pRL-null Vector

Technical Bulletin No. 238

INSTRUCTIONS FOR USE OF PRODUCT E2271. *PLEASE DISCARD PREVIOUS VERSIONS.*
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I. Description

The pRL-null Vector(a,b) (Figure 1) is intended for use in constructing a control reporter vector that may be used in combination with any experimental reporter vector to cotransfect mammalian cells. All of Promega's pRL Reporter Vectors contain a cDNA(b) (R*luc*) encoding *Renilla* luciferase, which was originally cloned from the marine organism *Renilla reniformis* (sea pansy; 1). As described below, the *Renilla* luciferase cDNA contained within the pRL Vectors has been modified slightly to provide greater utility.

The pRL-null Vector contains no enhancer or promoter elements. Rather, it contains a multiple cloning region upstream of R*luc* to allow for the cloning of any desired regulatory element(s) to drive expression of *Renilla* luciferase. *Renilla* luciferase is a 36kDa monomeric protein that does not require post-translational modification for activity (2). Therefore, like firefly luciferase, the enzyme may function as a genetic reporter immediately following translation. For information about the use of this plasmid in conjunction with a reporter vector containing the firefly luciferase gene, refer to the Dual-Luciferase® Reporter Assay System(c,d) Technical Manual (#TM040).

The pRL Vectors are isolated from a *dam*⁻/*dcm*⁻ *E. coli* K host strain, allowing digestion with restriction enzymes that are sensitive to dam and dcm methylation.

The GenBank®/EMBL Accession Number for the pRL-null Vector is AF025844.

II. Product Components

Product	Size	Cat.#
pRL-null Vector	20µg	E2271

All pRL Vectors are supplied in TE buffer (pH 7.4) and are provided with a glycerol stock of bacterial strain JM109. The JM109 cells do not contain vector and are not competent cells.

Storage Conditions: Store vector DNA at –20°C and the glycerol stock of JM109 cells at –70°C.

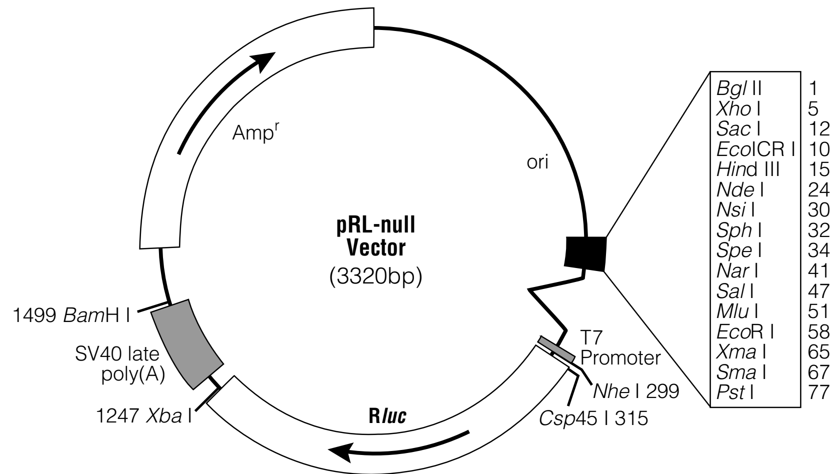
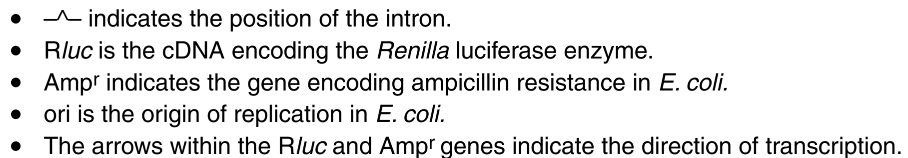


Figure 1. The pRL-null Vector circle map and sequence reference points.

Sequence reference points:

Multiple cloning region	1–78
Chimeric intron	101–237
T7 RNA polymerase promoter (–17 to +2)	281–299
T7 RNA polymerase promoter transcription initiation site	298
R*luc* reporter gene	309–1244
SV40 late polyadenylation signal	1286–1487
β-lactamase (Amp^r) coding region	1634–2494

In addition:



- —^— indicates the position of the intron.
- R*luc* is the cDNA encoding the *Renilla* luciferase enzyme.
- Amp^r indicates the gene encoding ampicillin resistance in *E. coli.*
- ori is the origin of replication in *E. coli.*
- The arrows within the R*luc* and Amp^r genes indicate the direction of transcription.

Table 1. Restriction Enzyme Sites within the Multiple Cloning Region of the pRL-null Vector.

Enzyme Site	End Generated	Compatible Ends
Bgl II	5´ overhang	*Bam*H I
Xho I	5´ overhang	*Sal* I
*Eco*ICR I	Blunt	*Sst* I
*Hin*d III	5´ overhang	None
Nde I	5´ overhang	*Tru*9 I, *Vsp* I
Nsi I	3´ overhang	*Pst* I
Sph I	3´ overhang	*Bbu* I, *Hsp* 92 II
Spe I	5´ overhang	*Xba* I, *Nhe* I
Nar I	5´ overhang	*Acy* I, *Cla* I, *Csp*45 I, *Hpa* II, *Msp* I, *Taq* I
Bbe I	3´ overhang	None
Ehe I	Blunt	Any blunt end
Sal I	5´ overhang	*Xho* I
Mlu I	5´ overhang	*Bss*H II
*Eco*R I	5´ overhang	None
Xma I	5´ overhang	*Acc* III
Sma I	Blunt	Any blunt end
Pst I	3´ overhang	*Nsi* I

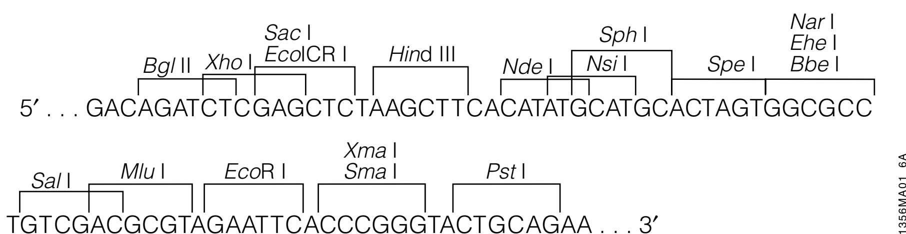


Figure 2. Multiple cloning region upstream of the intron and *Renilla* luciferase reporter gene in the pRL-null Vector.

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III. Features of the pRL-null Vector

A. Multiple Cloning Region

The pRL-null Vector contains a multiple cloning region positioned immediately upstream of the chimeric intron and *Renilla* luciferase reporter gene (Figure 2). To aid in devising cloning strategies, Table 1 summarizes the types of DNA ends generated from restriction endonuclease digestion within the multiple cloning region as well as the compatibility of those ends with the ends of DNA fragments generated by heterologous restriction enzymes.

B. Chimeric Intron

Downstream of the multiple cloning region of the pRL-null Vector is a chimeric intron comprised of the 5´-donor splice site from the first intron of the human β-globin gene, and the branch and 3´-acceptor splice site from an intron preceding an immunoglobulin gene heavy chain variable region (3). The sequences of the donor and acceptor splice sites, along with the branchpoint site, have been modified to match the consensus sequences for optimal splicing (4).

Transfection studies have demonstrated that the presence of an intron flanking a cDNA insert frequently increases the level of gene expression (5–8). In the pRL-null Vector the intron is positioned 5´ to R*luc* to minimize the utilization of cryptic 5´-donor splice sites that may reside within the reporter gene sequence (9).

C. T7 Promoter

Due to sequence differences between the T7 Promoter Primer offered by Promega (Cat.# Q5021) and the T7 promoter used in the pRL family of *Renilla* luciferase co-reporter vectors, this primer cannot be used for sequencing with this vector.

A T7 promoter is located downstream of the chimeric intron and immediately precedes the R*luc* reporter gene. This T7 promoter can be used to synthesize RNA transcripts in vitro using T7 RNA Polymerase (Cat.# P2075). T7 RNA Polymerase can also be used to synthesize active *Renilla* luciferase in a cell-free coupled eukaryotic in vitro transcription/translation reaction (e.g., Promega's TNT® Reticulocyte Lysate[c,e,f,g] [Cat.# L4610], TNT® T7 Coupled Wheat Germ Extract[c,e,f,g] [Cat.# L4140] or TNT® T7 Quick Coupled Transcription/Translation [c,e,f,g,h] [Cat.# L1170] Systems).

D. *Renilla* Luciferase Reporter Gene (R*luc*)

The *Renilla* luciferase cDNA inserted into all of the pRL Vectors is derived from the anthozoan coelentrate *Renilla reniformis* (1) but contains nucleotide changes that were engineered during the construction of the individual vectors. The following bases were altered in the pRL-null Vector: base 539 (T→C), to eliminate an internal *Bgl* II site; base 1082 (T→C), to eliminate an internal *Bam*H I site; base 1115 (C→T), to eliminate internal *Nar* I, *Kas* I, *Ban* I and *Acy* I sites. These nucleotide substitutions do not alter the amino acid sequence of the encoded *Renilla* luciferase reporter enzyme.

E. SV40 Late Polyadenylation Signal

Polyadenylation signals cause the termination of transcription by RNA polymerase II and signal the addition of approximately 200–250 adenosine residues to the 3´-end of the RNA transcript (10). Polyadenylation has been shown to enhance RNA stability and translation (11,12). The late SV40 polyadenylation signal, which is extremely efficient and has been shown to increase the steady-state level of RNA approximately 5-fold over the early SV40 polyadenylation signal (13), has been positioned 3´ to the R*luc* gene in the pRL-null Vector to increase the level of *Renilla* luciferase expression.

IV. Transfection of Mammalian Cells with the pRL-null Vector

The pRL-null Vector, once it has been modified to contain appropriate genetic regulatory domains, may be used in combination with any experimental reporter vector to cotransfect mammalian cells. However, it is important to realize that trans effects between promoters on cotransfected plasmids can potentially affect reporter gene expression (14). Primarily this is of concern when either the control or experimental reporter vector, or both, contain very strong promoter/enhancer elements. The occurrence and magnitude of such effects will depend on several factors: i) the combination and activities of the genetic regulatory elements present on the cotransfected vectors; ii) the relative ratio of experimental vector to control vector introduced into the cells; and iii) the cell type transfected.

To help ensure independent genetic expression between experimental and control reporter genes, preliminary cotransfection experiments should be performed to optimize both the amount of vector DNA and the ratio of the coreporter vectors added to the transfection mixture. Similar to the firefly luciferase assay, the *Renilla* luciferase assay is extremely sensitive, providing accurate measurement of ≤10 femtograms of *Renilla* luciferase, with linearity over seven orders of enzyme concentration. Therefore, it is possible to use relatively small quantities of the pRL-null Vector to provide low-level, constitutive coexpression of *Renilla* luciferase control activity.

The pRL-null Vector, once genetic regulatory domains have been added, can be used for both transient and stable expression of *Renilla* luciferase. For stable expression, the pRL-null Vector must be cotransfected with an expression vector containing a selectable gene in mammalian cells. Transfection of DNA into mammalian cells may be mediated by cationic lipids (15,16), calcium phosphate (17,18), DEAE-Dextran (19–21), polybrene-DMSO (22,23), or electroporation (24,25).

Transfection systems based on cationic lipid compounds (TransFast™ Reagent[i], Tfx™ Reagents[j] and Transfectam® Reagent[k]), calcium phosphate and DEAE-Dextran are available from Promega. For more information and a protocol for the Transfectam® Reagent, please request the *Transfectam® Reagent Technical Bulletin* (#TB116) and for the TransFast™ Reagent, please request the *TransFast™ Transfection Reagent Technical Bulletin* (#TB260). Protocols for the use of the Tfx™ Reagents can be found in the *Tfx™-10, Tfx™-20 and Tfx™-50 Reagents for the Transfection of Eukaryotic Cells Technical Bulletin* (#TB216). For transfection procedures using calcium phosphate or DEAE-Dextran, please request the *ProFection® Mammalian Transfection Systems Technical Manual* (#TM012).

V. pRL-null Vector Restriction Sites and Sequence

A. pRL-null Vector Restriction Sites

The following restriction enzyme tables were constructed using DNASTAR® sequence analysis software. Please note that we have not verified this information by restriction digestion with each enzyme listed. The location given specifies the 3´end of the cut DNA (the base to the left of the cut site). For more information on the cut sites of these enzymes, or if you identify a discrepancy, please contact your local Promega Branch Office or Distributor. In the U.S., contact Promega Technical Services at 800-356-9526.

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Table 2. Restriction Enzymes That Cut the pRL-null Vector Between 1 and 5 Times.

Enzyme	# of Sites	Location
Acc I	1	48
Acy I	2	41, 1881
Afl II	1	264
Afl III	2	51, 491
_Alw_26 I	4	129, 154, 1579, 2355
_Alw_44 I	2	1749, 2995
_Alw_N I	1	2900
_Asp_H I	4	12, 1753, 1838, 2999
Ava I	2	5, 65
Ava II	4	357, 1079, 2057, 2279
_Bam_H I	1	1498
Ban I	4	40, 190, 1113, 2468
Ban II	1	12
Bbe I	1	44
Bbs I	2	175, 1149
Bbu I	1	32
Bcl I	2	593, 802
Bgl I	1	2303
Bgl II	1	1
Bsa I	2	129, 2355
_Bsa_O I	4	1256, 1903, 2052, 2975
_Bsa_A I	1	1041
_Bsa_B I	1	1497
_Bsa_H I	2	41, 1881
_Bsa_J I	3	65, 1082, 3149
_Bsa_M I	2	1317, 1410
Bsm I	2	1317, 1410
_Bsp_1286 I	4	12, 1753, 1838, 2999
_Bsp_H I	3	877, 1581, 2589
_Bsp_M I	1	91
Bsr BR I	1	1497
_Bsr_G I	1	1007
_Bss_S I	3	967, 1752, 3136
_Bst_98 I	1	264
_Bst_O I	5	1084, 1503, 3150, 3163, 3284
_Bst_Z I	1	1253
_Cfr_10 I	1	2336
Cla I	1	1491
_Csp_45 I	1	315
Dde I	5	13, 1920, 2460, 2626, 3035
Dra I	4	1457, 1843, 2535, 2554
Drd I	1	3207
Eae I	3	659, 1253, 2028
Eag I	1	1253
Ear I	2	479, 1622
_Ecl_HK I	1	2421
_Eco_52 I	1	1253
_Eco_ICR I	1	10
_Eco_R I	1	5
Ehe I	1	42
Fsp I	1	2198
Hae II	2	44, 3069
Hga I	4	59, 1889, 2619, 3197
Hinc II	2	49, 1396
_Hin_d II	2	49, 1396
_Hin_d III	1	15
Hpa I	1	1396
_Hsp_92 I	2	41, 1881
Kas I	1	40
Mae II	5	1003, 1040, 1819, 2192, 2608
Mlu I	1	51
_Msp_A1 I	3	1785, 2726, 2971
Nar I	1	41
Nci I	5	66, 67, 1885, 2236, 2932
Nde I	1	24
Nhe I	1	299
Not I	1	1253
Nsi I	1	30
Nsp I	3	32, 435, 495
_Pae_R7 I	2	157, 3315
Ple I	4	165, 281, 2430, 2933
_Ppu_10 I	1	26
_Psp_A I	1	65
Pst I	1	77
Pvu I	1	2052
Rsa I	4	71, 277, 1009, 1940
Sac I	1	12
Sal I	1	47
Sca I	2	277, 1940
Sin I	4	357, 1079, 2057, 2279
Sma I	1	67
Spe I	1	34
Sph I	1	32
Ssp I	1	1616
Tfi I	5	399, 420, 759, 1074, 1087
Vsp I	2	409, 2246
Xba I	1	1246
Xcm I	1	958
Xho I	1	5
Xma I	1	65
Xmn I	2	843, 1821

Note: The enzymes listed in boldface type are available from Promega.

Table 3. Restriction Enzymes That Do Not Cut the pRL-null Vector.

***Aat* II**	*Blp* I	*Dra* III	***Nae* I**	*Psh*A I	*Srf* I
***Acc* B7 I**	*Bpu* 1102 I	*Dsa* I	***Nco* I**	*Psp*5 II	*Sse*8387 I
***Acc* III**	*Bsp*120 I	***Eco*47 III**	***Ngo*M IV**	***Pvu* II**	***Stu* I**
***Acc*65 I**	***Bss*H II**	*Eco*72 I	***Nru* I**	*Rsr* II	***Sty I***
***Age* I**	*Bst*1107 I	*Eco*81 I	*Pac* I	***Sac* II**	*Swa* I
***Apa* I**	***Bst*E II**	*Eco*N I	*Pfl*M I	***Sfi* I**	***Tth*111 I**
Asc I	***Bst*X I**	***Eco*R V**	*Pin*A I	***Sgf* I** (I)	
Avr II	***Bsu*36 I**	*Fse* I	*Pme* I	*Sgr*A I	
***Bal* I**	***Csp* I**	**I-*Ppo* I**	*Pml* I	***Sna*B I**	
*Bbr*P I	*Dra* II	***Kpn* I**	*Ppu*M I	*Spl* I	

Table 4. Restriction Enzymes That Cut the pRL-null Vector 6 or More Times.

Aci I	*Bst*U I	***Hae* III**	*Mae* I	***Msp* I**	*Scr*F I
***Alu* I**	***Cfo* I**	***Hha* I**	*Mae* III	***Nde* II**	*Sfa*N I
Bbv I	***Dpn* I**	***Hin*f I**	***Mbo* I**	*Nla* III	***Taq* I**
Bsr I	*Dpn* II	***Hpa* II**	***Mbo* II**	*Nla* IV	***Tru*9 I**
***Bsr* S I**	*Fnu*4H I	*Hph* I	*Mnl* I	***Sau*3A I**	***Xho* II**
***Bst*71 I**	***Fok* I**	***Hsp*92 II**	*Mse* I	***Sau*96 I**	

Note: The enzymes listed in boldface type are available from Promega.

B. pRL-null Vector Sequence

The sequence shown corresponds to the mRNA synthesized from the *Renilla* luciferase gene from a promoter positioned in the multiple cloning region. The vector sequence is also available on the Internet at www.promega.com/vectors/. The GenBank®/EMBL Accession number for the pRL-null Vector is AF025844.

```
  1  AGATCTCGAG CTCTAAGCTT CACATATGCA TGCACTAGTG GCGCCTGTCG
 51  ACGCGTAGAA TTCACCCGGG TACTGCAGAA GTTGGTCGTG AGGCACTGGG
101  CAGGTAAGTA TCAAGGTTAC AAGACAGGTT TAAGGAGACC AATAGAAACT
151  GGGCTTGTCG AGACAGAGAA GACTCTTGCG TTTCTGATAG GCACCTATTG
201  GTCTTACTGA CATCCACTTT GCCTTTCTCT CCACAGGTGT CCACTCCCAG
251  TTCAATTACA GCTCTTAAGG CTAGAGTACT TAATACGACT CACTATAGGC
301  TAGCCACCAT GACTTCGAAA GTTTATGATC CAGAACAAAG GAAACGGATG
351  ATAACTGGTC CGCAGTGGTG GGCCAGATGT AAACAAATGA ATGTTCTTGA
401  TTCATTTATT AATTATTATG ATTCAGAAAA ACATGCAGAA AATGCTGTTA
451  TTTTTTTACA TGGTAACGCG GCCTCTTCTT ATTTATGGCG ACATGTTGTG
501  CCACATATTG AGCCAGTAGC GCGGTGTATT ATACCAGACC TTATTGGTAT
551  GGGCAAATCA GGCAAATCTG GTAATGGTTC TTATAGGTTA CTTGATCATT
601  ACAAATATCT TACTGCATGG TTTGAACTTC TTAATTTACC AAAGAAGATC
651  ATTTTTGTCG GCCATGATTG GGGTGCTTGT TTGGCATTTC ATTATAGCTA
701  TGAGCATCAA GATAAGATCA AAGCAATAGT TCACGCTGAA AGTGTAGTAG
751  ATGTGATTGA ATCATGGGAT GAATGGCCTG ATATTGAAGA AGATATTGCG
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B. pRL-null Vector Sequence (continued)

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 801  TTGATCAAAT CTGAAGAAGG AGAAAAAATG GTTTTGGAGA ATAACTTCTT
 851  CGTGGAAACC ATGTTGCCAT CAAAAATCAT GAGAAAGTTA GAACCAGAAG
 901  AATTTGCAGC ATATCTTGAA CCATTCAAAG AGAAAGGTGA AGTTCGTCGT
 951  CCAACATTAT CATGGCCTCG TGAAATCCCG TTAGTAAAAG GTGGTAAACC
1001  TGACGTTGTA CAAATTGTTA GGAATTATAA TGCTTATCTA CGTGCAAGTG
1051  ATGATTTACC AAAAATGTTT ATTGAATCGG ACCCAGGATT CTTTTCCAAT
1101  GCTATTGTTG AAGGTGCCAA GAAGTTTCCT AATACTGAAT TTGTCAAAGT
1151  AAAAGGTCTT CATTTTTCGC AAGAAGATGC ACCTGATGAA ATGGGAAAAT
1201  ATATCAAATC GTTCGTTGAG CGAGTTCTCA AAAATGAACA ATAATTCTAG
1251  AGCGGCCGCT TCGAGCAGAC ATGATAAGAT ACATTGATGA GTTTGGACAA
1301  ACCACAACTA GAATGCAGTG AAAAAAATGC TTTATTTGTG AAATTTGTGA
1351  TGCTATTGCT TTATTTGTAA CCATTATAAG CTGCAATAAA CAAGTTAACA
1401  ACAACAATTG CATTCATTTT ATGTTTCAGG TTCAGGGGGA GGTGTGGGAG
1451  GTTTTTTAAA GCAAGTAAAA CCTCTACAAA TGTGGTAAAA TCGATAAGGA
1501  TCCAGGTGGC ACTTTTCGGG GAAATGTGCG CGGAACCCCT ATTTGTTTAT
1551  TTTTCTAAAT ACATTCAAAT ATGTATCCGC TCATGAGACA ATAACCCTGA
1601  TAAATGCTTC AATAATATTG AAAAAGGAAG AGTATGAGTA TTCAACATTT
1651  CCGTGTCGCC CTTATTCCCT TTTTTGCGGC ATTTTGCCTT CCTGTTTTTG
1701  CTCACCCAGA AACGCTGGTG AAAGTAAAAG ATGCTGAAGA TCAGTTGGGT
1751  GCACGAGTGG GTTACATCGA ACTGGATCTC AACAGCGGTA AGATCCTTGA
1801  GAGTTTTCGC CCCGAAGAAC GTTTTCCAAT GATGAGCACT TTTAAAGTTC
1851  TGCTATGTGG CGCGGTATTA TCCCGTATTG ACGCCGGGCA AGAGCAACTC
1901  GGTCGCCGCA TACACTATTC TCAGAATGAC TTGGTTGAGT ACTCACCAGT
1951  CACAGAAAAG CATCTTACGG ATGGCATGAC AGTAAGAGAA TTATGCAGTG
2001  CTGCCATAAC CATGAGTGAT AACACTGCGG CCAACTTACT TCTGACAACG
2051  ATCGGAGGAC CGAAGGAGCT AACCGCTTTT TTGCACAACA TGGGGGATCA
2101  TGTAACTCGC CTTGATCGTT GGGAACCGGA GCTGAATGAA GCCATACCAA
2151  ACGACGAGCG TGACACCACG ATGCCTGTAG CAATGGCAAC AACGTTGCGC
2201  AAACTATTAA CTGGCGAACT ACTTACTCTA GCTTCCCGGC AACAATTAAT
2251  AGACTGGATG GAGGCGGATA AAGTTGCAGG ACCACTTCTG CGCTCGGCCC
2301  TTCCGGCTGG CTGGTTTATT GCTGATAAAT CTGGAGCCGG TGAGCGTGGG
2351  TCTCGCGGTA TCATTGCAGC ACTGGGGCCA GATGGTAAGC CCTCCCGTAT
2401  CGTAGTTATC TACACGACGG GGAGTCAGGC AACTATGGAT GAACGAAATA
2451  GACAGATCGC TGAGATAGGT GCCTCACTGA TTAAGCATTG GTAACTGTCA
2501  GACCAAGTTT ACTCATATAT ACTTTAGATT GATTTAAAAC TTCATTTTTA
2551  ATTTAAAAGG ATCTAGGTGA AGATCCTTTT TGATAATCTC ATGACCAAAA
2601  TCCCTTAACG TGAGTTTTCG TTCCACTGAG CGTCAGACCC CGTAGAAAAG
2651  ATCAAAGGAT CTTCTTGAGA TCCTTTTTTT CTGCGCGTAA TCTGCTGCTT
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B. pRL-null Vector Sequence (continued)

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2701  GCAAACAAAA AAACCACCGC TACCAGCGGT GGTTTGTTTG CCGGATCAAG
2751  AGCTACCAAC TCTTTTTCCG AAGGTAACTG GCTTCAGCAG AGCGCAGATA
2801  CCAAATACTG TTCTTCTAGT GTAGCCGTAG TTAGGCCACC ACTTCAAGAA
2851  CTCTGTAGCA CCGCCTACAT ACCTCGCTCT GCTAATCCTG TTACCAGTGG
2901  CTGCTGCCAG TGGCGATAAG TCGTGTCTTA CCGGGTTGGA CTCAAGACGA
2951  TAGTTACCGG ATAAGGCGCA GCGGTCGGGC TGAACGGGGG GTTCGTGCAC
3001  ACAGCCCAGC TTGGAGCGAA CGACCTACAC CGAACTGAGA TACCTACAGC
3051  GTGAGCTATG AGAAAGCGCC ACGCTTCCCG AAGGGAGAAA GGCGGACAGG
3101  TATCCGGTAA GCGGCAGGGT CGGAACAGGA GAGCGCACGA GGGAGCTTCC
3151  AGGGGGAAAC GCCTGGTATC TTTATAGTCC TGTCGGGTTT CGCCACCTCT
3201  GACTTGAGCG TCGATTTTTG TGATGCTCGT CAGGGGGGCG GAGCCTATGG
3251  AAAAACGCCA GCAACGCGGC CTTTTTACGG TTCCTGGCCT TTTGCTGGCC
3301  TTTTGCTCAC ATGGCTCGAC
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VI. Related Products

pRL Family of *Renilla* Luciferase Vectors for Coreporter Applications

Product	Size	Cat.#
pRL-TK Vector[a,b]	20µg	E2241
pRL-CMV Vector[a,b,m]	20µg	E2261
pRL-SV40 Vector[a,b]	20µg	E2231

To inquire about the availability of bulk packaging and pricing for pRL Vectors, please contact Promega. For inquiries on the availability of new promoter variations within the pRL family of co-reporter vectors, contact Technical Services or visit our web site at www.promega.com.

pGL3 Vectors

Product	Size	Cat.#
pGL3 Control Vector[a,f,n]	20µg	E1741
pGL3 Basic Vector[a,f,n]	20µg	E1751
pGL3 Promoter Vector[a,f,n]	20µg	E1761
pGL3 Enhancer Vector[a,f,n]	20µg	E1771

Luciferase Assay Systems

Product	Size	Cat.#
Dual-Luciferase® Reporter Assay System	100 assays	E1910
Dual-Luciferase® Reporter Assay System 10-pack[c,d]	1,000 assays	E1960
Dual-Luciferase® Reporter 1000 Assay System[c,d]	1,000 assays	E1980

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VI. Related Products (continued)

Transfection Systems

Product	Size	Cat.#
TransFast™ Transfection Reagent	1.2mg	E2431
Transfectam® Reagent for the Transfection of Eukaryotic Cells	1mg	E1231
	0.5mg	E1232
Tfx™-50 Reagent	2.1mg	E1811
Tfx™-10 Reagent	9.3mg	E2381
Tfx™-20 Reagent	4.8mg	E2391
Tfx™ Reagents Transfection Trio	5.4mg	E2400
ProFection® Mammalian Transfection System - Calcium Phosphate	80 transfections	E1200
ProFection® Mammalian Transfection System - DEAE-Dextran	80 transfections	E1210

VII. References

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