**New Phytologist Supporting Information**

Article title: **Interaction between brassica yellows virus silencing suppressor P0 and plant SKP1 facilitates stability of P0 in vivo against degradation by proteasome and autophagy pathways**

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The following Supporting Information is available for this article:

**Fig. S1** The Phe219 residue in P0Br is essential for local and systemic silencing suppression.

**Fig. S2** Symptoms of the *Nicotiana benthamiana* plants infected with TRV:00 or TRV:NbATG5.

**Fig. S3** P0Br-mediated degradation of AGO1 is blocked by E-64d inhibitor.

**Fig. S4** Detection of Myc-tagged P0Br and its mutants in yeast.

**Fig. S5** Detection of P0Br-6Myc in *XVE:P0Br-6Myc* transgenic *Nicotiana benthamiana* plants.

**Fig. S6** Mutation of the tyrosine-61 residue in P0Br abolished suppression of RNA silencing.

**Fig. S7** Complementation analysis of P0Br and its mutants.

**Table S1** Sequences of primers and probes.
**Fig. S1** The Phe219 residue in P0Br is essential for local and systemic silencing suppression. (a) Alignment of C-terminus of P0Br from 10 different viruses of *polerovirus*. P0Br and its C-terminus region containing FWR residues are represented by white and black boxes, respectively. FWR residues and Alanine-223 residue are indicated. (b) Suppression of RNA silencing by P0Br mutant F219R. GFP was transiently co-expressed by *Agrobacterium*-infiltration in *Nicotiana benthamiana* or 16c leaves together with empty vector (EV), P0Br-3FLAG or F219R-3FLAG mutants. Fluorescence images of *N. benthamiana* infiltrated leaves were taken under long-wave length UV light at 2 dpi. The number of plants showing systemic silencing were calculated and compared with total number of coinfiltrated plants tested in 3 independent experiments.
**Fig. S2** Symptoms of the *Nicotiana benthamiana* plants infected with TRV:00 or TRV:*NbATG5*. Wild-type *N. benthamiana* leaves were inoculated with *Agrobacteria* harboring pTRV1 plus *Agrobacteria* harboring pTRV2 (TRV:00) or pTRV2-*NbATG5* (TRV-*NbATG5*). Photographs of plants were taken 20 dpi.
**Fig. S3** P0\textsuperscript{Br}-mediated degradation of AGO1 is blocked by E-64d inhibitor. 6Myc-tagged AtAGO1 was transiently co-expressed by *Agrobacterium*-infiltration in *Nicotiana benthamiana* leaves together with 3FLAG-tagged P0\textsuperscript{Br} and its mutant LP in the presence of P38\textsuperscript{TCV}. Total protein was extracted from co-infiltrated patches at 2 dpi. 50 μM E-64d was infiltrated into *N. benthamiana* leaves for 12 h before harvesting (+) and DMSO treatment was used as a solvent control (-). Accumulation of 6Myc-tagged and 3FLAG-tagged proteins were analyzed by western blotting with c-Myc monoclonal antibody (α c-Myc) and FLAG monoclonal antibody (α FLAG), respectively. Coomassie stain of total proteins is shown to indicate equal loading (Coom.).
**Fig. S4** Detection of Myc-tagged $P_0^{Br}$ and its mutants in yeast. Total proteins were extracted from yeasts. Accumulation of myc-tagged proteins were detected by western blotting with c-Myc monoclonal antibody (α c-Myc). Coomassie stains of total proteins are shown to indicate equal loading (Coom.).
**Fig. S5** Detection of P0Br-6Myc in *XVE::P0Br-6Myc* transgenic *Nicotiana benthamiana* plants. Estradiol (100 μM) was applied to the non-transgenic (NT) or *XVE::P0Br-6Myc* transgenic *N. benthamiana* to induce expression of P0Br-6Myc. Leaves were harvested 2 days after estradiol treatment for protein and RNA extraction. Accumulation of 6Myc-tagged P0 proteins were analyzed by western blotting with c-Myc monoclonal antibody (α c-Myc). Coomassie stains of total proteins are shown to indicate equal loading (Coom.).
**Fig. S6** Mutation of the tyrosine-61 residue in P0<sup>Br</sup> abolished suppression of RNA silencing. GFP was transiently co-expressed by *Agrobacterium*-infiltration in *Nicotiana benthamiana* leaves together with empty vector (EV), P0<sup>Br</sup>-3FLAG (P0<sup>Br</sup>), Y61A-3FLAG, or Y61D-3FLAG. Photographs were taken under long-wave length UV light at 2 dpi.

*N. benthamiana* leaves coinfiltrated with GFP+
Fig. S7 Complementation analysis of P0\textsuperscript{Br} and its mutants. The mutant BrYV\textsuperscript{FS} was co-infiltreated with 3FLAG-tagged P0\textsuperscript{Br} or its derivative mutants Q2A, LP, L184A, Y61D, Δ224-249, and Δ225-249. Empty vector (EV) co-infiltreated with BrYV\textsuperscript{FS} or BrYV were used as negative and positive control, respectively. Accumulation of the mutant BrYV\textsuperscript{FS} in \textit{Nicotiana benthamiana} plants was analyzed by northern blotting. Total RNA and protein extracted from inoculated leaves at 2 dpi. Viral RNAs of BrYV were hybridized with a random primed 3′ UTR specific probe. Methylene blue staining of ribosomal RNAs after northern transfer was used as loading control for high molecular-weight RNAs blots (rRNA). The bands corresponding to viral genome RNAs (gRNA) and subgenomic RNAs (sgRNA) are indicated respectively at the right side of the panel. 3FLAG-tagged P0\textsuperscript{Br} and its derivative mutants were detected with FLAG monoclonal antibody (α FLAG). Coomassie stain of total proteins is shown to indicate equal loading (Coom.).
| Experiment                                      | Name            | Sequence                                      | Note                                      |
|------------------------------------------------|-----------------|-----------------------------------------------|-------------------------------------------|
| Cloning of expression constructs/ Y2H constructs | P38-F           | CCCaagcttATGGAATATGATCTAGAG                  | pGD-P38<sup>TCV</sup> cloning            |
|                                                 | P38-R           | CGCggatccCTAAATTCGAGTTCGG                    |                                           |
|                                                 | BrP0XhoF        | TtctcgagATGCAATTGTAGGC                      | pGD-P0<sup>Br</sup>-3FLAG cloning        |
|                                                 | BrP0ApaR        | CgggccCTAAACATTTGGG                        |                                           |
|                                                 | BrP0GGGApapR    | ATgggccCTCTCCTGCCTAACAACATTTGGG             | pGD-P0<sup>Br</sup>-GFP cloning          |
|                                                 | BrP0NdElF       | TtCcatatgATGCAATTGTAGCTCAC                  | pGBK-P0<sup>Br</sup> and its mutants cloning |
|                                                 | BrP0BamH1R      | CGggatccTACAAACATTTGGG                      |                                           |
|                                                 | Q2ANde1F        | TtCcatatgATGGAATTGTAGCTCAC                  | pGBK-P0<sup>Br</sup>Q2A cloning          |
|                                                 | NbSKP1XhoF      | CCGctcgagATGGAATATGATCTAGGC                 | pGD-NbSKP1-GFP cloning                   |
|                                                 | NbSKP1ApaR      | ACGggccCTCGAAAGCCGACG                      |                                           |
|                                                 | GUSXhoF         | CGctcgagATGTTAAGTCCTGATGAAAAC               | pGD-GUS-3FLAG cloning                     |
|                                                 | GUSApapR        | ACGggccTCATGTCCTGCTATGCTCCCTGC             |                                           |
|                                                 | Br-P0XhoF       | CTCGAGATGCAATTCTTGC                       | pER8-P0<sup>Br</sup>-6Myc cloning        |
|                                                 | Myc-SpeR        | ACTAGTTTACAAGTCCTTTTGAG                    |                                           |
| Truncation mutagenesis of P0<sup>Br</sup>       | BrP0N2          | TATctcgagATGGTTGATGCTACG                    | P0<sup>Br</sup>Δ2 cloning                 |
|                                                 | BrP0N2-3        | TATctcgagATGGTAGCTACGACAAC                 | P0<sup>Br</sup>Δ2-3 cloning              |
|                                                 | BrP0N2-4        | TATctcgagATGGCTACGACAACTTTTAC              | P0<sup>Br</sup>Δ2-4 cloning              |
|                                                 | BrP0N3          | TATctcgagATGCAAGTAGCTCACG                  | P0<sup>Br</sup>Δ3 cloning                 |
|                                                 | C223TGaan      | CggatccgggcccCTAGGGCAATCTCCAAAGG           | P0<sup>Br</sup>Δ224-249 cloning          |
|                                                 | C224TGaan      | TATggatccgggcccCTAACTGGAATTCCT            | P0<sup>Br</sup>Δ225-249 cloning          |
|                                                 | C225TGaan      | TATgggcccTCAGTAGTGGCAATTCT                | P0<sup>Br</sup>Δ226-249 cloning          |
| Experiment                                      | Name              | Sequence                          | Note               |
|------------------------------------------------|-------------------|-----------------------------------|--------------------|
| Alanine substitution mutagenesis of P0Br       | BrYVAQ2AF(-)      | GTAGCTCACGACACTTTTCAC             | P0BrQ2A cloning    |
|                                                | BrYVAQ2AR(+)      | AATGCCATAAGCTTTATC                |                    |
|                                                | BrF3R(-)          | CATAAGCTTATCAACAAAG               | P0BrF3A cloning    |
|                                                | TuAF3AF(+)        | CAAGCTGTAGCTACGACAAAC             |                    |
|                                                | BrD7F(-)          | AACTTTCACTCTAGAAGTCC             | P0BrV4A cloning    |
|                                                | BrD7F(+)          | GTCGTAGCTACAAATTGCG              |                    |
|                                                | BrD7F(-)          | AACTTTCACTCTAGAAGTCC             | P0BrH6A cloning    |
|                                                | BrD7AR(+)         | GTCGTGCTACAAATTGCG               |                    |
|                                                | BrD7AR(-)         | TGGCGTGAGCTACAAATTGCG            |                    |
|                                                | BrN8AF(+)         | GCAATTTCACTTCTAGAAGTCC           | P0BrN8A cloning    |
|                                                | BrF9R(-)          | GTCGTGAGCTACAAATTGCG             |                    |
|                                                | BrF9AF(+)         | AAGCGTACACTCTAGAAGTCC            | P0BrH10A cloning   |
|                                                | BrF9R(-)          | GTCGTGAGCTACAAATTGCG             |                    |
|                                                | BrH10AF(+)        | AACTTTGCAACTTCTAGAAGTCC          | P0BrT11A cloning   |
|                                                | BrF9R(-)          | GTCGTGAGCTACAAATTGCG             |                    |
|                                                | BrT11AF(+)        | AACTTTCACTGCAGTACAGA             | P0BrL12A cloning   |
|                                                | BrF9R(-)          | GTCGTGAGCTACAAATTGCG             |                    |
|                                                | BrL12AF(+)        | AACTTTCACTGACAGAAGTCC            | P0BrE13A cloning   |
|                                                | BrF9R(-)          | GTCGTGAGCTACAAATTGCG             |                    |
|                                                | BrYVAE13AF(+)     | CTAGCAGTCACAAAGTTAG              | P0BrV14A cloning   |
|                                                | BrYVAE13AR(-)     | AGTTGAGTAGTGGTCGTG               |                    |
|                                                | BrYVAV14AF(+)     | CTAGAAGCAAGAAAAGTTAG             | P0BrR15A cloning   |
| Experiment | Name     | Sequence                        | Note                     |
|------------|----------|---------------------------------|--------------------------|
| BrYVA E13AR(-) | AGTGTGAAAGTTGTCGTG |                                  |                          |
| BrR15AF(+)   | GCAAAAGTTAGATTCCTCCATC |                                  | P0BrR15A cloning         |
| BrR15R(-)    | GACTTCTAGAGTGAAGTTG   |                                  |                          |
| BrK16AF(+)   | AGAGCAGTTAGATTCCTCCATC |                                  | P0BrK16A cloning         |
| BrR15R(-)    | GACTTCTAGAGTGAAGTTG   |                                  |                          |
| BrV17AF(+)   | AGAAAAGCAAGATTCCTCCATC |                                  | P0BrV17A cloning         |
| BrR15R(-)    | GACTTCTAGAGTGAAGTTG   |                                  |                          |
| BrR18AF(+)   | AGAAAAGTTGCAATTCTCTAC  |                                  | P0BrR18A cloning         |
| BrR15R(-)    | GACTTCTAGAGTGAAGTTG   |                                  |                          |
| BrF19AF(+)   | AGAGCCCTCCATCCGGGAC   |                                  | P0BrF19A cloning         |
| BrF19R(-)    | AACTTTTCTGACTTCTAGAG  |                                  |                          |
| BrL20AF(+)   | AGAAAAGTTAGATTCGTCCAC  |                                  | P0BrL21A cloning         |
| BrR15R(-)    | GACTTCTAGAGTGAAGTTG   |                                  |                          |
| BrH21AF(+)   | AGAAAAGTTAGATTCGTCCAC  |                                  | P0BrH21A cloning         |
| BrR15R(-)    | GACTTCTAGAGTGAAGTTG   |                                  |                          |
| BrV25F(-)    | ACGTTTCTTTTAGCAGTTTA   |                                  | P0BrR23A cloning         |
| BrR23AR(+)   | TACTTGTGCGGATGGAGG    |                                  |                          |
| BrV25F(-)    | ACGTTTCTTTTAGCAGTTTA   |                                  | P0BrQ24A cloning         |
| BrQ24AR(+)   | TACTGCTGCGGATGGAGG    |                                  |                          |
| BrV25F(-)    | ACGTTTCTTTTAGCAGTTTA   |                                  | P0BrV25A cloning         |
| BrV25AR(+)   | TGCTTGTCGCGGATGGAGG   |                                  |                          |
| BrT26AF(+)   | GCTTTTTCTTTTAGCAGTTTA   |                                  | P0BrT26A cloning         |
| BrF27R(-)    | TACTTGTGCGGATGGAGG    |                                  |                          |
| Experiment | Name | Sequence | Note |
|------------|------|----------|------|
| BrF27AF(+) | ACGGCTCTTTTAGCAGGTTTAT | $P_0^{BrF27A}$ cloning |
| BrF27R(-)  | TACCTTGTCGGATGGAGG | |
| BrL28AF(+) | ACGTTTGGCAGTTGTTTA | $P_0^{BrL28A}$ cloning |
| BrF27R(-)  | TACCTTGTCGGATGGAGG | |
| BrL29AF(+) | ACGTTTCTTGCAGGTTTA | $P_0^{BrL29A}$ cloning |
| BrF27R(-)  | TACCTTGTCGGATGGAGG | |
| BrG31AF(+) | ACGTTTCTTTTAGCAGCATTAA | $P_0^{BrG31A}$ cloning |
| BrF27R(-)  | TACCTTGTCGGATGGAGG | |
| BrYVAL32AF(+) | GGTGCATTGCTTAACATC | $P_0^{BrL32A}$ cloning |
| BrYVAL32AR(-) | TGCTAAAAGAAACGTTAC | |
| BrYVAL33AF(+) | GGTATTAGCCTTAACTC | $P_0^{BrL33A}$ cloning |
| BrYVAL32AR(-) | TGCTAAAAGAAACGTTAC | |
| BrYVAL34AF(+) | GGTATTATGGCAAAACATC | $P_0^{BrL34A}$ cloning |
| BrYVAL32AR(-) | TGCTAAAAGAAACGTTAC | |
| BrK41F(-)  | AAAGCAATCAAAGAGCGCAAC | $P_0^{BrN35A}$ cloning |
| BrN35AR(+) | TACGAAATTGCTGATGGCAAGCAA | |
| BrK41F(-)  | AAAGCAATCAAAGAGCGCAAC | $P_0^{BrI36A}$ cloning |
| BrI36AR(+) | TACGAAATTGCTGATGGCAAGCAA | |
| BrK41F(-)  | AAAGCAATCAAAGAGCGCAAC | $P_0^{BrE37A}$ cloning |
| BrE37AR(+) | TACGAAATTGCTGATGGCAAGCAA | |
| BrK41F(-)  | AAAGCAATCAAAGAGCGCAAC | $P_0^{BrQ38A}$ cloning |
| BrQ38AR(+) | TACGAAATTGCTGATGGCAAGCAA | |
| BrF39AF(+) | CAAGCCGTAAAGCAAATCAAAG | $P_0^{BrF39A}$ cloning |
| Experiment | Name            | Sequence                           | Note                  |
|------------|-----------------|------------------------------------|-----------------------|
| BrF39R(-)  |                 | TTCGATGTTAAGCAATAAAC               |                       |
| BrK41F(-)  |                 | AAAGCAATCAAAGAGCGCAAC              |                       |
| BrV40AR(+) |                 | TGGCAATTGTGTTGATGTTAAGCAA          |                       |
| BrK41AF(+) |                 | GCAGCAATCAAAGAGCGCAAC              |                       |
| BrK41R(-)  |                 | TACGAATTTGTTGATGTTAAGCAA           |                       |
| BrI43AF(+) |                 | AAAGCAAGCAAAAGAGCGCAAC             |                       |
| BrK41R(-)  |                 | TACGAATTTGTTGATGTTAAGCAA           |                       |
| BrK44AF(+) |                 | AAAGCAATCGCAGAGCGCAAC              |                       |
| BrK41R(-)  |                 | TACGAATTTGTTGATGTTAAGCAA           |                       |
| BrE45AF(+) |                 | AAAGCAATCAAAGAGCGCAAC              |                       |
| BrK41R(-)  |                 | TACGAATTTGTTGATGTTAAGCAA           |                       |
| BrYVAR46AF(+) |           | AAGAGGCAAAACAATGAATTC              |                       |
| BrYVAR46AR(-) |             | TGATTTGCTTTTACGAAATTGTTTC         |                       |
| BrYVAN47AF(+) |           | AAGAGCGCGCAAAATGAATTC              |                       |
| BrYVAR46AR(-) |             | TGATTTGCTTTTACGAAATTGTTTC         |                       |
| BrN48AF(+) |                 | GCCGAATTCAAGATGATATTTTATTCGC       |                       |
| BrN48R(-)  |                 | GTTGCGCCTTTTGTGATGCTTTTACG         |                       |
| BrE49AF(+) |                 | AATGCTTCAAGATGATATTTTATTCGC        |                       |
| BrN48R(-)  |                 | GTTGCGCCTTTTGTGATGCTTTTACG         |                       |
| BrF50AF(+) |                 | GAAGCCAAGATGATATTTTATA             |                       |
| BrF50R(-)  |                 | ATTTGCTCCTTTTGATGCTTG             |                       |
| BrK51AF(+) |                 | AATGAATTTGCGCAATTTTATTCGC          |                       |
| BrN48R(-)  |                 | GTTGCGCCTTTTGTGATGCTTTTACG         |                       |
| Experiment | Name     | Sequence                           | Note                  |
|------------|----------|------------------------------------|-----------------------|
| BrI52AF(+)|          | AATGAATTCAAGGCTGATATTTTATTTCGC     | P0^Br^I52A cloning    |
| BrN48R(-) |          | GTTGCGCTCTTGGATTGCTTTTACG          |                       |
| BrD53AF(+)|          | AATGAATTCAAGAGATTGCTTTTATTTCGC     | P0^Br^D53A cloning    |
| BrN48R(-) |          | GTTGCGCTCTTGGATTGCTTTTACG          |                       |
| BrI54AF(+)|          | AATGAATTCAAGGATGCTTTTATTTCGC       | P0^Br^I54A cloning    |
| BrN48R(-) |          | GTTGCGCTCTTGGATTGCTTTTACG          |                       |
| BrF55AF(+)|          | ATTGCTATTCGCTCTCTGC                | P0^Br^F55A cloning    |
| BrF55R(-) |          | ATCAATCTTGAATCTGATTTGTTC           |                       |
| BrI56AF(+)|          | AATGAATTCAAGATGCTTTTACTTGCTCAGTC   | P0^Br^I56A cloning    |
| BrN48R(-) |          | GTTGCGCTCTTGGATTGCTTTTACG          |                       |
| BrR57AF(+)|          | GCATCTCTGATCTCACTGTTTCCTCTCTCCTCCTC| P0^Br^R57A cloning    |
| BrS58R(-) |          | AATAAAAATATCAATCTTGAAAT            |                       |
| BrS58AF(+)|          | CGCGCTCTGCTCTANATGCAGGGCTTCCTGCTCTC| P0^Br^S58A cloning    |
| BrS58R(-) |          | AATAAAAATATCAATCTTGAAAT            |                       |
| BrL59AF(+)|          | CGCTCTCTCGCTCTCTATGCAGGGCTTCCTGCTCTC| P0^Br^L59A cloning    |
| BrS58R(-) |          | AATAAAAATATCAATCTTGAAAT            |                       |
| BrL60AF(+)|          | CGCTCTCTCGCTCTATGCAGGGCTTCCTGCTCTC| P0^Br^L60A cloning    |
| BrS58R(-) |          | AATAAAAATATCAATCTTGAAAT            |                       |
| BrY61AF(+)|          | CGCTCTCTCGCTCTCTATGCAGGGCTTCCTGCTCTC| P0^Br^Y61A cloning    |
| BrS58R(-) |          | AATAAAAATATCAATCTTGAAAT            |                       |
| BrYVAQ62AF(+)| | GCACCTCTCCTCCTCCTCCTCGG            | P0^Br^Q62A cloning    |
| BrYVAQ62AR(-)| | ATAGAGCAGAGAGCGAAT              |                       |
| BrL63AF(+)|          | CGCTCTCTGCTCTACGACCTCCTCCTCCTCCTC| P0^Br^L63A cloning    |
| Experiment | Name       | Sequence                          | Note          |
|------------|------------|-----------------------------------|---------------|
| BrS58R(-)  | AATAAAAATATCAATCTTGAAT            |                |
| BrYVAL65AF(+) | CAGCTTCCCTGCACTTCTCGG          | P0<sup>Br</sup>L65A cloning    |
| BrYVAQ62AR(-) | ATAGAGCAGAGAGCGAAT               |                |
| BrYVAL66AF(+) | CAGCTTCCCTCAGCAGTACGGG          | P0<sup>Br</sup>L66A cloning    |
| BrYVAQ62AR(-) | ATAGAGCAGAGAGCGAAT               |                |
| BrL67AF(+)  | GCAGGAGACCACGTCAGTACGAGTACGGG     | P0<sup>Br</sup>L67A cloning    |
| BrL67R(-)   | AAGGAGAGGAGCTGATAGAGCAG         |                |
| BrG68AF(+)  | CTCGGAGAGACGTCAGTACGAGTACGGG     | P0<sup>Br</sup>G68A cloning    |
| BrL67R(-)   | AAGGAGAGGAGCTGATAGAGCAG         |                |
| BrD69AF(+)  | CTCGGAGACAACGTCCAGTACGAGTACGGG   |                |
| BrL67R(-)   | AAGGAGAGGAGCTGATAGAGCAG         | P0<sup>Br</sup>D69A cloning    |
| BrH70AF(+)  | CTCGGAGACGAGCTCAGTACGAGTACGGG    | P0<sup>Br</sup>H70A cloning    |
| BrL67R(-)   | AAGGAGAGGAGCTGATAGAGCAG         |                |
| BrV71AF(+)  | CTCGGAGACAGGCAGTACGAGTACGGG      | P0<sup>Br</sup>V71A cloning    |
| BrL67R(-)   | AAGGAGAGGAGCTGATAGAGCAG         |                |
| BrH72AF(+)  | CTCGGAGACACGTCAGTACGAGTACGGG     | P0<sup>Br</sup>H72A cloning    |
| BrL67R(-)   | AAGGAGAGGAGCTGATAGAGCAG         |                |
| BrD73AF(+)  | CTCGGAGACACGTCAGTACGAGTACGGG     | P0<sup>Br</sup>D73A cloning    |
| BrL67R(-)   | AAGGAGAGGAGCTGATAGAGCAG         |                |
| BrD74AF(+)  | CTCGGAGACACGTCAGTACGAGTACGGG     | P0<sup>Br</sup>D74A cloning    |
| BrL67R(-)   | AAGGAGAGGAGCTGATAGAGCAG         |                |
| BrV75AF(+)  | CTCGGAGACACGTCAGTACGAGCAGAAGG   | P0<sup>Br</sup>V75A cloning    |
| BrL67R(-)   | AAGGAGAGGAGCTGATAGAGCAG         |                |
| Experiment | Name     | Sequence                                  | Note                   |
|------------|----------|-------------------------------------------|------------------------|
| BrYVAR76AF(+) | CGTTGCAAAAGTCCATACTTGTC | P0BrR76A cloning                  |
| BrYVAR76AR(-) | TCATCGTGAGCAGTGTTCTCC |                          |
| BrK77AF(+) | GCATCCATACTTGTCCCCGGAACCA | P0BrK77A cloning                  |
| BrS78R(-) | CCTAACGTCATCGTGAGCGTG |                          |
| BrS78AF(+) | AAGCCATACTTGTCCCCGGAAC | P0BrS78A cloning                  |
| BrS78R(-) | CCTAACGTCATCGTGAGCGTG |                          |
| BrL80AF(+) | AAGTCCTAGCAGTCCTCGGACA | P0BrL80A cloning                  |
| BrS78R(-) | CCTAACGTCATCGTGAGCGTG |                          |
| BrV81AF(+) | AAGTCATACCTTGCCCCCGGAACA | P0BrV81A cloning                  |
| BrS78R(-) | CCTAACGTCATCGTGAGCGTG |                          |
| BrE83AF(+) | AAGTCATACCTTGCCCCGGAACA | P0BrE83A cloning                  |
| BrS78R(-) | CCTAACGTCATCGTGAGCGTG |                          |
| BrE85AF(+) | GCACCTCTGCGCCCTGTTCTCTTTAC | P0BrE85A cloning                  |
| BrE85R(-) | TGATTCAGGACAAGTATGGAC |                          |
| BrL86AF(+) | GAGCCACGCGCTGGTTCTCTTTAC | P0BrL86A cloning                  |
| BrE85R(-) | TGATTCAGGACAAGTATGGAC |                          |
| BrC87AF(+) | GAGCTCGACAGCTGGTTCTCTTTAC | P0BrC87A cloning                  |
| BrE85R(-) | TGATTCAGGACAAGTATGGAC |                          |
| BrW89AF(+) | GAGCTCTGCGCCGACATTCTCTTTAC | P0BrW89A cloning                  |
| BrE85R(-) | TGATTCAGGACAAGTATGGAC |                          |
| BrF90AF(+) | TGAGCCCTCTTTACAAACGGG | P0BrF90A cloning                  |
| Experiment | Name    | Sequence                                                                 | Note                  |
|------------|---------|--------------------------------------------------------------------------|-----------------------|
| BrF90R(-)  |         | GGCGCAGAGCTCTGGTTCAG                                                    |                       |
| BrS91AF(+) |         | GCTTTACAACGGAGATATGC                                                    | P0BrS91A cloning      |
| BrS91R(-)  |         | GAACCAGGGCAGAGCTCTGG                                                    |                       |
| BrYVAL92AF(+) |       | TCTGCACAAACGGGATATG                                                    | P0BrL92A cloning      |
| BrYVAL92AR(-) |       | GAACCAGGGCAGAGCTCTGG                                                   |                       |
| BrQ93AF(+) |         | TCTTTAGCAACGGGATATGCTCC                                                  | P0BrQ93A cloning      |
| BrS91R(-)  |         | GAACCAGGGCAGAGCTCTGG                                                    |                       |
| BrT94AF(+) |         | TCTTTACAACGGGATATGCTCC                                                  | P0BrT94A cloning      |
| BrS91R(-)  |         | GAACCAGGGCAGAGCTCTGG                                                    |                       |
| BrG95AF(+) |         | TCTTTACAACGGGATATGCTCC                                                  | P0BrG95A cloning      |
| BrS91R(-)  |         | GAACCAGGGCAGAGCTCTGG                                                    |                       |
| BrY96AF(+) |         | TCTTTACAACGGGATATGCTCC                                                  | P0BrY96A cloning      |
| BrS91R(-)  |         | GAACCAGGGCAGAGCTCTGG                                                    |                       |
| BrS100AF(+) |        | GCCGCCACCTACGGGCTG                                                     | P0BrS100A cloning     |
| BrS100R(-) |         | GGAGGCATATCCGGTTTGA                                                   |                       |
| BrT101AF(+) |        | GCCTCAGGGCTCCGGTGTG                                                   | P0BrT101A cloning     |
| BrS100R(-) |         | GGAGGCATATCCGGTTTGA                                                   |                       |
| BrS102AF(+) |        | GCCTCAGGGCTCCGGTGTG                                                   | P0BrS102A cloning     |
| BrS100R(-) |         | GGAGGCATATCCGGTTTGA                                                   |                       |
| BrG103AF(+) |        | GCCTCAGGGCTCCGGTGTG                                                   | P0BrG103A cloning     |
| BrS100R(-) |         | GGAGGCATATCCGGTTTGA                                                   |                       |
| BrR104AF(+) |        | GCCTCAGGGCTCCGGTGTG                                                   | P0BrR104A cloning     |
| BrS100R(-) |         | GGAGGCATATCCGGTTTGA                                                   |                       |
| Experiment | Name       | Sequence                        | Note                      |
|------------|------------|---------------------------------|---------------------------|
| BrV105AF(+) | GCCCTCACCTCAGGCCGTGCAAAC         | P0^{Br}V105A cloning          |
| BrS100R(-) | GGGAGCATATCCCGTTTGTCA           |                            |
| BrYVAN106AF(+) | TGCATTACACGTGCCAGG     | P0^{Br}N106A cloning          |
| BrYVAN106AR(-) | ACACGGCCTGAGGTGGAGG     |                            |
| BrYVAL107AF(+) | TAACGGCACACGTGCCAGG     | P0^{Br}L107A cloning          |
| BrYVAN106AR(-) | ACACGGCCTGAGGTGGAGG     |                            |
| BrYVAH108AF(+) | TAACTTAGCAGTGCCAGG     | P0^{Br}H108A cloning          |
| BrYVAN106AR(-) | ACACGGCCTGAGGTGGAGG     |                            |
| BrK113F(-) | ACCTCTCGTGAAGAATC         | P0^{Br}V109A cloning          |
| BrV109AR(+) | CTTGGTTTGGCTGGCAGTGCAA     |                            |
| BrK113F(-) | ACCTCTCGTGAAGAATC         | P0^{Br}G111A cloning          |
| BrG111AR(+) | CTTGGTTTGGCTGGCAGTGCAA     |                            |
| BrT112AF(+) | GGAGCCAAGACCTCTCTGAG      | P0^{Br}T112A cloning          |
| BrT112R(-) | TGGCACGTGTAAGTTAAC         |                            |
| BrK113F(-) | ACCTCTCTGTAAGAATC         | P0^{Br}K113A cloning          |
| BrK113AR(+) | TGCCGTTCTCGGCGACTCAGAATC    |                            |
| BrS115AF(+) | ACCGCTCTAGAAGAATCAT        | P0^{Br}S115A cloning          |
| BrS115R(-) | CTGGTTTCTCGGCGACTCAGAATC    |                            |
| BrR116AF(+) | ACCTCTGCAAGAAGAACCATACAAC   | P0^{Br}R116A cloning          |
| BrS115R(-) | CTGGTTTCTCGGCGACTCAGAATC    |                            |
| BrR117AF(+) | ACCTCTGCAAGAAGAACCATACAAC   | P0^{Br}R117A cloning          |
| BrS115R(-) | CTGGTTTCTCGGCGACTCAGAATC    |                            |
| BrR118AF(+) | ACCTCTGCAAGAAGAACCATACAAC   | P0^{Br}R118A cloning          |
| Experiment | Name | Sequence | Note |
|------------|------|----------|------|
| BrS115R(-) | CTTGGTTCCTGGCACGTGTA |  |
| Br119AF(+) | ACCTCTCGTAGAGAGCCATACAA | P0Br119A cloning |
| BrS115R(-) | CTTGGTTCCTGGCACGTGTA |  |
| BrI120AF(+) | ACCTCTCGTAGAGAGCCATACAA | P0Br120A cloning |
| BrS115R(-) | CTTGGTTCCTGGCACGTGTA |  |
| BrYVAQ121AF(+) | GCACGATCTCTTGGCGAGC | P0BrQ121A cloning |
| BrYVAQ121AR(-) | TATGATTTCTTCTAGAGAG |  |
| BrR122AF(+) | GCATCTTGTGCCAGACATTTTC | P0BrR122A cloning |
| BrS123R(-) | TTGTATGATTTCTTCTACGAGAG |  |
| BrS123AF(+) | CGACGATCTCTTGGCGAGC | P0BrS123A cloning |
| BrS123R(-) | TTGTATGATTTCTTCTACGAGAG |  |
| BrL124AF(+) | CGATCTGCAGCCGAGCCATTTC | P0BrL124A cloning |
| BrS123R(-) | TTGTATGATTTCTTCTACGAGAG |  |
| BrS126AF(+) | CGACGATCTCTTGGCGAGC | P0BrS126A cloning |
| BrS123R(-) | TTGTATGATTTCTTCTACGAGAG |  |
| BrYVAN127AF(+) | AGCGCATTCTCAGAGAAAG | P0BrN127A cloning |
| BrYVA N127AR(-) | CGCAAGAGATCGTTGTATG |  |
| BrF128AF(+) | AATGCTCTGAGAGATCTTCAAG | P0BrF128A cloning |
| BrF128AR(-) | GCTCGCAAGAGATCTTCAAG |  |
| BrS129AF(+) | CGATCTTGTGCCAGAATTTCTGAGAATAAGTCTCAAG | P0BrS129A cloning |
| BrS123R(-) | TTGTATGATTTCTTCTACGAGAG |  |
| BrE130AF(+) | GCCAAATTTGAGAATGTTTA | P0BrE130A cloning |
| BrE130R(-) | TGAAAGATTGCTCGAGAGATCG |  |
| Experiment   | Name   | Sequence                                                                 | Note                      |
|--------------|--------|--------------------------------------------------------------------------|---------------------------|
| BrK131AF(+)  |        | GAAGCATTTCAAGCGATTTCCAGAATGTTTA                                         | P0BrK131A cloning         |
| BrE130R(-)   |        | TGAGAAATTGCTCGCAAGAGATCG                                                 |                           |
| BrF132AF(+)  |        | AAGGCCAAGCGATTTCCAGA                                                     | P0BrF132A cloning         |
| BrF132R(-)   |        | TTCTGAGAAATTGCTCGCAAG                                                    |                           |
| BrK133AF(+)  |        | GAAAAGTTTCAGCAGATTTCCAGAATGTTTA                                         | P0BrK133A cloning         |
| BrE130R(-)   |        | TGAGAAATTGCTCGCAAGAGATCG                                                 |                           |
| BrR134AF(+)  |        | GAAAAGTTTCAGCAGATTTCCAGAATGTTTA                                         | P0BrR134A cloning         |
| BrE130R(-)   |        | TGAGAAATTGCTCGCAAGAGATCG                                                 |                           |
| BrF135AF(+)  |        | CGAGCTCCAGAATGTTTATTC                                                   | P0BrF135A cloning         |
| BrF135R(-)   |        | CTGGAACCTTTCGTGAGAAATTTGA                                                |                           |
| BrE137AF(+)  |        | GAAAAGTTTCAGCAGATTTCCAGAATGTTTA                                         | P0BrE137A cloning         |
| BrE130R(-)   |        | TGAGAAATTGCTCGCAAGAGATCG                                                 |                           |
| BrYVAC138AF(+) |      | GCATTTATTCGGTTGAGCTTG                                                   | P0BrC138A cloning         |
| BrYVAC138AR(-) |      | TTCTGGAAATCGCTTGAAC                                                     |                           |
| BrYVAL139AF(+) |      | TGTGCACTTTCGGTTGAGCTTG                                                  | P0BrL139A cloning         |
| BrYVAC138AR(-) |      | TTCTGGAAATCGCTTGAAC                                                     |                           |
| BrF140AF(+)  |        | TTAGCCGGTTGAGCTTGAAC                                                    | P0BrF140A cloning         |
| BrF140R(-)   |        | ACATTCTGGAAATCGCTTGAAC                                                  |                           |
| BrV141AF(+)  |        | GCCGGCTTTGAGACATTTCCAGCGA                                                | P0BrV141A cloning         |
| BrV141R(-)   |        | GAATAAACATTTCTGGAATCG                                                   |                           |
| BrG142AF(+)  |        | GTCAGCTTTGAGACATTTCCAGCGA                                                | P0BrG142A cloning         |
| BrV141R(-)   |        | GAATAAACATTTCTGGAATCG                                                   |                           |
| BrL143AF(+)  |        | GTCAGCTTTGAGACATTTCCAGCGA                                                | P0BrL143A cloning         |
| Experiment   | Name              | Sequence                                   | Note                      |
|-------------|------------------|--------------------------------------------|---------------------------|
| BrV141R(-)  | GAATAAACATTTCTGGAAATCG |                                            |                           |
| BrE144AF(+) | GTTGCCCTTGACATTTCGCCAGCA |                                            | P0BrE144A cloning         |
| BrV141R(-)  | GAATAAACATTTCTGGAAATCG |                                            |                           |
| BrH145AF(+) | GTTGCCCTTGACATTTCGCCAGCA |                                            | P0BrH145A cloning         |
| BrV141R(-)  | GAATAAACATTTCTGGAAATCG |                                            |                           |
| BrF146AF(+) | GCCCAGCGATTTCTGTCTAC  |                                            | P0BrF146A cloning         |
| BrF146R(-)  | ATGTCAGCGCAGCACTGGAAATAC |                                          |                           |
| BrYVAQ147AF(+) | GCACGATTTCTGTCTACTTGT |                                            | P0BrQ147A cloning         |
| BrYVAQ147AR(-) | GAATGCTTGACAGCACTGGAAATAC |                                          |                           |
| BrYVAR148AF(+) | CAGGCATTTCTGTCTACTTGT |                                            | P0BrR148A cloning         |
| BrYVAQ147AR(-) | GAATGCTTGACAGCACTGGAAATAC |                                          |                           |
| BrF149AF(+) | CGAGCTCTCTCTACTTGGAC  |                                            | P0BrF149A cloning         |
| BrF149R(-)  | CTGGCAATTTCTTGAGCACTGGAAATAC |                                          |                           |
| BrL150AF(+) | GCATCTACTTGGACTAGAGATGC |                                            | P0BrL150A cloning         |
| BrS151R(-)  | AAATCGCTGGAAATTTCTTGCAAG |                                          |                           |
| BrS151AF(+) | CTGGCCTTTGGACTAGAGATGC |                                            | P0BrS151A cloning         |
| BrS151R(-)  | AAATCGCTGGAAATTTCTTGCAAG |                                          |                           |
| BrT152AF(+) | CTGTCTACTTGGACTAGAGATGC |                                            | P0BrT152A cloning         |
| BrS151R(-)  | AAATCGCTGGAAATTTCTTGCAAG |                                          |                           |
| BrW153AF(+) | CTGTCTACTTGGACTAGAGATGC |                                            | P0BrW153A cloning         |
| BrS151R(-)  | AAATCGCTGGAAATTTCTTGCAAG |                                          |                           |
| BrT154AF(+) | CTGTCTACTTGGACTAGAGATGC |                                            | P0BrT154A cloning         |
| BrS151R(-)  | AAATCGCTGGAAATTTCTTGCAAG |                                          |                           |
| Experiment | Name         | Sequence                          | Note                  |
|------------|--------------|-----------------------------------|-----------------------|
| BrR155AF(+) | CTGCTACTTTGGACTGCAGATGC            | P0BrR155A cloning              |
| BrS151R(-)  | AAATCGCTGGAAATGTTCAAG              |                                    |
| BrD156AF(+) | CTGCTCTTTGGACTAGAGCAGC             | P0BrD156A cloning              |
| BrS151R(-)  | AAATCGCTGGAAATGTTCAAG              |                                    |
| BrR160AF(+) | GAAAGACGACTCTTTCTTGCTTG            | P0BrE158A cloning              |
| BrE158R(-)  | AGCATCTCTAGTCCAAAGTAG              |                                    |
| BrL161AF(+) | GAAAGACGCGCATTTTCCTGGCTG           | P0BrL161A cloning              |
| BrE158R(-)  | AGCATCTCTAGTCCAAAGTAG              |                                    |
| BrF162AF(+) | CTCGCTCTTGCTGCTGAGAAA             | P0BrF162A cloning              |
| BrF162R(-)  | GCCTTTTTCCAGATCTCTTAG              |                                    |
| BrYVAG164AF(+) | CCTGCATGTCGAGAAATTC               | P0BrG164A cloning              |
| BrYVAG164AR(-) | AAAGAGGCGTCTTTCACGC               |                                    |
| BrC165AF(+) | GAAAGACGCCTCTTTCTGGGCTTGAG        | P0BrC165A cloning              |
| BrE158R(-)  | AGCATCTCTAGTCCAAAGTAG              |                                    |
| BrYVAR166AF(+) | CTCGGCTGTGCAAGAAATTC              | P0BrR166A cloning              |
| BrYVAG164AR(-) | AAAGAGGCGTCTTTCACGC               |                                    |
| BrE167AF(+) | GCAATTTCTGTGGGTCTGACACG            | P0BrE167A cloning              |
| BrE167R(-)  | TCGACAGCCAGGAAGAGGCC              |                                    |
| BrI168AF(+) | GAAGCACTCTGTGGGTCTCACACG           | P0BrI168A cloning              |
| BrE167R(-)  | TCGACAGCCAGGAAGAGGCC              |                                    |
| BrV170AF(+) | GAAATTCCTCGAGGGTCTCACACG           | P0BrV170A cloning              |
| BrE167R(-)  | TCGACAGCCAGGAAGAGGCC              |                                    |
| BrG171AF(+) | GAAATTCCTGTGGGCATCTCACACG          | P0BrG171A cloning              |
| Experiment | Name         | Sequence                                      | Note                     |
|------------|--------------|-----------------------------------------------|--------------------------|
| BrE167R(-) | TCGACAGCCAGGAAGGAGCCG |                                          |                          |
| BrS172AF(+) | GGGGCTCACACGCTTGTGGA |                                          | P0^Br^S172A cloning     |
| BrS172R(-) | CACAGGAATTTCCTCGACAGC |                                          |                          |
| BrH173AF(+) | GAAATTTCTGTGGGCTCTGCAACG |                                          | P0^Br^H173A cloning     |
| BrE167R(-) | TCGACAGCCAGGAAGGAGCCG |                                          |                          |
| BrT174AF(+) | GGGTCTCACCCGCTTGTGGAGCTCGC |                                          | P0^Br^T174A cloning     |
| BrS172R(-) | CACAGGAATTTCCTCGACAGC |                                          |                          |
| BrL175AF(+) | GCAGTGGAGCTCGCTAATGTGTC |                                          | P0^Br^L175A cloning     |
| BrL175R(-) | CGTGTGAGACCCACAGGAATTTCCTCGAC |                                          |                          |
| BrV176AF(+) | CTTGCAAGAGCTCGCTAATGTGGG |                                          |                          |
| BrL175R(-) | CGTGTGAGACCCACAGGAATTTCCTCGAC |                                          |                          |
| BrE177AF(+) | CTTGTCACCTCGCTAATGTGGG |                                          | P0^Br^E177 cloning      |
| BrL175R(-) | CGTGTGAGACCCACAGGAATTTCCTCGAC |                                          |                          |
| BrL178AF(+) | CTTGTCAGGACGCTAATGTGGG |                                          | P0^Br^L178A cloning     |
| BrL175R(-) | CGTGTGAGACCCACAGGAATTTCCTCGAC |                                          |                          |
| BrN180AF(+) | CTTGTCAGGACGCTAATGTGGG |                                          | P0^Br^N180A cloning     |
| BrL175R(-) | CGTGTGAGACCCACAGGAATTTCCTCGAC |                                          |                          |
| BrVYAV181AF(+) | GCGAGCCGAGCTTCCTCCGC |                                          | P0^Br^V181A cloning     |
| BrVYAV181AR(-) | ATTAGCGAGCTCCACAAGC |                                          |                          |
| BrVYAG182AF(+) | GTTGCAGAGCTTCCTCCGC |                                          | P0^Br^G182A cloning     |
| BrVYAV181AR(-) | ATTAGCGAGCTCCACAAGC |                                          |                          |
| BrE183AF(+) | GCACCTTCTCCGCTTATGGTGGG |                                          | P0^Br^E183A cloning     |
| BrE183R(-) | GCCAACATTAGCGAGCTCCACAAG |                                          |                          |
| Experiment | Name          | Sequence                        | Note                  |
|------------|---------------|---------------------------------|-----------------------|
| BrL184AF(+) | GAGGCACTCCGCGTTATGGTGCC |                                | P0^Br^L184A cloning   |
| BrE183R(-) | GCCAACATTAGCGAGCTCCACAAG |                                |                       |
| BrL185AF(+) | GAGCTTGCAAGCGTTATGGTGCC  |                                | P0^Br^L185A cloning   |
| BrE183R(-) | GCCAACATTAGCGAGCTCCACAAG |                                |                       |
| BrR186AF(+) | GAGCTTTCTCGCATGTATGGTGCC  |                                | P0^Br^R186A cloning   |
| BrE183R(-) | GCCAACATTAGCGAGCTCCACAAG |                                |                       |
| BrV187AF(+) | GAGCTTCTCCGCTATGGTGCC    |                                | P0^Br^V187A cloning   |
| BrE183R(-) | GCCAACATTAGCGAGCTCCACAAG |                                |                       |
| BrM188AF(+) | GAGCTTCTCCGCTATGGTGCC    |                                | P0^Br^M188A cloning   |
| BrE183R(-) | GCCAACATTAGCGAGCTCCACAAG |                                |                       |
| BrV189AF(+) | GAGCTTCTCCGCTATGGTGCC    |                                | P0^Br^V189A cloning   |
| BrE183R(-) | GCCAACATTAGCGAGCTCCACAAG |                                |                       |
| BrYVAD191AF(+) | GCTGCAGAGCAATTTTAC     |                                | P0^Br^D191A cloning   |
| BrYVAD191AR(-) | CACCATAACGCGGAGAAGC   |                                |                       |
| BrYVAE192AF(+) | GCTGATGCACAATTTTAC     |                                | P0^Br^E192A cloning   |
| BrYVAD191AR(-) | CACCATAACGCGGAGAAGC   |                                |                       |
| BrQ193AF(+) | GCATTTCAACCACCTCCGTC   |                                | P0^Br^Q193A cloning   |
| BrQ193R(-) | CTATCACGCACCACATAACG   |                                |                       |
| BrH195AF(+) | CAATTTGCAACTCTCCGTC    |                                | P0^Br^H195A cloning   |
| BrQ193R(-) | CTATCACGCACCACATAACG   |                                |                       |
| BrN196AF(+) | CAATTTCAACGCATCCGTC    |                                | P0^Br^N196A cloning   |
| BrQ193R(-) | CTATCACGCACCACATAACG   |                                |                       |
| BrS197AF(+) | AAGGCCGTCTTCTGTCG      |                                | P0^Br^S197A cloning   |
| Experiment | Name     | Sequence                      | Note                  |
|------------|----------|-------------------------------|-----------------------|
| BrS197R(-) |          | GTGAAATTGCTCATCAGCCA          |                       |
| BrR198AF(+) |         | CAATTTCAACAACCTCGCAGCTTC     | P0Br198A cloning      |
| BrQ193R(-) |          | CTCATCGACACCATTAACG          |                       |
| BrYVAL199AF(+) |   | GCACTGTCTCGCCCTTGTCTG       | P0BrL199A cloning     |
| BrYVAL199AR(-) |       | ACGGGAGTTTGTAACATTGC        |                       |
| BrYVAL200AF(+) |   | CTTCATCTCGAGCTTGTCTG        | P0BrL200A cloning     |
| BrYVAL199AR(-) |       | ACGGGAGTTTGTAACATTGC        |                       |
| BrS201AF(+) |          | AACTCGGTCTGCTGCTCGCTGCTGTAC | P0BrS201A cloning     |
| BrS197R(-) |          | GTGAAATTGCTCATCAGCCA          |                       |
| BrR202AF(+) |          | GCACCTTGCTGTCATGTTTAC       | P0BrR202A cloning     |
| BrR202R(-) |          | AGACACAAGAGAGGAGTTG         |                       |
| BrL203AF(+) |          | CGCCTCAGCTGCTACGTTTACC      | P0BrL203A cloning     |
| BrR202R(-) |          | AGACACAAGAGAGGAGTTG         |                       |
| BrV205AF(+) |          | CGCCTGCTGAACGTTTACC         | P0BrV205A cloning     |
| BrR202R(-) |          | AGACACAAGAGAGGAGTTG         |                       |
| BrH206AF(+) |          | CGCCTGCTGTACGTGTTTACC       | P0BrH206A cloning     |
| BrR202R(-) |          | AGACACAAGAGAGGAGTTG         |                       |
| BrYVAC207AF(+) |     | CACGCATAAGATTTATGTTGA       | P0BrC207A cloning     |
| BrYVAC207AR(-) |   | TACAGCAAGACGCCAGAGAC        |                       |
| BrY208AF(+) |          | TGGCCACAAGATTTATGTTGA       | P0BrY208A cloning     |
| BrY208R(-)  |          | GTGACGCAAGAGCCAGAGAGAG      |                       |
| BrK209AF(+) |          | GCAAATTTATGGAAGATGTTG      | P0BrK209A cloning     |
| BrK209R(-)  |          | GTAACAGTGTACAGCAAGGCCG      |                       |
| Experiment | Name            | Sequence                                                                 | Note               |
|------------|-----------------|--------------------------------------------------------------------------|--------------------|
| BrI210AF(+)| AAGGCATATG    GGTGAAGATGGT                                              | P0BrI210A cloning   |
| BrK209R(-) | GTAACAGTGTACAGCAAGGCG                                           |                    |
| BrY211AF(+)| TGTTCACAAGATTGCGTGGAAGATGGTTTC                                   | P0BrY211A cloning   |
| BrY208R(-) | GTGTACAGCAAGGCGAGA                                                 |                    |
| BrG212AF(+)| AAGATTATGCGAGAAGATGGT                                              | P0BrG212A cloning   |
| BrK209R(-) | GTAACAGTGTACAGCAAGGCG                                           |                    |
| BrE213AF(+)| AAGATTTATGCGAGATGGT                                              | P0BrE213A cloning   |
| BrK209R(-) | GTAACAGTGTACAGCAAGGCG                                           |                    |
| BrD214AF(+)| AAGATTATGCGAGATGGT                                              | P0BrD214A cloning   |
| BrK209R(-) | GTAACAGTGTACAGCAAGGCG                                           |                    |
| BrYVAG215AF(+)| GCATTCATTTCATTTTTTTTTGG                                   | P0BrY215A cloning   |
| BrYVAG215AR(-)| ATCTTCACCATAAAATCTTTG                                       |                    |
| BrF216AF(+)| GGTGCCATTTATTTTTTTTTGAGG                                       | P0BrF216A cloning   |
| BrF216R(-) | ATCTTCACCATAAAATCTTTGGAAC                                       |                    |
| BrYVAI217AF(+)| GGGTTTCGCAATCTTTTTTTGG                                   | P0BrY217A cloning   |
| BrYVAG215AR(-)| ATCTTCACCATAAAATCTTTG                                       |                    |
| BrF219AF(+)| TCTGCTTGGAGGATTGCGCAAAA                                      | P0BrF219A cloning   |
| BrF219R(-) | AATGAAACCACATCTTTGACACCATAA                                     |                    |
| BrW220AF(+)| GCAAGATTGCGCAATCTTTG                                           | P0BrW220A cloning   |
| BrW220R(-) | AAAAGAAATGCAAAACCATCTTTGCA                                      |                    |
| BrR221AF(+)| TGGGCATTGCGCAATCTTTG                                           | P0BrR221A cloning   |
| BrW220R(-) | AAAAGAAATGCAAAACCATCTTTGCA                                      |                    |
| BrI222AF(+)| TGGAGGGCAGCAATCTTTG                                           | P0BrI222A cloning   |
| Experiment | Name | Sequence | Note |
|------------|------|----------|------|
| BrW220R(-) | AAAAGAAATGAAACCATCTTCAC | |
| BrYVAN224AF(+) | GCACTGGATCATTTGCGATTGC | P0^Br^N224A cloning |
| BrYVAN224AR(-) | GCGAATCTCTCCAAAAAG | |
| BrYVAL225AF(+) | AATGCAGATCATTTGCGATTGC | P0^Br^L225A cloning |
| BrYVAN224AR(-) | GCGAATCTCTCCAAAAAG | |
| BrYVAD226AF(+) | AAATCGGCCATTTGCGATTGC | P0^Br^D226A cloning |
| BrYVA N224AR(-) | GCGAATCTCTCCAAAAAG | |
| BrH227AF(+) | GCATTCGATCTTTTCTCAC | P0^Br^H227A cloning |
| BrH227R(-) | ATCCAGATTGCGAATCTTC | |
| BrF228AF(+) | CATTTCGCATTTTCTCAC | P0^Br^F228A cloning |
| BrF228R(-) | ATCCAGATTGCGAATCTTC | |
| BrD229AF(+) | CATTTCGCATTTTCTCAC | P0^Br^D229A cloning |
| BrH227R(-) | ATCCAGATTGCGAATCTTC | |
| BrC230AF(+) | CATTTCGATCTTTTCTCAC | P0^Br^C230A cloning |
| BrH227R(-) | ATCCAGATTGCGAATCTTC | |
| BrF231AF(+) | TGGCCTCTGATCTTTTCTCAC | P0^Br^D231A cloning |
| BrF231R(-) | ATCCAGATTGCGAATCTTC | |
| BrYVAL232AF(+) | GCAACTCTCTGATCCAGAATGCC | P0^Br^L232A cloning |
| BrYVAL232AR(-) | AAAGCAATCTGAAATCG | |
| BrT233AF(+) | TGGCTTTTCTGCTTTTCTGAAATG | P0^Br^T233A cloning |
| BrF231R(-) | ATCCAGATTGCGAATCTTC | |
| BrE235AF(+) | GCAGAATCTTTTCTAGCTC | P0^Br^E235A cloning |
| BrE235R(-) | AGGAGTGAGAAGCAATCG | |
| Experiment | Name       | Sequence                              | Note                  |
|------------|------------|---------------------------------------|-----------------------|
| BrE236AF(+) | GAAGCAATCCTTTTCAGCTC                          | P0^{Br}E236A cloning |
| BrE235R(-) | AGGAGTGAGAAAGCAATCG                          |                       |
| BrI237AF(+) | GAAGAAGCAATTTCAGCTC                          |                       |
| BrI237A cloning | GAAGAAGCAATTTCAGCTC                      |                       |
| BrL238AF(+) | GAAGAAATCGCATTTTCAGCTC                      | P0^{Br}L238A cloning |
| BrE235R(-) | AGGAGTGAGAAAGCAATCG                          |                       |
| BrF239AF(+) | CTTGCCAGCTCTTTGCTAC                           | P0^{Br}F239A cloning |
| BrF239R(-) | GATTTCCTTCAGGAGTGAGAAG                          |                       |
| BrS240AF(+) | GCCTCTCGGTCTACACCGAAATG                         | P0^{Br}S240A cloning |
| BrS240R(-) | GAAAAGGATTTTCAGGAGTG                          |                       |
| BrS241AF(+) | AGCGCTTCGGGTCTACACCGAAATG                       | P0^{Br}S241A cloning |
| BrS240R(-) | GAAAAGGATTTTCAGGAGTG                          |                       |
| BrV243AF(+) | GCATACACCAGAATGGTTT                           | P0^{Br}V243A cloning |
| BrV243R(-) | CGAAGAGCTGAAAGAGATTTC                          |                       |
| BrY244AF(+) | AGCTCTCGGTCCAGCCACCGAAATGGTTT                  | P0^{Br}Y244A cloning |
| BrS240R(-) | GAAAAGGATTTTCAGGAGTG                          |                       |
| BrT245AF(+) | AGCTCTCGGTCTACGCCGAAATGGTTT                  | P0^{Br}T245A cloning |
| BrS240R(-) | GAAAAGGATTTTCAGGAGTG                          |                       |
| BrE246AF(+) | GTCTACACCAGAATGGTTT                           | P0^{Br}E246A cloning |
| BrV243R(-) | CGAAGAGCTGAAAGAGATTTC                          |                       |
| BrYVAM247AF(+) | GAAGCATTTTGTAGAGCAG                        | P0^{Br}M247A cloning |
| BrYVAM247AR(-) | GGTGTAGACCGAAGACGTG                     |                       |
| BrF248AF(+) | ATGGCTGTAGAGCAGAAGCTG                         | P0^{Br}F248A cloning |
| Experiment                          | Name            | Sequence                                         | Note                          |
|------------------------------------|-----------------|--------------------------------------------------|-------------------------------|
| BrF248R(-)                         | TTCGGTGTAGACCGAGAGC | -                                               | P0BrV249A cloning             |
| BrYVAV249AF(+)                     | GAAATGTTCAGAGCGAG | -                                               |                               |
| BrYVAM247AR(-)                     | GGTGTAGACCGAGACTG | -                                               |                               |
| Other substitution mutagenesis of P0Br |                  |                                                  |                               |
| BrY61DF(+)                         | CGCTCTCTGCTCGATCAGCTTCCTCTCC | -                                               | P0BrY61D cloning             |
| BrS58R(-)                          | AATAAAAAATATATCTTGGAAT | -                                               | P0BrA88F cloning             |
| BrA88F(+)                          | GAGCTCGGCAGCTGTTGGTCTCTTAC | -                                               |                               |
| BrE85R(-)                          | TGTTTCAAGAGACAAATGGAC | -                                               | P0BrA97F cloning             |
| BrA97FF(+)                         | TCTTTTACAAACGGGATATTCTCC | -                                               |                               |
| BrS91R(-)                          | GAACCAGGCGACAGCTCTGG | -                                               | P0BrA204F cloning             |
| BrA204FF(+)                        | CGCCCTTTTCTGTACTGTTAC | -                                               |                               |
| BrR202R(-)                         | AGACGAGAACGGGAGTTG | -                                               | P0BrA223F cloning             |
| BrA223FF(+)                        | TGGAGGAATTTTTCAATCTGG | -                                               |                               |
| BrW220R(-)                         | AAAAGAAATGAAACCCTCTCACC | -                                               |                               |
| Mutagenesis of consensus-residues in P0Br |                  |                                                  | P0BrLP (LP63-64AA) and P0BrLPK(LP44A) cloning |
| Tu194F(-)                          | TCCTTCTCGGAGACCACGTCCAC | -                                               |                               |
| TuLP63AAR(+)                       | GAGCTCGCTGCTGAGACAGAGAG | -                                               |                               |
| F219RF(+)                          | TCTAGGGTGGAGATTGCAATCTCG | -                                               | P0BrF219R cloning             |
| F219R(-)                           | AATGAACACCTCTCTCACC | -                                               | P0BrW220F cloning             |
| W220FF(+)                          | TCTTTGGGAGGATTGCAATCTCG | -                                               |                               |
| F219R(-)                           | AATGAACACCTCTCTCACC | -                                               |                               |
| Mutagenesis of BrYV infectious cDNA clone |            |                                                  |                               |
| BrpCB301Q2AF(+)                    | CATTTGGTACCTACGACAAACTTTCAC | -                                               | BrYV-P0Q2A cloning             |
| BrpCB301Q2AR(+)                    | CCATCAACTTTAGATCCCCTCTGCGG | -                                               |                               |
| BrP0Y61DF(+)                       | GATCAGCTTCTCTCTCTCTCGGAGACC | -                                               | BrYV-P0V61D cloning             |
| BrP0Y61DR(-)                       | GAGCAGAGAGGCAATAAATATCAATC | -                                               |                               |
| Experiment                      | Name      | Sequence                     | Note                                      |
|---------------------------------|-----------|------------------------------|-------------------------------------------|
|                                 | Br104CCF(+) | CCTAACGTTTCTTTTAGCAGGTTTATTG  | BrYV-P0<sup>F</sup>S cloning             |
|                                 | Br104R(-)  | CTGTCGCGGATGGAGGAATCTAATCT   |                                           |
| Semi quantitive RT-PCR          | ATG5-F    | AAGCTCATACGCATTCAGGG          | NbATG5 expression level analysis         |
|                                 | ATG5-R    | GCTTCGACCTTTGCTACCT           |                                           |
|                                 | BrP0-sqF  | ATGCAATTGTGACCTACAGG          | BrYV P0 expression level analysis        |
|                                 | BrP0-sqR  | AGACCGAAGAGCTGAAAGGG          |                                           |
|                                 | EF1A-F    | CCCCTTCGTCCTCCACTTCA          | NbEF1A expression level analysis         |
|                                 | EF1A-R    | GCTTGGTCGCCACATTTA            |                                           |
| Template amplification of probe | T7GFP-5   | TAATACGACTCTATTAGGGCGAATCC    | GFP Northern blot probe cloning          |
|                                 | GFP-3-R   | TATTTGTATATGTTCATCCATGCGATG  |                                           |
|                                 | BrYV(5101)F | CCGAGAGCGGACCATAAGGAC        | BrYV-A Northern blot probe cloning       |
|                                 | BrYV(5620)R | GCGGAGTGGTTCCAGTTTA          |                                           |

**Note:** All the sequences are shown in 5'-to-3' direction. Sequences in italics indicate restriction enzyme sites. Primers with mutated sequence are followed by a plus sign (+), and the mutated sequences are underlined. Primers without mutated sequence are followed by a minus sign (-).