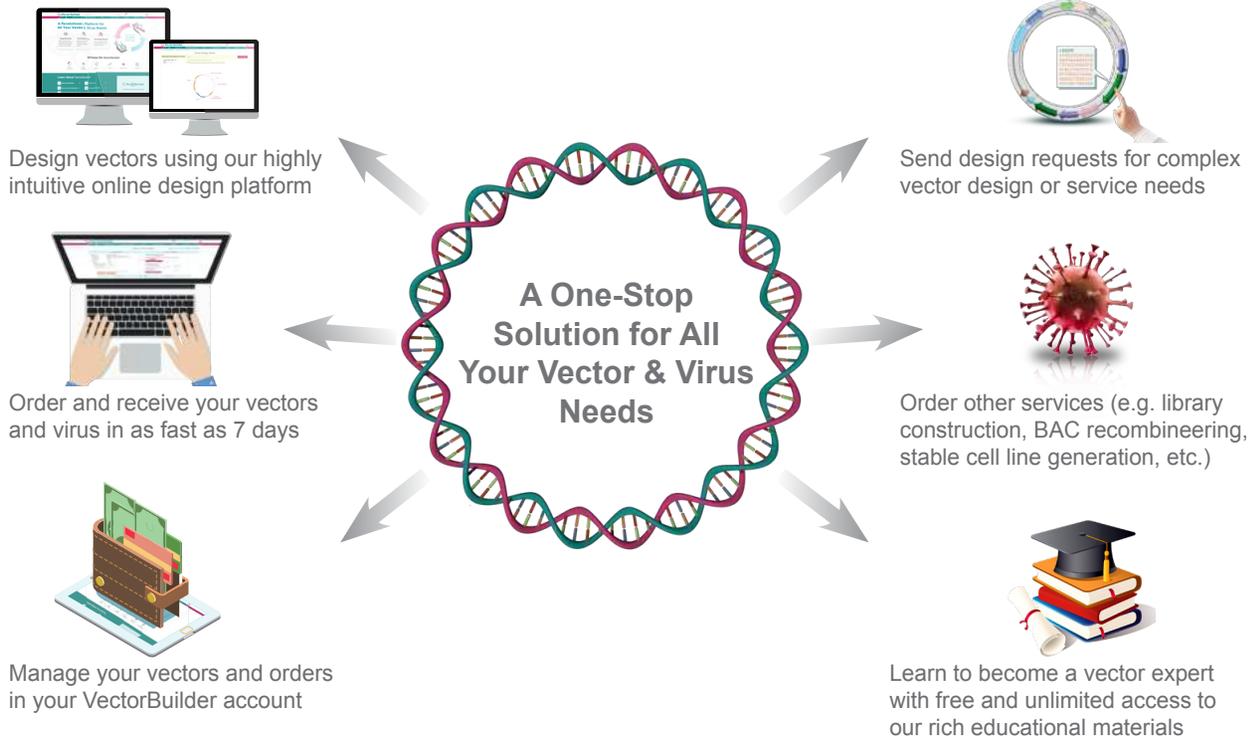
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VectorBuilder's Revolutionary Online Platform



What Can You Do with VectorBuilder



Highlights



Diverse vector systems: >100 standard systems for various applications in multiple model organisms



Expansive collections of vector components: promoters, ORFs, epitope tags, markers, linkers, peptide signals, whole-genome shRNA, and gRNA databases



Bioinformatic tools for codon optimization, sequence alignment, shRNA, and CRISPR target design



Streamlined online shopping experience: fast checkout, easy order tracking, versatile payment options, and dedicated customer service

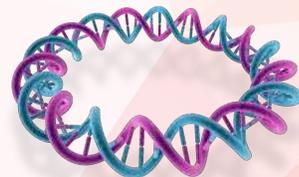


Highly affordable prices and rapid turnaround



Robust production and comprehensive QC for release

**A vector is just a reagent, not a research project.
Let VectorBuilder do the cloning for you!**



How to Design a Vector Using VectorBuilder

To design a vector, just follow the simple steps below.

1 Go to the www.VectorBuilder.com homepage:

- Click **Design My Vectors** to start designing your own vector.
- You can quickly search our pre-designed and premade gene overexpression, shRNA knockdown, and CRISPR vectors by looking up your gene of interest through **Find Popular Vectors**.
- If you can't design your desired vector, click **Send Design Request** to ask our scientists to design your vector for you.

2 Next, on the **Choose Vector System for Vector Design** page:

- Choose from >100 vector backbones for a wide range of applications in multiple model organisms.
- Overexpression, shRNA, CRISPR, enhancer/promoter testing, in vitro transcription, recombinant protein expression, homologous recombination, etc.
 - Mammalian, zebrafish, Drosophila, plant, yeast, bacteria, etc.

All-Purpose Gene Expression			
• Regular plasmid	Guide	From \$159	Go to Design
• Lentivirus	Guide	From \$159	Go to Design
• Adenovirus	Guide	From \$159	Go to Design
• AAV	Guide	From \$159	Go to Design
• MMLV retrovirus	Guide	From \$159	Go to Design
• MSCV retrovirus	Guide	From \$159	Go to Design
• PiggyBac	Guide	From \$159	Go to Design
• Tol2	Guide	From \$159	Go to Design
• Sleeping Beauty	Guide	From \$159	Go to Design

3 Next, On the **Vector Design Studio** page:

Add your desired vector components, such as promoter, ORF, marker, etc.

You can express up to four ORFs as a single polycistron, separated by linkers of your choice such as 2A or IRES.

You can also edit your ORF to introduce mutations and add epitope tags.

After you have added all the desired vector components, click **Finish Design**.

*** Sequence:**
Full length: 1162 Residue: 251-260 (length: 10) Copy full sequence

```

241 GCCTGGCCTC TTTACGGGT ATGGCCCTTG CGTGCCTTGA ATTACTTCCA CCTGGCTGCA GTACGTGATT CTTGATCCCG
323 AGCTTGGGG TGGAAAGTGGG TGGGAGAGTT CGAGGCCCTTG CGCTTAAGGA GCCCCTTCGC CTCGTGCTTG AGTTGAGGCC
401 TGGCCTGGGC GCTGGGGCCG CCGCGTGCGA ATCTGGTGGC ACCTTCGCGC CTGTCTCGCT GCTTTCGATA AGTCTCTAGC
481 CATTAAAAAT TTTTATGAC CTGCTGCGAC GCTTTTTTTC TGGCAAGATA GTCTTGTAAG TGCGGGCCAA GATCTGCACA
561 CTGGTATTTC GGTTTTTTGGG GCCGCGGGCG CCGACGGGGC CCGTGCCTCC CAGCGCACAT GTTCGGCGAG GCGGGGCCCTG
641 CGAGCGCGGC CACCGAGAAT CGGACGGGGG TAGTCTCAAG CTGGCCGGCC TGCTCTGGTG CCTGGTCTCG CGCCGCCGTG
721 TATCGCCCCG CCCTGGGCGG CAAGGCTGGC CCGGTCGGCA CCAAGTTGCGT GAGCGGAAAAG ATGGCCGCTT CCCGGCCCTG
801 CTGCAGGGAG CTCAAAATGG AGGACGCGGC GCTCGGGAGA GCGGGCGGGT GAGTCACCCA CACAAAGGAA AAGGGCCTTT
881 CCGTCCTCAG CCGTCGCTTC ATGTGACTCC ACGGAGTACC GGGCGCCGTC CAGGCACCTC GATTAGTCTT CGAGCTTTTG
961 GAGTACCTCG TCTTTAGGTT GGGGGGAGGG GTTTTATGCG ATGGAGTTTC CCCACACTGA GTGGGTGGAG ACTGAAGTTA
1041 GGCAGCTTG GCACCTTATG TAATTCTCCT TGGAAATTCG CCTTTTTGAG TTTGGATCTT GGTTCATTCT CAAGCCTCAG
1121 ACAGTGGTTC AAAGTTTTTT TCTTCCATT T CAGGTGCTGT GA
    
```

Deleted from original sequence:
11-27
CCCGTCAGTGGGCAGAG

Buttons: Add tag, Translate, Find ORF, View Opposite Strand, Clear Edits

ORF:

Guide to protein tags »

Epitope tag
 FLAG ▾ 3xFLAG ▾ HA ▾ Myc ▾ V5 ▾

Purification tag
 6xHis ▾ 10xHis ▾ Strep_tag_II ▾ Twin_Strep_tag ▾ S_tag ▾ MBP ▾ GST ▾ Avi ▾ Halo ▾ Halo-TEV ▾

4 Lastly, you arrive at the **Vector Information** page, where you can:

- View complete vector map and sequence with full annotation.
- Order cloning service for the vector and downstream services such as virus packaging.
- Order related products such as control vectors.
- Save the vector to your account and share it with colleagues.
- Download a vector report in several file formats.

Vector Information

[Share with my colleagues:](#)

Vector Summary

Vector ID : VB200526-1051rjx [?](#)
Vector Name : pLV[Exp]-CMV>EGFP [?](#)
Vector Type : Mammalian Gene Expression Lentiviral Vector [Guide](#) [?](#)
Vector Size : 7495 bp
Viral Genome Size : 4020 bp
Promoter : CMV
ORF : EGFP
Plasmid Copy Number : High
Antibiotic Resistance : Ampicillin
Vector Description : [\[Edit\]](#)

Vector Report : [PDF](#) [GenBank](#) [FASTA](#) [SnapGene](#) [?](#)

[Back to Edit](#) [Save This Vector](#) [?](#)

Designed on VectorBuilder

Order Information

Vector construction service [?](#)

- Deliverable : E. coli stock
- Cloning Host Strain : VB UltraStable (or alternative strain) [?](#)

Price : \$159.00 **Estimated turnaround:** 10-16 days [?](#)

[Add to cart](#)

Downstream services [?](#)

- Plasmid DNA Preparation From \$39.00
- Lentivirus Packaging From \$399.00

Related products [?](#)

- Control Vectors From \$99.00

[View Details](#)

Vector Map

VB200526-1051rjx

pLV[Exp]-CMV>EGFP...
7495 bp

[Download Image](#)

Vector Sequence

Full length: 7495 Residue: 1

```

1  AATGTAGTCT  TATGCAATAC  TCTTGTAGTC  TTGCAACATG  GTAACGATGA
51  GTTAGCAACA  TGCCTTACAA  GGAGAGAAAA  AGCACCGTGC  ATGCCGATTG
101  GTGGAAGTAA  GGTGGTACGA  TCGTGCCTTA  TTAGAAGGCG  AACAGACGGG
151  TCTGACATGG  ATTGACGAAA  CCACCTGAAT  GCGGCATTGC  AGAGATATTG
201  TATTTAAGTG  CCTAGCTCSA  TACATAAACG  GGTCTCTCTG  GTTAGACCAG
251  ATCTGAGCCT  GGGAGCTCTC  TGGCTAACTA  GGAACCCAC  TGCTTAAGCC
301  TCAATAAAGC  TTGCCTTGAG  TGCTTCAAGT  AGTGTGTGCC  CATCTGTTGT
351  GTGACTCTGG  TAAC TAGAGA  TCCCTCAGAC  CCTTTTAGTC  AGTGTGGAAA
401  ATCTCTAGCA  GTGGCGCCCG  AACAGGACT  TGAAGCGAA  AGGGAACCA
451  GAGGAGCTCT  CTGACGCGAG  GACTCGGCTT  GCTGAAGCGC  GCACGGCAAG
501  AGCGAGGGGG  CGGCGACTGG  TGAGTACGCC  AAAAAATTTG  ACTABCGGAG
551  GCTAGAAGGA  GAGAGATGGG  TGCAGAGCG  TCAGTATTTA  GCGGGGGAGA
601  ATTAGATCGC  GATGGGAAAA  AATTCGGTTA  AGGCCAGGGG  GAAAGAAAAA
651  ATATAATTA  AAACATATAG  TATGGCAAG  CAGGGAGCTA  GAACGATTGG
701  CAGTTAATCC  TGGCCTGTTA  GAAACATCAG  AAGGCTGTAG  ACAAACTACTG
751  GGACAGCTAC  AACATCCCT  TCAGACAGGA  TCAGAAAGAC  TTAGATCATT
801  ATATAATACA  GTAGCAACCC  TCTATTGTGT  GCATCAAGG  ATAGAGATAA
851  AAGACACCA  GGAAGCTTTA  GACAAGATAG  AGGAAGAGCA  AAACAAAAGT
901  AAGACACCG  CACAGCAAGC  GGCCGCTGAT  CTTAGACCT  GGAGAGGAG
951  ATATGAGGGA  CAATTGGAGA  AGTGAATTAT  ATAAATATA  AGTAGTAAAA
1001  ATTGAACCAT  TAGGAGTAG  ACCCAACAG  GCAAAGAGAA  GAGTGGTGCA
1051  GAGAGAAAA  AGAGCAGTGG  GAATAGGAGC  TTTGTTCTCT  GGGTCTTTGG
1101  GAGCAGCAGG  AAGCACTATG  GCGCAGCGT  CAATGACGCT  GACGGTACAG
                    
```

Vector Components

Name	Position	Size (bp)	Type	Description	Application notes	View
RSV promoter	1-229	229	Promoter	Rous sarcoma virus enhance r/promoter	Strong promoter; drives transcription of viral RNA in packaging cells.	View Details
5' LTR-ΔU3	230-410	181	LTR	Truncated HIV-1 5' long terminal repeat	Allows transcription of viral RNA and its packaging into virus.	View Details
Ψ	521-565	45	Miscellaneous	HIV-1 packaging signal	Allows packaging of viral RNA into virus.	View Details
RRE	1075-1308	234	Miscellaneous	HIV-1 Rev response element	Rev protein binding site that allows Rev-dependent nuclear export of viral RNA during viral packaging.	View Details
cPPT	1803-1920	118	Miscellaneous	Central polypurine tract	Facilitates the nuclear import of HIV-1 cDNA through a central DNA flap.	View Details

How to Order on VectorBuilder



Design your vector on www.VectorBuilder.com.

- Design a vector yourself on VectorBuilder.com.
- OR
- Send a design request to our experts.



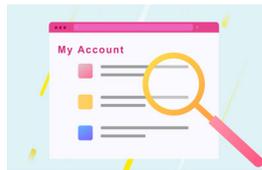
View your final vector design on the [Vector Information](#) page.

- View price and turnaround time.
- Add vector to shopping cart.
- Add downstream services such as virus packaging.



Open the [Shopping Cart](#) page and place your order.

- Get an official quote and use it to place your order by PO.
- OR
- Purchase directly by credit card or using store credit.



Track your order online.

- Monitor the production status and get the estimated completion date for your order.
- OR
- Chat with our project managers to get detailed updates on your project.



Receive your vector shipment.

- Your vector is sequence verified.
- Your virus titer is fully validated.

Account Management and Online Tracking

[Home](#) > [My Account](#) > [My Business](#) > [Orders](#)

My Saved Designs

- Vectors
- Service Proposals

My Inquiries

- Price Inquiries
- Design Requests

My Business

- Quotes
- Orders**
- Invoices
- Order Requests
- Store Credit

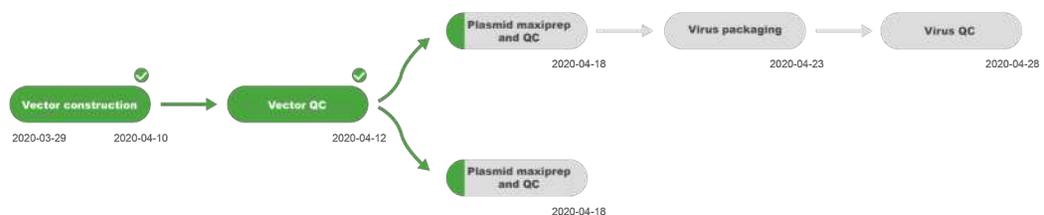
My Information

- Message Center
- Profile
- Address
- Credit Card

Orders

	Sales Order #	Project Tracking #	Price (USD)	PO File	Payment	Date Last Updated	Status	Tracker	Monday Tracker
	S200329-1012qgy	T200328-1017fcd	\$1,737.00			2020-03-29	In Production	Track	
	S200223-1002jes	T200218-1014jpk	\$1,973.00			2020-03-12	Completed	Track	

Project Timeline



Molecular Biology Products & Services



Vector Construction

As the world's largest provider of custom vector cloning services, VectorBuilder can make virtually any vector tailored to your research needs.

Highlights

- Over 100 vector systems optimized through extensive R&D work
- Unlimited customization options with expansive collections of vector components including promoters, ORFs, markers, etc.
- Available in both viral and non-viral formats
- Available for a variety of model organisms including mammals, zebrafish, Drosophila, plants, bacteria, and yeast

Detailed descriptions of our vector construction services, including ordering information, are available on VectorBuilder's website under "**Products & Services**".

Vector Systems Offered Online

Mammalian Gene Expression Vectors (From \$159)	All-Purpose Gene Expression	Regular plasmid
		Lentivirus
		Adenovirus
		AAV (scAAV available)
		MMLV retrovirus
		MSCV retrovirus
		PiggyBac
		Tol2
		Sleeping Beauty
	Inducible Gene Expression (Tet Based)	Regular plasmid
		Lentivirus
		AAV
	Conditional Gene Expression (Cre-Lox Based)	PiggyBac
		Regular plasmid (LoxP-Stop-LoxP)
		PiggyBac (LoxP-Stop-LoxP)
Regular plasmid (FLEX)		
Lentivirus (FLEX)		
Adenovirus (FLEX)		
AAV (FLEX)		
PiggyBac (FLEX)		
Tol2 (FLEX)		
Mammalian Non-Coding RNA Expression Vectors (From \$159)	Regular plasmid	
	Lentivirus	
	Adenovirus	
	AAV (scAAV available)	
	MMLV retrovirus	
	MSCV retrovirus	
	PiggyBac	
	Tol2	
Mammalian shRNA Knockdown Vectors (From \$99)	U6-Based shRNA	Regular plasmid
		Lentivirus
		Adenovirus
		AAV (scAAV available)
		PiggyBac
	miR30-Based shRNA (Single or Multiple shRNA)	Regular plasmid
		Lentivirus
		Adenovirus
		AAV
		PiggyBac
	shRNA Sensor Vectors (for Testing shRNA Specificity)	Tol2
		Lentivirus (sensor only)
		Lentivirus (shRNA and sensor in a single vector)

Mammalian CRISPR Gene Editing Vectors (From \$99)	gRNA and Cas9 Coexpression (Single or Dual gRNA)	Regular plasmid
		Lentivirus
		Adenovirus
		AAV
		PiggyBac
	gRNA Expression (Single or Dual gRNA)	Regular plasmid
		Lentivirus
		Adenovirus
		AAV (scAAV available)
		PiggyBac
	Cas9 Expression	Regular plasmid
Lentivirus		
Adenovirus		
AAV		
PiggyBac		
gRNA Sensor Vector (for Testing gRNA Specificity)	Regular plasmid	
	Gene Targeting Donor Vectors	
Gene Targeting Donor Vectors	For gene knockout	
	For gene knockin	
Mammalian CRISPR Gene Regulation Vectors (From \$99)	CRISPR-Based Gene Activation (SAM, SunTag, VPR)	Lentivirus AAV
	CRISPR-Based Gene Inhibition	Lentivirus
Enhancer/Promoter Testing Vectors (From \$99)	For In Vitro Testing	Regular plasmid (for enhancer testing)
		Regular plasmid (for promoter testing)
	For In Vivo Testing	Regular plasmid (for enhancer testing)
		Regular plasmid (for promoter testing)
		PiggyBac (for enhancer testing)
		PiggyBac (for promoter testing)
Zebrafish Gene Expression Vectors (From \$159)	Tol2	
Zebrafish CRISPR Vectors (From \$99)	gRNA and Cas9 Coexpression	Tol2
	gRNA Expression	Tol2
	Cas9 Expression	Tol2
Drosophila Transformation Vectors (From \$159)	P Element-Based Vector (pUAST)	
	PhiC31-Based Vector (pUASTattB)	
	P Element and PhiC31-Based Vector (pUASTB)	
Drosophila CRISPR Gene Editing Vectors (From \$99)	gRNA Expression	pattB
	Cas9 Expression	P element-based vector (pUAST)
		PhiC31-based vector (pUASTattB)
		P element and phiC31-based vector (pUASTB)
	Gene Targeting Donor Vectors	For gene knockout with attP landing pad
Scarless		

Plant Gene Expression Vectors (From \$159)	T-DNA Binary Vector (for Plant Transformation)	
	Regular plasmid (for Electroporation of Plant Protoplasts)	
Recombinant Protein Expression Vectors (From \$159)	Bacteria	pET
		pBAD
		Cold-shock induced
	Yeast	Pichia pastoris
		Saccharomyces cerevisiae
	Insect	Baculovirus transfer vector (single promoter)
Baculovirus transfer vector (dual promoters)		
In Vitro Transcription Vectors (From \$99)	For mRNA	
	For In Situ Hybridization	
	For Small RNA	

Price and Turnaround Time

VectorBuilder offers top-quality vector construction services at unbeatable prices with rapid turnaround time. Price and turnaround time are based on the criteria below.



Vector cloning starts at just **\$99**
as fast as **7 days**



Basic vectors

These are vectors built from VectorBuilder's standard backbones and standard components.

Vector Type	Price (USD)	Turnaround
shRNA vector	\$99	7-14 days
CRISPR vector (single-gRNA)	\$99	7-14 days
CRISPR vector (dual-gRNA)	\$289	13-21 days
Expression vector	\$159	10-16 days

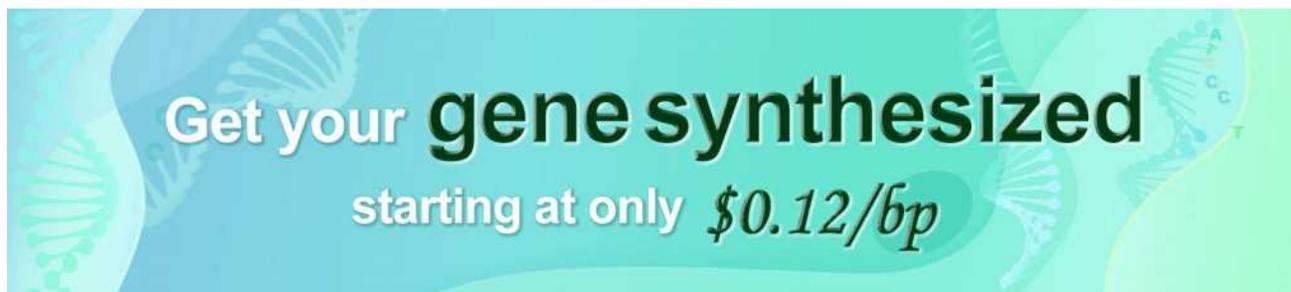
Complex vectors

These are vectors using VectorBuilder's standard backbones, which contain complex components that need to be created. They typically require multiple steps to build, and often involve complicated procedures such as amplification of large fragments from template DNA, fusion of multiple fragments, de novo gene synthesis, and targeted mutagenesis.

Additional prices and turnaround times for complex vectors:

Cloning Procedure	Additional Price (USD)	Additional Turnaround
Insertion of 1 PCR fragment (≤ 7 kb)	\$ 80	5-10 days
Insertion of 2 fused PCR fragments (≤ 7 kb)	\$100	5-11 days
Insertion of 3 fused PCR fragments (≤ 7 kb)	\$130	5-12 days
Insertion of 4 fused PCR fragments (≤ 7 kb)	\$160	5-14 days
Insertion of 5 fused PCR fragments (≤ 7 kb)	\$180	5-19 days
De novo gene synthesis (≤ 1.5 kb)	\$0.12/bp*	6-10 days
De novo gene synthesis (1.5-3 kb)	\$0.14/bp*	10-14 days
De novo gene synthesis (3-5 kb)	\$0.16/bp*	10-16 days
De novo gene synthesis (5-7 kb)	\$0.18/bp*	16-20 days
Mutagenesis	from \$100/site	7-9 days

* The de novo gene synthesis fee may be higher **when** 1) the fragment contains regions that are difficult to synthesize such as high GC content, simple repeats or segmental repeats; 2) fewer than three DNA fragments are synthesized.



Mutagenesis (for Vectors)

If you need to introduce mutations into your vectors, whether for knocking out gene function, mapping protein functional domains, or characterizing gene regulatory elements, VectorBuilder can construct your mutant vectors at unbeatable prices and with rapid turnaround.

Highlights

- Variety of options including base substitutions, insertions, deletions, and more
- Delivered as E. coli stock to save your time on retransformation
- 100% sequence verified

Detailed descriptions of our mutagenesis services, including ordering information, are available on VectorBuilder's website under "Products & Services".

Plasmid DNA Preparation

High quality plasmid DNA is integral to many molecular biology techniques including cloning, transfection, transformation, virus packaging, mutagenesis, protein production, Southern blot etc. VectorBuilder's plasmid DNA preparation services allow you to obtain high-quality plasmid DNA on a desired scale in a rapid and cost-effective way.

Detailed descriptions of our plasmid DNA preparation services, including ordering information, are available on VectorBuilder's website under "Products & Services".

Price and Turnaround Time

Scale	Deliverable	Price (USD)	Turnaround	Application
Miniprep	DNA (>200 ng/ul, 50 ul, 1x TE buffer)	\$39	3-5 days	Molecular biology
Midiprep	DNA (> 1 ug/ul, 100 ul, 1x TE buffer, endotoxin-free, sterile)	\$69	4-6 days	Molecular biology and cell culture
Maxiprep	DNA (>1 ug/ul, 300 ul, 1x TE buffer, endotoxin-free, sterile)	\$109	4-6 days	
Megaprep	DNA (>1 ug/ul, 1 ml, 1x TE buffer, endotoxin-free, sterile)	\$199	4-6 days	
Gigaprep	DNA (>1 ug/ul, 10 ml, 1x TE buffer, endotoxin-free, sterile)	\$759	6-8 days	

Animal-Free Plasmid Preparation

VectorBuilder now offers animal-free plasmid DNA that is free of TSE/BSE. We have optimized our production processes to eliminate the use of any animal-derived components, providing you with superior-quality plasmid DNA suitable for various applications.

Highlights

- High-quality plasmid DNA free of TSE/BSE
- Prepared using culture media containing plant-based tryptone substitute
- Purified via non-enzymatic processes to circumvent RNase usage
- Provided with TSE/BSE statement

Pooled Library Construction



Pooled Library Construction starts at **\$3,000**

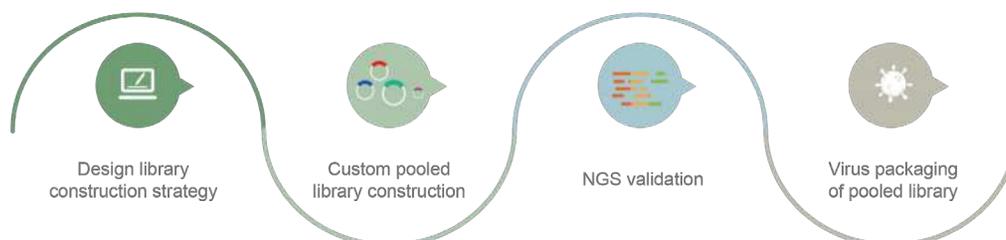
VectorBuilder can help you custom build pooled libraries, such as CRISPR or shRNA libraries, to perform large-scale functional screens. We can deliver your library as E. coli stock, DNA or packaged virus. Our custom libraries are fully validated by next-generation sequencing to ensure uniform clone representation and low error rates.

Detailed descriptions of our pooled library construction services, including ordering information, are available on VectorBuilder's website under "**Products & Services**".

Libraries Offered

- CRISPR libraries (knockout, CRISPRa/i)
- shRNA libraries
- Barcode libraries
- cDNA libraries
- Enhancer/promoter libraries
- Protein interaction libraries (two-hybrid system)
- Libraries compatible with single cell sequencing technology (e.g. CROP-seq, Perturb-seq)

Workflow of Pooled Library Construction



Services Offered

Service	Brief Description	Price (USD)	Turnaround
Custom library construction strategy design		Free	1-4 days
Custom pooled library construction	Includes high-efficiency cloning of variable regions into desired vector backbone, and preliminary validation of the plasmid pool by Sanger sequencing.	From \$3,000	4-6 weeks
Amplification of premade plasmid library pool	The plasmid pool is transformed into E. coli cells with an average of >100x representation, and E. coli glycerol stocks are prepared for long-term storage.	From \$300	3-5 days
Library DNA preparation	>1 ug/ul, 150 ul, 1xTE buffer, endotoxin-free, sterile	\$109	4-6 days
Virus packaging of pooled library	Please see "Virus Packaging" on page 20.		
NGS validation of pre-made plasmid library pool	We can validate the quality of your premade plasmid library pool by NGS before and/or after amplification. This includes NGS library preparation from plasmid pool, Illumina sequencing, and data analysis.	From \$300	3-4 weeks
NGS deconvolution of post-screening sample	Includes NGS library preparation from genomic DNA of screened cells, Illumina sequencing, and data analysis.	From \$250 per sample	5-7 weeks
Other custom library construction	Please inquire.		

Premade shRNA Libraries and CRISPR Libraries



VectorBuilder.com

For a limited time
50% *off for premade*

shRNA and CRISPR libraries

VectorBuilder offers premade whole-genome shRNA libraries and dual-gRNA CRISPR libraries for human and mouse.

Highlights

- Genome-wide targeting
- High complexity
- High uniformity
- Fully validated by NGS
- Ready-to-use high titer lentivirus
- Dual marker for efficient and versatile selection

Premade shRNA libraries

VectorBuilder offers high-quality, pooled shRNA lentivirus libraries targeting human and mouse genes at two scales: Whole Genome (~19,000 RefSeq genes) and Elite Gene (~2,000 most frequently cited genes on PubMed Central).

Product	Target Genes	No. of shRNAs	Scale	Price (USD)
Human Elite Gene Pooled shRNA Library	2,161	12,471	Medium (>1.0x10 ⁸ TU/ml, 1 ml)	\$2,499 \$4,999
Mouse Elite Gene Pooled shRNA Library	2,233	12,472	Medium (>1.0x10 ⁸ TU/ml, 1 ml)	\$2,499 \$4,999
Human Whole Genome Pooled shRNA Library	18,432	92,917	Medium (>1.0x10 ⁸ TU/ml, 1 ml)	\$2,499 \$4,999
			Plus (>1.0x10 ⁸ TU/ml, 5 ml)	\$7,499 \$14,999
Mouse Whole Genome Pooled shRNA Library	19,790	92,917	Medium (>1.0x10 ⁸ TU/ml, 1 ml)	\$2,499 \$4,999
			Plus (>1.0x10 ⁸ TU/ml, 5 ml)	\$7,499 \$14,999

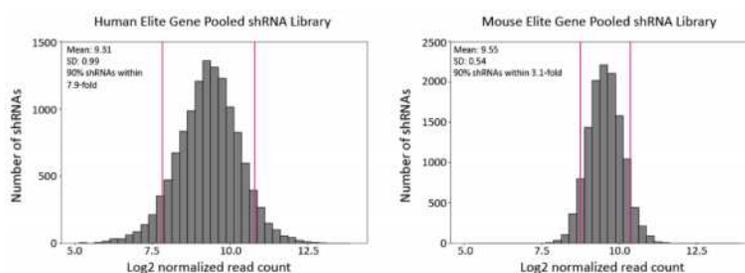


Figure 1. Representation of shRNAs in different pooled plasmid libraries.

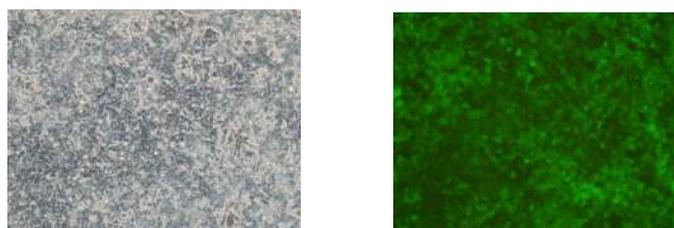


Figure 2. EGFP marker expression in 293T cells transduced with Human Elite Gene Pooled shRNA Library (MOI=10) after 4 days of puromycin selection (1.5 ug/ml). Magnification: 200X.

Premade dual-gRNA CRISPR knockout libraries

VectorBuilder offers the only commercially available dual-gRNA lentivirus libraries for CRISPR-based whole-genome knockout screens in human and mouse cells. Each CRISPR vector contains a pair of gRNAs targeting the same gene. When introduced into Cas9-expressing cells, each vector can produce two cuts on the same target gene. Attempts by cells to repair the broken ends of the two cut sites would typically lead to a large deletion spanning the two sites. The two cut sites are designed to flank a functionally important region of the target gene such that a deletion spanning them would most likely lead to the loss of gene function. Dual-gRNA libraries are more powerful than single-gRNA libraries for knockout screens because the introduction of large deletions by these libraries can have much higher efficiencies in generating loss-of-function mutations.

Product	Target Genes	No. of gRNA Pairs	Scale	Price (USD)
Human Whole Genome Dual-gRNA Library	20,048	91,926	Medium (>1.0x10 ⁸ TU/ml, 1 ml)	\$3,999 \$7,999
			Plus (>1.0x10 ⁸ TU/ml, 5 ml)	\$8,499 \$16,999
Mouse Whole Genome Dual-gRNA Library	20,493	90,344	Medium (>1.0x10 ⁸ TU/ml, 1 ml)	\$3,999 \$7,999
			Plus (>1.0x10 ⁸ TU/ml, 5 ml)	\$8,499 \$16,999

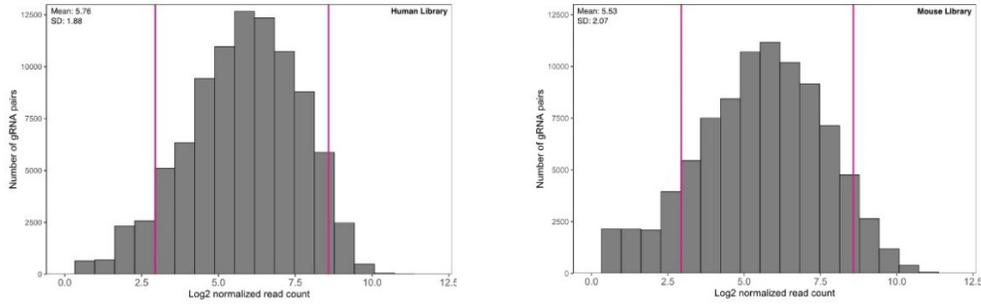


Figure 3. Representation of gRNA pairs in different pooled libraries.

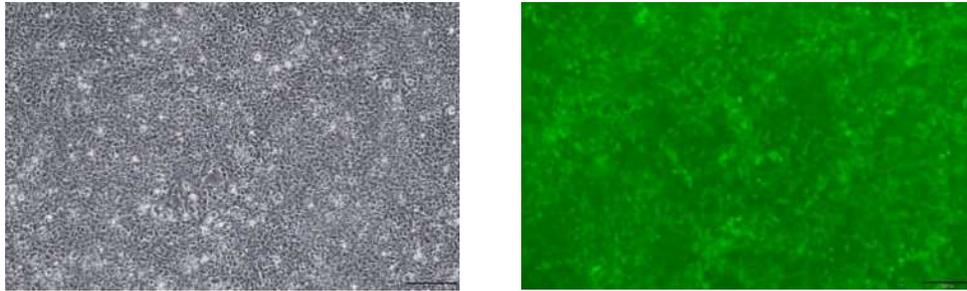


Figure 4. EGFP marker expression in 293T cells transduced with Human Whole-Genome Dual-gRNA Lentivirus Library (MOI=10) after 4 days of puromycin selection (1.5 ug/ml). Magnification: 200X.

BAC Recombineering



BAC recombineering starts at just **\$1,145**

VectorBuilder can fulfill all your BAC recombineering needs with rapid turnaround and unbeatable prices.

Detailed descriptions of our BAC recombineering services, including ordering information, are available on VectorBuilder's website, under "Products & Services".

Services Offered

Service	Price (USD)	Turnaround	Note
Knockin			
EGFP, mCherry, LacZ, GCaMP6s, Luciferase, DTR	\$2,690	42-63 days	Drug-selection cassette used in one-step BAC modification is removed.
	\$3,640	63-84 days	Drug-selection cassette used in one-step BAC modification is removed; piggyBac ITRs are added to BAC backbone.
Cre, CreERT2	\$6,590	98-119 days	Drug-selection cassette used in one-step BAC modification is removed; loxP sites on BAC backbone are removed.
	\$6,590	98-119 days	Drug-selection cassette used in one-step BAC modification is removed; loxP sites on BAC backbone are removed; piggyBac ITRs are added to BAC backbone.
Custom DNA fragment	Please inquire		

Service	Price (USD)	Turnaround	Note
Point mutation			
Custom point mutation	\$5,145	49-77 days	Two-step BAC modification.
	\$6,095	70-98 days	Two-step BAC modification; piggyBac ITRs are added to BAC backbone.
Removal of loxP sites on BAC backbone			
pBACe3.6	\$4,095	63-84 days	The loxP and loxP511 sites on pBACe3.6 backbone may interact with Cre to cause unwanted recombination in the genome.
	\$4,095	63-84 days	In addition to the removal of loxP sites on BAC backbone, piggyBac ITRs are added to BAC backbone.
Other BAC cloning vectors	Please inquire		
Transfer fragment from BAC to plasmid			
pStart-K	\$2,745	35-49 days	Typically, the transferred fragment should not exceed 30 kb.
pStart-K-ITR	\$2,745	35-49 days	Typically, the transferred fragment should not exceed 30 kb; the plasmid backbone has piggyBac ITRs.
Other plasmids	Please inquire		
Add markers or other elements to BAC backbone			
Neo, Puro, piggyBac ITRs	\$1,145	35-42 days	These elements are added to the loxP site on BAC backbone.
Other elements	Please inquire		

Stable Cell Line Generation

VectorBuilder can provide stable cell lines containing customized genetic modifications with unbeatable prices and rapid turnaround times. Let us help you overcome variations associated with transient transfection and deliver reproducible outcomes in experiments requiring ectopic gene expression or endogenous gene modification.

Detailed descriptions of our stable cell line generation services are available on VectorBuilder's website, under "Products & Services".

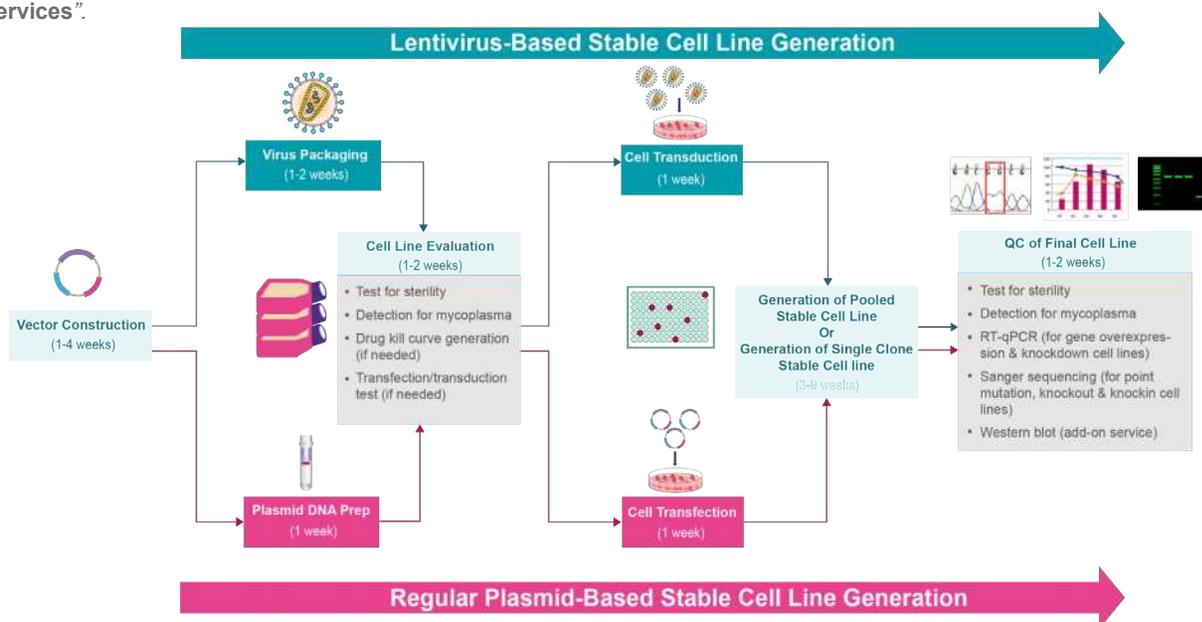


Figure 5. Workflow of transduction-based and transfection-based stable cell line generation approaches.

Highlights

- Variety of modifications available, e.g. gene overexpression, knockdown, knockin, and knockout
- Cell lines generated by chemical transfection, electroporation, or viral transduction as needed
- Screened by drug selection or additional methods for targeted alterations of defined loci
- Gene expression or editing validated by various methods, such as RT-qPCR, Western blot, Sanger sequencing, etc.
- Stringent QC of final cell lines including sterility tests and mycoplasma detection

Services Offered

Stable Cell Line Model	Modification Strategy	Deliverable	Price (USD)	Turnaround
Gene Overexpression	Lentivirus transduction	Pooled Cells	From \$4,136	9-15 weeks
		3 Single Clones	From \$6,135	12-20 weeks
shRNA Gene Knockdown	Lentivirus transduction	Pooled Cells	From \$6,646	8-13 weeks
		3 Single Clones	From \$8,645	11-18 weeks
Gene Knockout	Transient transfection of Cas9 and dual-gRNA	2 Single Clones	From \$6,994	10-16 weeks
	Lentivirus transduction of Cas9 and dual-gRNA	2 Single Clones	From \$7,974	10-17 weeks
Point Mutation	Transient transfection of CRISPR components and donor vector	2 Single Clones	From \$10,112	13-19 weeks
Gene Knockin	Transient transfection of CRISPR components and donor vector	2 Single Clones	From \$11,072	14-19 weeks

VB UltraStable™ Chemically Competent Cells

VB UltraStable™ chemically competent cells are designed for achieving high transformation efficiency ($>1 \times 10^8$ cfu/ug) and propagation of DNA plasmids with unstable elements such as repeated sequences.

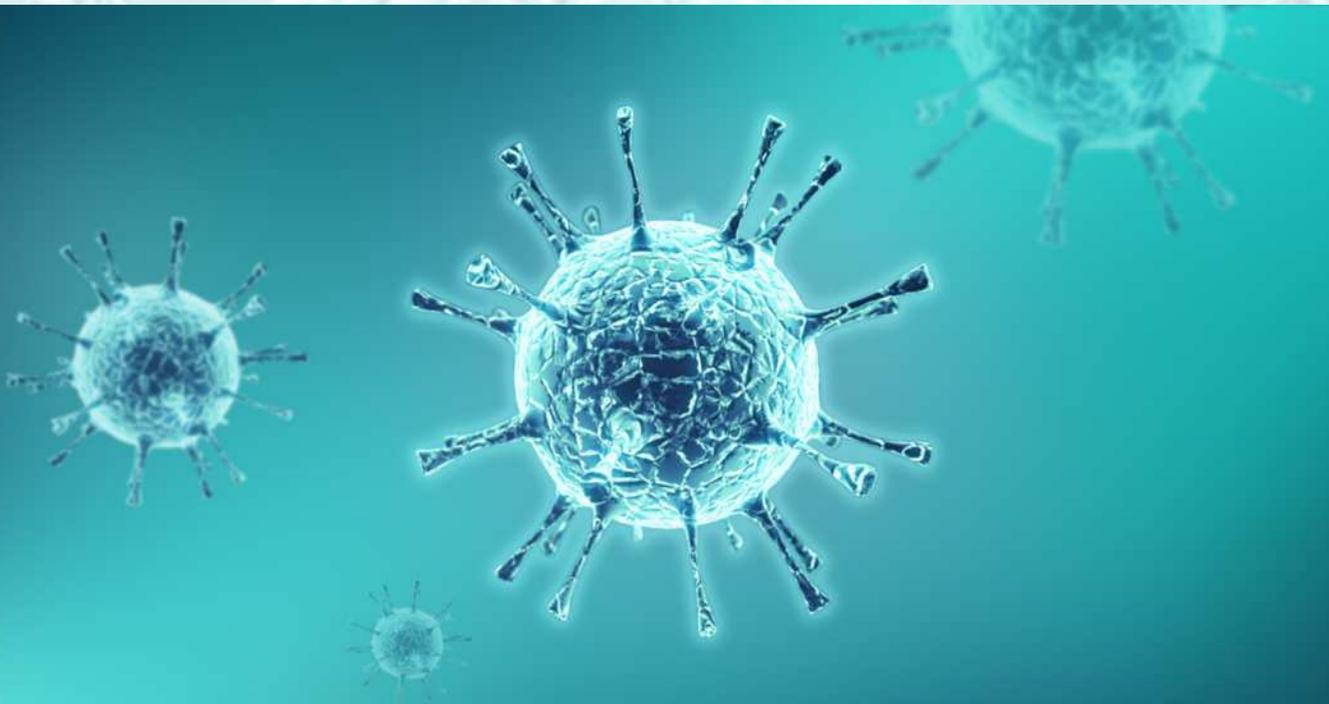


Highlights

- Lacks ability to undergo homologous recombination due to mutations introduced in the recA gene
- Suitable for the cloning and hosting of lentiviral and retroviral vectors, as well as vectors with repeated sequences and unstable fragments
- High efficiency for Gateway Cloning, because cells lack the functional ccdAB operon
- Can produce high quality plasmid DNA due to the endA mutation (plasmids won't be digested by endonuclease)
- T1 phage resistant due to fhuA mutation
- Can be used for blue/white screening because it expresses the omega-fragment of LacZ gene

Product name	Deliverable	Catalog No.	Price (USD)
VB UltraStable™ Chemically Competent Cells	10 x 100 ul	UC001-010	\$169

Virus Packaging Products & Services



Virus Packaging

VectorBuilder has developed a range of proprietary technologies and reagents that greatly improved virus packaging in terms of titer, purity, viability, and consistency. Our packaging protocols are also optimized for the viral vector systems used in our cloning services. As a result, we have a growing base of highly satisfied customers who repeatedly come back to us for their virus packaging needs.

Viruses produced by VectorBuilder undergo a series of QC assays including titration by qPCR or immunoassay, sterility test for bacteria and fungi, mycoplasma detection, transduction test for GOI expression, endotoxin assay (for ultra-purified virus), and SDS-PAGE analysis (for ultra-purified virus). Additional QC assays are available upon request (e.g. ddPCR, full/empty capsid ratio, TCID50, etc.).

Detailed descriptions of our virus packaging services, including ordering information, are available on VectorBuilder's website under "Products & Services".



Virus packaging starts at **\$399**
as fast as **8 days**



Lentivirus

Types of lentivirus offered

- VSV-G pseudotyped second- and third-generation lentivirus
- Integrase-defective lentivirus (IDLV)
- Coronavirus spike (S) protein pseudotyped lentivirus
- Bald lentivirus lacking viral envelope protein

Note: We also offer lentivirus pseudotyping services with other envelop proteins.

Highlights

- Permanent integration of vector DNA
- Very broad tropism targeting dividing and non-dividing cells
- High viral titer
- Customizable internal promoter
- Uniform transduction in cell population
- Effective gene delivery both in vitro and in vivo
- Minimal safety concern due to self-inactivation design

Price and turnaround time

Scale	Application	Typical Titer (TU/ml)	Minimum Titer (TU/ml)	Volume	Price (USD)	Turnaround
Pilot	Cell culture	>4x10 ⁸	>10 ⁸	250 ul (10 x 25 ul)	\$399	8-16 days
Medium		>3x10 ⁸		1 ml (10 x 100 ul)	\$599	
Large		>2x10 ⁹	>10 ⁹	1 ml (10 x 100 ul)	\$999	
Ultra-purified medium	Cell culture & in vivo	>2x10 ⁹	>10 ⁹	500 ul (10 x 50 ul)	\$1,199	
Ultra-purified large				1 ml (10 x 100 ul)	\$1,499	

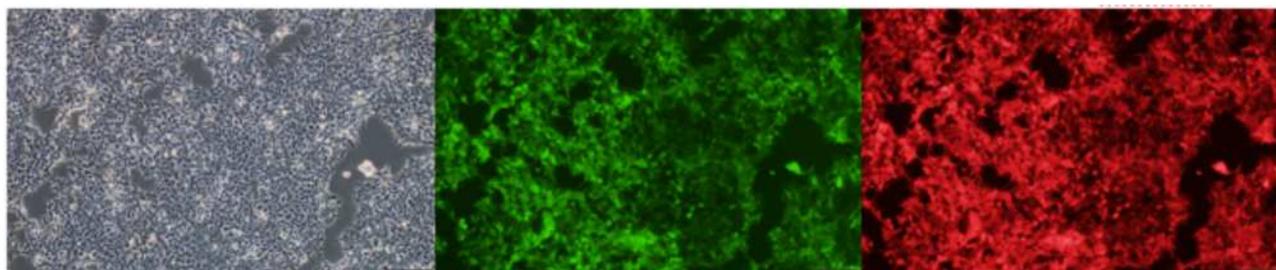


Figure 6. Lentivirus-mediated fluorescent protein expression in 293T cells. Magnification: 100X.

Left: bright field. Middle: EGFP. Right: mCherry.

Adeno-Associated Virus (AAV)

Types of AAV offered

- Second generation AAVs with AAV2 ITRs
- Available serotypes: 1, 2, 3, 4, 5, 6, 6.2, 7, 8, 9, rh10, DJ, DJ/8, PHP.eB, PHP.S, AAV2-retro, AAV2-QuadYF, and AAV2.7m8
- ssAAV (single-stranded AAV) and scAAV (self-complementary AAV)

Highlights

- Non-pathogenic in human
- Low risk of host genome disruption
- Various serotypes with broad tropism
- High viral titer
- Effective gene delivery both in vitro and in vivo

Tissue tropism of popular AAV serotypes

Tissue type	 Smooth muscle	 CNS	 PNS	 Brain	 Retina	 Inner ear	 Spleen	 Liver
Recommended AAV serotypes	AAV1, 2, 3, 5, 6, 7, 8, 9, rh10	AAV1, 2, 4, 5, 7, 8, 9, rh10, PHP.eB	AAV-PHP.S	AAV1, 2, 5, 7, 8, DJ/8	AAV1, 2, 4, 5, 7, 8, 9, rh10, 2.7m8	AAV1, 2, 6.2, 8, 9, 2.7m8	AAV-DJ, DJ/8	AAV1, 2, 3, 6, 6.2, 7, 8, 9, rh10, DJ, DJ/8
Tissue type	 Pancreas	 Heart	 Kidney	 Lung	 Testes	 Adipose	 Spinal nerves	 Endothelial cells
Recommended AAV serotypes	AAV1, 2, 6, 8, 9, rh10	AAV1, 4, 5, 6, 8, 9, rh10, DJ	AAV2, 4, 8, 9, rh10, DJ, DJ/8	AAV1, 3, 4, 5, 6, 6.2, 9, rh10	AAV2, 9	AAV6, 8, 9	AAV2-retro	AAV2-QuadYF

Price and turnaround time

Scale	Application	Typical Titer (GC/ml)	Minimum Titer (GC/ml)	Volume	Price (USD)	Turnaround
Pilot	Cell culture	>10 ¹²	>2x10 ¹¹	250 ul (10 x 25 ul)	\$399	10-20 days
Medium				1 ml (10 x 100 ul)	\$549	
Large				1 ml (10 x 100 ul)	\$999	
Ultra-purified pilot	Cell culture & in vivo	>2x10 ¹³	>10 ¹³	100 ul (4 x 25 ul)	\$1,149	20-30 days
Ultra-purified medium				500 ul (10 x 50 ul)	\$1,649	
Ultra-purified large				1 ml (10 x 100 ul)	\$2,549	

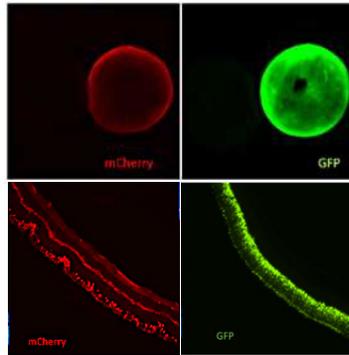


Figure 7. AAV8-mediated tissue-specific mCherry and EGFP expression in mouse retina. (Hoang et al., unpublished data)

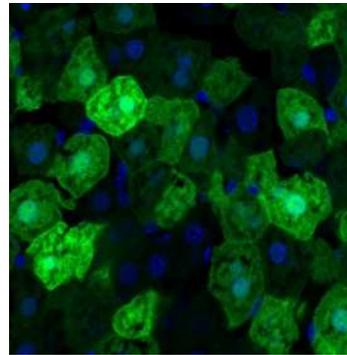


Figure 8. AAV9-mediated EGFP expression in mouse hepatocytes. Magnification: 480X. Green: EGFP. Blue: DAPI.

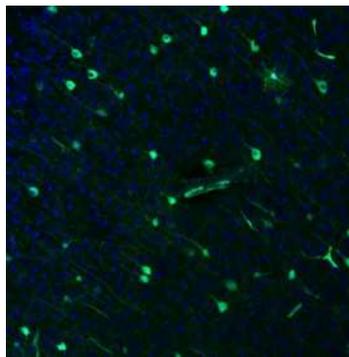


Figure 9. AAV9-mediated EGFP expression in mouse cortical neurons. Magnification: 120X. Green: EGFP. Blue: DAPI.

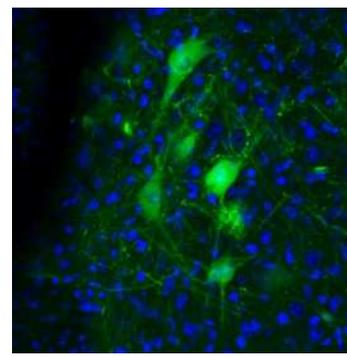


Figure 10. AAV9-mediated EGFP expression in mouse motor neurons. Magnification: 240X. Green: EGFP. Blue: DAPI.

AAV serotype testing panel

VectorBuilder now offers an AAV serotype testing panel enabling you to select the optimal serotype for specific applications via systematic comparison of a variety of serotypes in cells or in animals.

A powerful tool kit for determining the suitable AAV serotype for your needs



- High-titer, ready-to-use, EGFP expressing AAVs
- Flexibility to select any 3 or more serotypes of your choice
- Large collection of AAV serotypes to select from
- In vitro and in vivo grade panels available
- Prices starting at only \$177 for in vitro panel and \$327 for in vivo panel

Product	Application	Titer & Volume Per Unit	Unit Price (USD)
In vitro grade AAV serotype testing panel (EGFP)	Cell culture	~10 ¹² GC/ml, 25 ul	\$59 per aliquot
In vivo grade AAV serotype testing panel (EGFP)	Cell culture & in vivo	~10 ¹³ GC/ml, 25 ul	\$109 per aliquot

Adenovirus

Types of adenovirus offered

- Human Ad5
- Chimeric Ad5/F35 adenovirus

Highlights

- Low risk of host genome disruption
- Very high viral titer
- Broad tropism
- Large cargo space
- Effective gene delivery both in vitro and in vivo
- Low safety concern

Price and turnaround time

Scale	Application	Titer (PFU/ml)	Volume	Price (USD)	Turnaround
Pilot	Cell culture	$>10^{10}$	250 ul (10 x 25 ul)	\$399	20-32 days
Medium			1 ml (10 x 100 ul)	\$599	
Large		$>10^{11}$	1 ml (10 x 100 ul)	\$999	
Ultra-purified large	Cell culture & in vivo	$>10^{12}$	1 ml (10 x 100 ul)	\$1,499	22-36 days

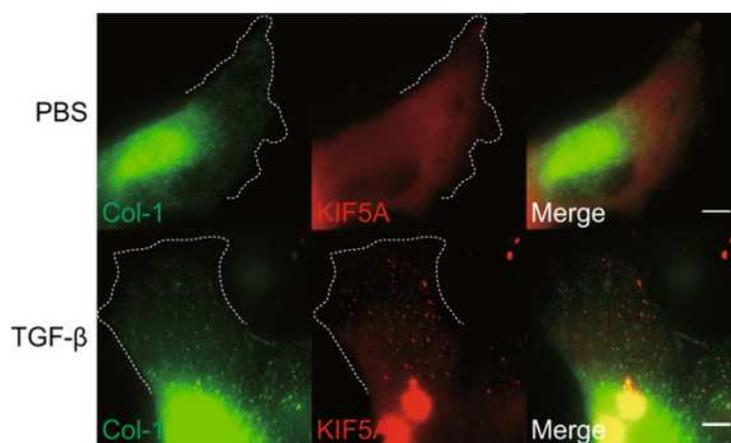


Figure 11. Adenovirus-mediated gene expression in human pleural mesothelial cells. (Sci Rep. 2017; 7:4556)

MMLV Retrovirus

Types of MMLV retrovirus offered

- VSV-G pseudotyped MMLV retrovirus

Price and turnaround time

Scale	Application	Titer (TU/ml)	Volume	Price (USD)	Turnaround
Pilot	Cell culture	$>10^7$	250 ul (10 x 25 ul)	\$399	8-16 days
Medium			1 ml (10 x 100 ul)	\$599	
Large		$>10^8$	1 ml (10 x 100 ul)	\$999	
Ultra-purified large	Cell culture & in vivo	$>10^8$	1 ml (10 x 100 ul)	\$1,499	

MSCV Retrovirus

Types of MSCV retrovirus offered

VSV-G pseudotyped MSCV retrovirus

Price and turnaround time

Scale	Application	Titer (TU/ml)	Volume	Price (USD)	Turnaround
Pilot	Cell culture	$>10^7$	250 ul (10 x 25 ul)	\$399	8-16 days
Medium			1 ml (10 x 100 ul)	\$599	
Large		$>10^8$	1 ml (10 x 100 ul)	\$999	
Ultra-purified large	Cell culture & in vivo	$>10^8$	1 ml (10 x 100 ul)	\$1,499	

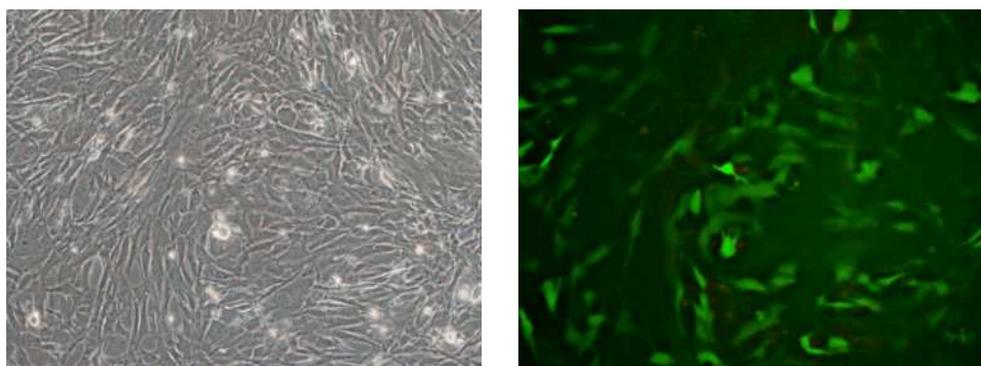


Figure 12. MSCV-mediated EGFP expression in mouse mesenchymal stem cells.
Magnification: 100X. Left: Bright field. Right: EGFP.

Baculovirus

Types of baculovirus offered

Baculovirus strain AcMNPV (Autographa californica multicapsid nucleopolyhedrovirus)

Price and turnaround time

Scale	Application	Titer (PFU/ml)	Volume	Price (USD)	Turnaround
Medium	Cell culture	$>10^6$	1 ml (10 x 100 ul)	\$599	15-22 days
Large		$>10^7$		\$999	22-29 days

Featured Offerings



CRISPR Genome Editing Solutions

VectorBuilder offers a variety of CRISPR products and services for in vitro and in vivo genome editing experiments at unbeatable prices and with rapid turnaround. Additionally, our online vector design platform features a free and user-friendly CRISPR design tool that allows you to design CRISPR vectors with high targeting efficiency.

Detailed descriptions of our CRISPR genome editing services, including ordering information, are available on VectorBuilder's website under "Products & Services".

Highlights

- Free & easy-to-use CRISPR design tool with whole-genome gRNA databases for popular species
- Various delivery approaches available (plasmid DNA, virus, RNA, and protein)
- Huge collection of backbones (regular plasmid, lentivirus, AAV, adenovirus, and piggyBac)
- Premade and custom-made CRISPR library options
- Powerful technical support for experimental design, data analysis, and troubleshooting

Our CRISPR Offerings

Custom CRISPR vectors

Vector Type	Price (USD)	Turnaround
gRNA and Cas9* coexpression vectors	From \$99	7-14 days
gRNA expression vectors	From \$99	7-14 days
Cas9* expression vectors	From \$159	10-16 days
Gene targeting donor vectors	From \$849	20-30 days
CRISPR-based gene activation vectors	From \$99	7-14 days
CRISPR-based gene inhibition vectors	From \$99	7-14 days
gRNA sensor vectors	From \$239	15-26 days

*We offer a variety of Cas9 variants including hCas9, Cas9_D10A, SaCas9, and many others.

Premade CRISPR vectors

Vector Type	Price (USD)
Cas9 expression vectors	From \$159
Scramble gRNA control vectors	From \$99
Cas9 and scramble gRNA coexpression vectors	From \$99
CRISPRa and CRISPRi helper vectors	From \$159

CRISPR virus

Lentivirus, AAV, and adenovirus are widely used to deliver CRISPR components into mammalian cells. VectorBuilder offers premium-quality virus packaging services for lentivirus, AAV, and adenovirus for achieving highly efficient CRISPR targeting in difficult-to-transfect cells. (See page 20 for detailed information on our virus packaging services.)

Cas9 mRNA and gRNA

VectorBuilder can provide transfection-ready and microinjection-ready Cas9 mRNA and gRNA specifically designed against user-selected target sites for easy RNA-based delivery of CRISPR components into mammalian cells.

Reagent	Concentration & Volume	Price (USD)	Turnaround
hCas9 mRNA	>500 ng/ul, 25 ul	\$349	3-5 days
Cas9(D10A) mRNA	>500 ng/ul, 25 ul	\$349	3-5 days
Custom gRNA	>500 ng/ul, 25 ul	\$349	3-5 days

Cas9 protein

VectorBuilder offers purified wildtype *Streptococcus pyogenes* Cas9 protein (SpCas9) and the Cas9 nickase (Cas9(D10A)) for preparing preformed Cas9-gRNA RNP to deliver CRISPR components into mammalian cells.

Reagent	Concentration & Volume	Price (USD)	Turnaround
SpCas9 protein	100 ug	\$599	5-7 days
SpCas9(D10A) nickase protein	100 ug	\$599	5-7 days

Gene targeting donor DNA

VectorBuilder offers donor DNA templates in the form of ssODN or dsDNA from linearized plasmid for guiding HDR-based DNA repair to introduce precise DNA sequence changes at CRISPR cleavage sites.

Reagent	Price (USD)	Turnaround
ssODN (normally 120-200 bp)	\$349	2-3 weeks
Gene targeting donor vector	From \$849	20-30 days

Pooled CRISPR libraries

VectorBuilder specializes in the custom design and construction of a variety of pooled CRISPR libraries such as CRISPR KO, CRISPRa/i, and CRISPR barcode libraries. In addition to custom pooled CRISPR libraries, we also offer premade dual-gRNA lentivirus libraries for whole-genome knockout screens in human and mouse. (See page 16 for detailed information on our premade dual-gRNA CRISPR libraries.)



shRNA Knockdown Solutions

VectorBuilder offers a comprehensive collection of shRNA reagents to provide you with the ideal tools for your gene knockdown experiments. We offer both U6-based and miR-30 based shRNA systems to give you the flexibility to control shRNA expression in different ways based on your experimental needs. Additionally, our online vector design tool is integrated with shRNA databases, enabling you to easily select suitable shRNA targeting your GOI while designing your shRNA vectors.

Highlights

- Free & intuitive vector design tool with integrated shRNA databases for human, mouse, and rat
- Versatile control of shRNA expression by either U6 or miR30
- Huge collection of backbones (regular plasmid, lentivirus, AAV, adenovirus, and piggyBac)
- Premade and custom-made shRNA library options
- Powerful technical support for shRNA selection, vector design, and troubleshooting

Our shRNA Offerings

Custom shRNA vectors

Vector Type	Price (USD)	Turnaround
U6-based shRNA vectors	From \$99	7-14 days
miR30-based shRNA vectors	From \$239	15-30 days
shRNA sensor vectors (for testing shRNA efficiency)	Please inquire	Please inquire

Popular shRNA vectors

Vector Type	Price (USD)
Scramble shRNA vectors	From \$99
Anti-EGFP shRNA vectors	From \$99
Anti-mCherry shRNA vectors	From \$99
Anti-luciferase shRNA vectors	From \$99
Anti-lacZ shRNA vectors	From \$99

shRNA virus

Viral vectors are the most preferred shRNA delivery vehicles given their ability to efficiently transduce a wide variety of cell types and achieve long-term knockdown of the targeted genes. We can design and construct shRNA vectors in a variety of viral vector formats including lentivirus, AAV, and adenovirus. (See page 20 for detailed information on our virus packaging services.)

shRNA (3+1) virus packaging

VectorBuilder offers shRNA (3+1) virus packaging services which include 3 custom shRNA viruses targeting your GOI and 1 scramble control virus, enabling you to test multiple shRNA against your target genes at highly affordable prices.

Virus Type	Scale	Application	Price (USD) *	Turnaround*
Lentivirus	Pilot	Cell culture	\$1,248	15-30 days
	Medium		\$1,748	
	Large		\$2,748	
	Ultra-purified medium	Cell culture & in vivo	\$3,648	
	Ultra-purified large		\$4,448	
AAV	Pilot	Cell culture	\$1,248	17-34 days
	Medium		\$1,748	
	Large		\$2,748	
	Ultra-purified pilot	Cell culture & in vivo	\$3,648	27-44 days
	Ultra-purified medium		\$4,948	
	Ultra-purified large		\$7,448	
Adenovirus	Pilot	Cell culture	\$1,598	35-58 days
	Medium		\$2,098	
	Large		\$3,098	
	Ultra-purified large	Cell culture & in vivo	\$4,798	37-62 days

* Vector construction is included in the services.

Pooled shRNA libraries

VectorBuilder specializes in the design and construction of pooled shRNA libraries for performing large-scale loss-of-function screens in mammalian cells. In addition, VectorBuilder offers premade whole-genome shRNA libraries for human and mouse which have been validated by NGS. (See page 14 for detailed information on our library construction services.)

shRNA knockdown stable cell lines

VectorBuilder can custom build shRNA knockdown stable cell lines for applications requiring long-term knockdown of your GOI. To ensure efficient knockdown of your GOI, the top 3 candidate shRNA based on knockdown score are tested and the one with the best knockdown efficiency is then used for generating the stable cell line via lentivirus transduction. The knockdown level of the cell line is validated by RT-qPCR. Additionally, a series of standard QC assays such as sterility tests and mycoplasma detection are performed prior to releasing the final cell line products. (See page 18 for detailed information on our stable cell line generation services.)

Inducible Gene Expression Solutions

VectorBuilder offers a comprehensive collection of Tet-inducible gene expression vectors to help you achieve nearly complete silencing of your GOI in the absence of tetracycline and its analogs (e.g. doxycycline), as well as rapid and robust expression in response to the addition of tetracycline and its analogs.

Highlights

- Utilize the rtTA/TTS fusion cassette to achieve maximal induction in the presence of tetracycline and minimal leaky expression in the absence of tetracycline
- Available in dual-vector and all-in-one formats
- 2nd and 3rd generation Tet systems available
- Low-leak tissue-specific vectors available with minimal leaky expression in non-target tissues in the absence of tetracycline
- Available in a variety of backbones (regular plasmid, lentivirus, AAV, adenovirus, and piggyBac)

Our Tet-Inducible System Offerings

Custom Tet vectors

Vector Type	Price (USD)	Turnaround
TRE driven GOI expression vectors	From \$209	10-16 days
Tet regulatory protein expression vectors	From \$159	10-16 days
All-in-one Tet-On vectors	From \$209	10-16 days
Low-leak Tet-On vectors	From \$209	10-16 days

Popular Tet vectors

Vector Type	Price (USD)
Tet-inducible vectors for EGFP, mCherry, TagBFP or luciferase	\$209
All-in-one Tet-On vectors for EGFP, mCherry, TagBFP or luciferase	\$209
Tet regulatory protein expression vectors	\$159

Tet-inducible virus

VectorBuilder can design, construct, and package a variety of viral vectors expressing the components of the Tet-inducible system to help you achieve virus-mediated inducible expression of your target genes in difficult-to-transfect cell lines. We can package recombinant lentivirus, AAV, adenovirus, MMLV, and MSCV retrovirus. (See page 20 for detailed information on our virus packaging services.)

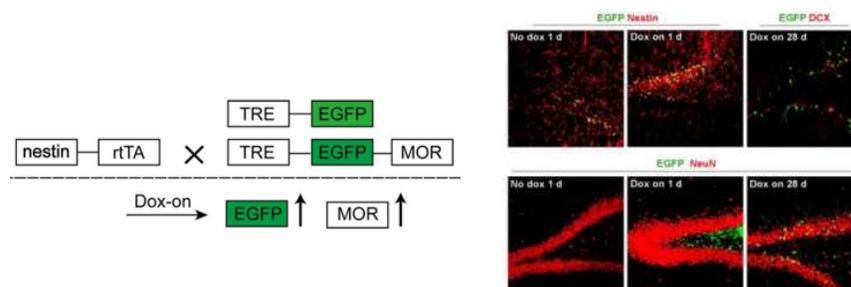


Figure 13. Lentivirus mediated Tet-inducible EGFP expression in neural stem cells. (Sci Rep. 2019; 9: 1471)

Tet-inducible stable cell lines

VectorBuilder can generate Tet-inducible stable cell lines expressing your GOI regulated by tetracycline or one of its analogs (e.g. doxycycline). Please send us an inquiry to get a detailed service proposal from us.

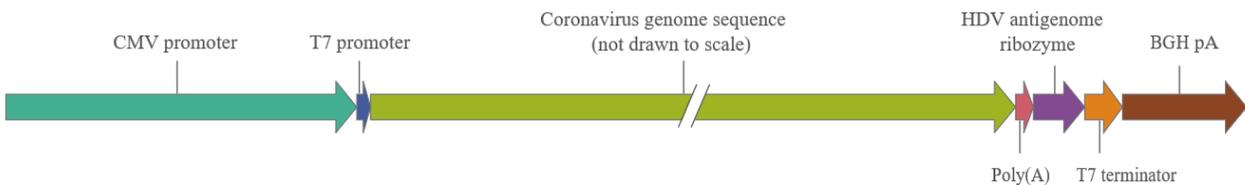
COVID-19 Coronavirus Solutions

VectorBuilder offers a range of powerful tools to help you uncover the biology of coronavirus and develop vaccines or treatment for coronavirus-related diseases.

Detailed descriptions of our coronavirus solutions are available on VectorBuilder's website, under "**Products & Services**".

Coronavirus Vectors

While you can custom design and construct expression, knockdown, and CRISPR vectors for coronavirus genes with VectorBuilder (see page 10 for detailed information on our vector construction services). VectorBuilder offers the only commercially available full-length genome coronavirus vectors which allow researchers to reconstitute live virus by simply transfecting the vector into the proper packaging cells. The structure of our coronavirus vector is depicted below:



Highlights

- Carries the full-length coronavirus genome
- RNA genome can be robustly transcribed in vitro or in packaging cells
- Versatile customization options such as mutagenesis, reporter knock-in and more
- Non-infectious, safe to handle and ship with minimal biosafety requirements

Lentivirus and VSV Pseudotyped with Coronavirus S Protein

VectorBuilder offers lentivirus and VSV pseudotyping services with coronavirus spike (S) proteins from a wide range of coronavirus species, thereby providing powerful and safe tools to study mechanisms of coronavirus cell entry and the evolution of viral tropism.

Highlights

- High-titer, ready-to-use lentiviral particles pseudotyped with coronavirus S protein
- Pseudotyping available with wildtype or mutant S proteins from a wide range of coronavirus species
- Transfer vector can be customized such as carrying reporter genes for monitoring viral entry
- Minimal safety concern

Cell Line Models for Coronavirus Research

VectorBuilder offers a variety of cell line models at affordable prices to help you accelerate your coronavirus research.

Highlights

- Virus growth cell lines for isolating and propagating the virus
- Virus packaging cell lines for packaging recombinant vectors into live virus
- Virus assay cell lines for studying mechanisms of viral entry into host cells and other aspects of virus biology

Animal Models for Coronavirus Research

VectorBuilder has partnered with Cyagen to offer genetically modified mouse models for your coronavirus research needs, including humanized, knockout (KO), and ROSA26 knockin (KI) mouse models of popular genes mediating coronavirus pathology.

GMP Manufacturing CDMO Services



CDMO Services for GMP Manufacturing

VectorBuilder is a full-service CDMO with extensive expertise in manufacturing GMP-grade gene therapy vectors. We support the full spectrum of vector design, production, and QC needs along the entire gene therapy drug development pipeline. Our highly experienced team have worked with thousands of customers to create research-grade vectors for the early discovery stage, GMP-like vectors for the pre-clinical stage, and full GMP-grade vectors for the clinical stage.

Our CDMO services include:

- **Process Development**

VectorBuilder has a dedicated process development team who are highly experienced in developing optimal manufacturing processes for GMP-grade gene therapy vectors. We consider many factors in our process development, including biological properties of the vector, quality and safety requirements, production quantity and scalability needs, regulatory requirements in the intended market, as well as the customer's cost and timeline target. Our process development services include **vector optimization, upstream process development, and downstream process development.**

- **Analytical Development**

VectorBuilder can provide the full range of analytical development services capable of developing, optimizing, qualifying, and validating in-process and release QC assays tailored to individual gene therapy vectors. We can also provide drug stability studies to ascertain drug shelf life under various storage and transport conditions.

- **Plasmid DNA Manufacturing**

We can manufacture GMP-grade plasmid DNA at various scales, employing antibiotic-free, and animal component-free production methods.

- **GMP-like plasmid DNA** is intended for pre-clinical studies such as animal testing of drug safety. Its production adopts key features of GMP guidelines, including comparable production process and similar quality attributes. Its production is performed in segregated production suites with document control and traceability. Where appropriate, GMP-like plasmid can be produced under antibiotic-free, animal component-free, RNase-free fermentation, and purification conditions.

- **GMP-grade plasmid DNA** is produced in our certified GMP suite with strict adherence to GMP guidelines. A comprehensive quality assurance system is implemented throughout the production process. A wide range of in-process and release QC assays are performed to ensure that the plasmid DNA meets the desired quality and safety standards.

- **Virus Manufacturing**

We can provide viruses of different scales and quality attributes to meet the full range of demands along the gene therapy drug development pipeline. We have established and validated platform technology for large-scale GMP manufacturing of adeno-associated virus (AAV) and lentivirus. We also have experience producing other types of viral vectors such as adenovirus, MMLV, herpes simplex virus (HSV), and vesicular stomatitis virus (VSV).

- **AAV:** We package AAV in HEK293 cells under either adherent conditions (Cell Factory 10 or iCELLis 500) or serum-free suspension conditions (up to 200 L single-use bioreactor). We also package AAV in suspension Sf9 insect cells. We can achieve a scale of up to 10^{17} GC AAV per batch.

- **Lentivirus:** We package lentivirus (2nd and 3rd generation, pseudotyped with VSV-G or other viral surface proteins) in HEK293, under either adherent growth conditions (Cell Factory 10 or iCELLis 500) or serum-free suspension conditions (up to 200 L single-use bioreactor). We can achieve a scale of up to 10^{11} TU per batch.

- **Cell Banking**

We can generate GMP-grade Master Cell Banks (MCBs) and Working Cell Banks (WCBs) for E. coli, mammalian cells, and insect cells, derived from either our in-house or customer-provided cell lines.

- **Fill/finish**

We can provide automated aseptic filling of the DS/DP with fill volume ranges from 0.5 ml to 2 ml per glass vial. We can complete >3000 vials per day.

- **Regulatory Support**

We can work closely with our customers to provide regulatory support at each critical milestone of their drug development process. These include on-site audit, consultation for regulatory strategies, and CMC and BLA documentation support.

- **Technology Transfer**

We can provide technology transfer with best practices including detailed bill of materials, well-documented production processes, and fully qualified analytical methods used in the manufacturing of the gene therapy vector.

Our comprehensive quality system is embedded in every aspect of our GMP manufacturing process which spans facilities, supplies, production, fill/finish, storage, in-process and release QC, and personnel. Our company culture places great emphasis on quality, innovation, continuous improvement, and “white-glove” customer service. As such, we can consistently meet and exceed customer expectations. We also strive to achieve rapid turnaround and affordable prices while maintaining the high quality and full regulatory compliance.

GMP Facilities

VectorBuilder currently operates one GMP facility (18,000 sq ft) and is building two additional facilities (18,000 and 32,000 sq ft) due to open in late 2020. By the end of 2020, our facilities will include:

- **11 GMP manufacturing suites:** varying sizes each with independent airflow, Grade A BSC in Grade B and C environment, BSL-2 certified
- **Fill/finish suite:** 2,000 sq ft, Grade A insulator in Grade C environment
- **QC laboratory:** 7,500 sq ft
- **Process and analytical development laboratory:** 6,500 sq ft

All our facilities are designed to meet major GMP regulations and guidelines of US, EU, Japan, China, and PIC/S. They are suitable for Phase I/II/III and commercial manufacturing.



To view customer testimonials and citations, please visit the "Resources" on VectorBuilder.com.



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