

FIGURE 1 -- Plasmid map of BV1168 and BV 1169

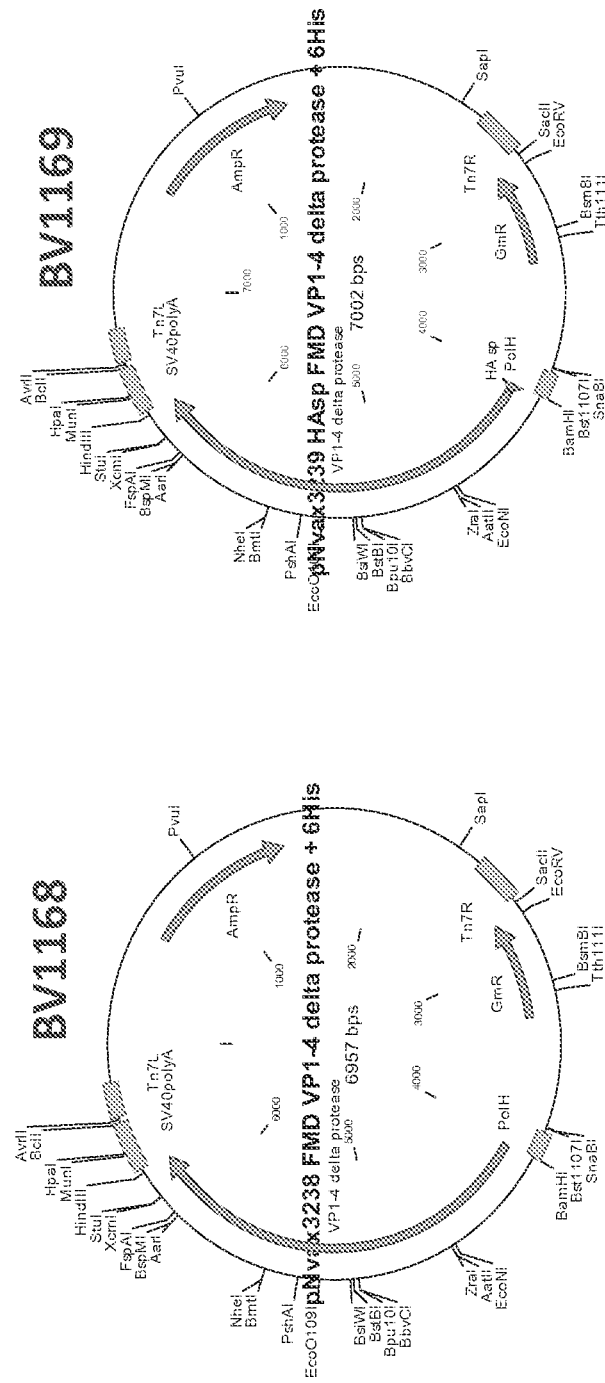


FIGURE 2 - Expression of FMDV P1 precursor protein +/- signal peptide

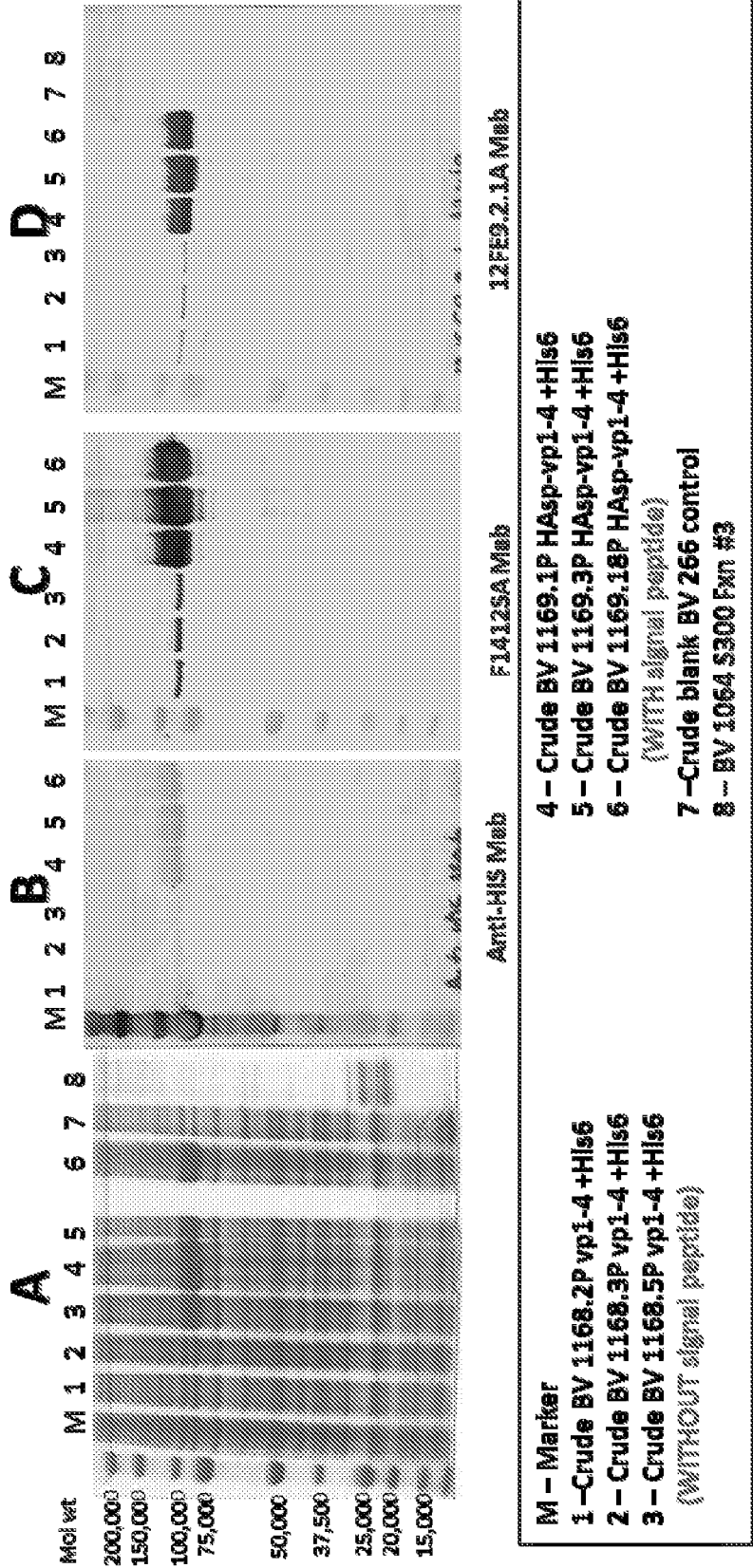


FIGURE 3 - Expression of non-secretory proteins +/- signal peptide

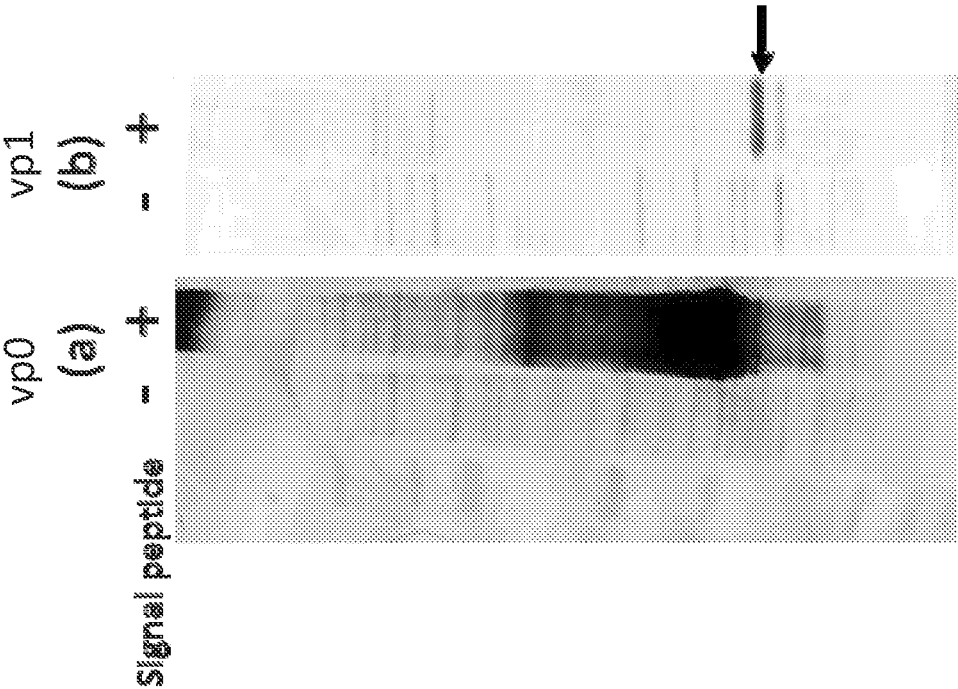


FIGURE 4A — Nucleotide Sequence for FMDV P1 polyprotein in BV1169

BV1169 HAsp-FMDV P1 (VP1-4)His₆

ATGGAAGAATCGTCTCCTCGCTATCGTGTCCCTGGTCAAGATGGGTGCGGTCAATCGTCGCCAGCTACAGGCTC
 GCAAAACAGTCGGGTAAACACAGGCTCTATCATCAACAATACTACATGCAACAGTACCAAAACAGCATGGACACCCAGC
 TGGGAGATAACGCTATCTCTGGTGGCAGCAACGAGGTTTCGACAGATACCATTCCACCCACACAACCACTCAAAAAC
 AACGACTGGTTCTCAAGTTGGCTCCTCTGCTTCTCTGGCTGTTCCGAGCCCTGCTCGCTGATAAGAAGACCGAGGA
 AACTACATTGCTGGAGGACCGTATCCTGACCACATAGAAACGGCCACACAACCTCCACTACACAGAGCTCAGTTGGCGTGA
 CATACGGATACGCCACCGCTGAAGACTTCGTGCTGGACCCAACTAGCGGTTTGGAGACACGTGTGGTCCAAGCTGA
 ACGCTTCTCAAGACACACCTGTTCCGACTGGGTGACCTCGGATTCTTCGGTAGATGCCACCTCTTGAGCTCCCTACCGA
 CCACAAGGCTGTCTACGGCTCCTTGACTGATCTTACGCCTACATGAGGAACGGTTGGGACGTGGAAGTTACCGCTGTGG
 GCAACCAAGTTCAACGGAGGTTGCCTGCTCGTGGCCATGGTCCCGAGCTCTGTTCTATCCAGAAGAGGGAATTGTACCAA
 CTGACCTCTTCCCCACCAGTTCAACCCTAGAATAACATGACAGCTCACATCACTGTGCCATTCTGGGCGTCAAC
 CGTTACGACCAATACAAGGTCCACAAGCCCTGGACCTGGTTGTGATGGTGTGCCCTCACCGTGAACACTGAGGG
 TGCTCTCAGATCAAGGTCTACGCCAACATCGCTCCCACTAACGTTACAGTGGCCGGAGAGTCCCAAGCAAGGAAGGTA
 TCTTCCCAAGTGGCTTGTCTAGACGGATACGGAGACTGGTCAACCACTGACCAAAAGACCGCTGATCCGGTTTACGGCAA
 GGTGTTCAACCCCCCGTAACAGCTCCCTGGCAGATTCACTAACTTGCTGGACGTGGCTGAGGCTTGTCCAACATTCT
 GCGCTTCGAAGGTGGGTTCCGTACGTGACAACCAAGACCGACTCAGATAGGCTCTTGGCTCAGTTCGACATGTCACTG
 GGTGCCAAGCACATGTGAAACACTTCTCGCCGGATTGGCTCAGTACTACACCAATACTCCGGTACTATCAACCCCCAC
 TTCATGTTACAGGCCCTACCGACGCCAAGGCTCGTACATGATCGCTTACGCTCCACGGGAATGGAGCCACCTAAGAC
 CCCAGAAGCTGCCGCTCACTGCATCCACGCCGAGTGGGACACTGGTCTGAACCTCAAAGTTCACATTCTCGATCCCCTACCT
 CTCGCGCGCTGACTACGCCCTACACCGCTTCTGATGTGGCTGAAACTACAAACGTCCAGGGTTGGGTTTGTCTGTCCAAAT
 CACTACGGCAAGGCTGACGGCGATGCTCTGGTGGTCTCGCTAGCGCTGGCAAGGACTTCGAGTTGCGTCTGCCTGTG
 GATGCCCGCGCTGAGACCACTAGCGCTGGCGAATCAGCTGACCCAGTGACAACCACTGTGAGGATTACGGAGGTGAA
 ACTCAGATCCAACGTGCCAGCACACAGACGTGTCTTCATCATGGATCGTTTCGTCAAGGTTACCCACAGAACCAATC
 AACATCTCGACTTGATGCAATCCCGAGCCACACACTGGTGGAGCTCTCTTGAGAGCTTCTACCTACTACTTCAGCGAT
 TTGGAGATCGCCGTCAAGCACGAAAGGAGACCTGACCTGGTTCCAAACGGCGCTCCGGAGAAGGATTGGACAACACA
 ACCAACCCAACTGCCTACCACAAGGCTCCGCTGACCCGCTGTGGCTCTCCCTACACTGCTCCTCACCGGTTCTCGCTACCG
 TGTACAACGGAGAAATGCCGTTACTACGCAACGCCGTCCTCCCAACGTTCTGGTGTGACTTGACGGTGTGGCTCAAAAAGGTT
 GTGGCACTCTGCCTACATCGTTCAACTACGGTGCCATCAAGGCTACCCGCTCACTGAGCTGCTCTACAGGATGAAGAG
 AGCCGAAACTTACTGCCCCAGGCTTGTGGCCATCCACCCACAGAGGCTAGACACAAGCAGAAGATCGTGGCTCCTG
 TCAAGCAACCTCAACTCGACCTCTTGAAGTTGGCCGGCGATGTGACAGAGCACCAACCACCACCTAA (SEQ ID

NO:1)

FIGURE 4B -- Amino Acid Sequence for FMDV P1 polyprotein in BV1169

MEKIVLLLAIVSLVKMGAGQSSPATGSQNQSGNTGSIINNYMQQYQNSMDTQLGDNAISGGSNEGSTDITSTHT
TNTQNNDWFSKLASSAFSGLFGALLADKKTEETLLLEDRLITRNGHTTSTTQSSVGVTYGYATAEDFVSGPNTSGLE
TRVVQAERFFKTHLFDWVTSDFSFRCHLLELPTDHKGVYGSITDSYAYMRNGWDVEVTAVGNQFNNGGCLLVAMV
PELCSIQKRELYQLTLFPHQFINPRTNMTAHITVPFVGVRNDQYKVKPWTLLVVMVWAPLTVNTEGAPQIKVYANI
APTNVHVAGEFFPSKEGIFPVACSDGYGGLVTTDPKTADPVYGVFNPPRNQLPGRFTNLLDVAEACPTFLRFEGGV
PYVTTKTSDRVLAQFDMSLAAKHMSNTFLAGLAQYTYQYSGTINPHFMFTGPTDAKARYMIAYAPPGMEPPKT
PEAAAHCIHAEWDGLNSKFTFIPVLSAADYAVTASDVAETTNNVQGWVCLFQJTHGKADGDALVVLASAGKDFEL
RLPVDARAETTSAGESADPVTTTVEDYGGGETQIQRQHTDVSFIMDRFVKVTPQNQINILDLMQIPSHTLVGALLR
ASTYYFSDLEIAVKHEGDLTWVPNGAPEKEGLDNTTNPATYHKAPLRLALPYTAPHRVLATVYNGECRYSRNAVPNV
RGDLQVLAQKVVRITLPTSFNYGAIKATRVTELLYRMKRAETCYPRPLLAIHPTEARHKQKIVAPVKQTLNFDLLKLAG
DVTEHHHHHH** (SEQ ID NO:2)

FIGURE 4C -- Nucleotide sequence for FMDV P1 polyprotein BV1168

BV1168 FMDV P1 (VP1-4)His₆:

ATGGGTGCGGTCAATCGTCGCCAGCTACAGGCTCGCAAAACCAAGTCGGGTAAACACAGGCTCTATCATCAAACTACTACATGCAACAGTACCAAAAC
 AGCATGGACACCCAGCTGGGAGATAACGCTATCTCTGGTGGCAGCAACGAGGGTTCGACAGATACCACTTCCACCCACACAACCACTCAAAACAAC
 GACTGGTTCTCCAAAGTTGGCTCTCTGCTTCTGCGCTGCTCGGAGCCCTGCTCGCTGATAAGAAAGACCGAGGAAACTACATTGCTGGAGGACCCGTA
 TCTGTACCACCTAGAAAACGGCCACACAACTCCACTACACAGAGCTCAGTTGGCTGACATACGGATACGCCACCGCTGAAGACTTCGTCTGGACCCCA
 AACTAGCGGTTTGGAGACACGTTGGTCCAAGCTGAACGCTTCTTCAAGACACACCTGTTGACTGGGTGACCTCGGATTCTCTCGGTAGATGCCACCT
 CTTGGAGCTCCCTACCGACCAAGGGTGTCTACGGCTCCTTGACTGATCTTACGCCCTACATGAGGAACGGTTGGGACGTCGAAGTTACCGCTGTGGG
 CAACCAAGTTCAACGGAGGTTGCCTGCTGCTGGCCATGGTCCCGAGCTCTGTTCTATCCAGAAGAGGGAAATTGTACCAACTGACCCCTCTTCCCCCACCAG
 TTCTATCAACCCCTAGAACTAACTACAGCTCACAATCACTGTGCCATTCGTGGGCGTCAACCGTTACGACCAATACAAGGTCCACAAGCCCTGGACCCCTGG
 TTGTGATGGTCTGTGGCCCTCACCGTGAACACTGAGGGTGTCTCTCAGATCAAGGTCTACGCCAACATCGCTCCCACTAACGTTACAGTGGCGGGAGA
 GTTCCAAAGCAAGGAAGGTATCTTCCCAAGTGGCTTGTCTCAGACGGATACGGAGGACTGGTCACCACTGACCCAAAGACCGCTGATCCGGTTTACGGCAA
 GGTGTTCAACCCCGCTAACCAAGTCCCTGGCAGATTCACTAATTGCTGGACGTGGTGAGGCTTGTCCAACATTCTCTGGCTTCGAAAGGTGGCGGT
 CCGTACGTGACAACCAAGACCGACTCAGATAGGGTCTTGGCTCAGTTCGACATGTCACTGGCTGCCAAGCACATGTGCAACACTTCTCTGCGCGGATTG
 GCTCAGTACTACACCCAACTACTCCGTAATAACACCCCACTTCACTGTTCACAGGCCCTACCGACGCCAAGGCTCGCTACATGATCGCTTACGCTCCACC
 GGGAAITGGAGCCACCTAAGACCCAGAAAGCTGCCGCTCACTGCACTCCACGCCGAGTGGGACACTGGTCTGAACCTCAAAGTTCACATTCTCGATCCCCCTA
 CCTCTCCGCGCTGACTACGCCCTACACCGCTTCTGATGTGGCTGAAACTACAAACGTCACAGGTTGGGTTTGTCTGTTCCTCAAATCACTCACGGCAAGGCT
 GACGGCGATGCTCTGGTGGTCTCGCTAGCGCTGGCAAGGACTTCGAGTTGCGTCTGCGCTGGATGCCCGCGCTGAGACCACTAGCGCTGGCGAATC
 AGCTGACCCAGTGACAACCACTGTCGAGGATTACGGAGGTGAAACTCAGATCCAACGTGCCAGCACACAGACGTGCTTTTCATCATGGATCGTTTCGT
 CAAGGTTACCCCAAGAACCAATCAACATCTCGACTTGATGCAAAATCCCGAGCCACACACTGGTCGGAGCTCTCTTGAGAGCTTCTACCTACTACTTCA
 GCGATTTGGAGATCGCCGTCAAGCACGAAGGAGACCTGACCTGGGTTCCAAACGGCGCTCCGGAGAGGGATTGGACAACACAACCAACCACTGCC
 TACCACAAGGCTCCGCTGACCCGTCTGGCTCTCCCTACACTGCTCCCTACCGGCTTCTCGCTACCGTGTACAACGGAGAAATGCCGTTACTCACGCAACGC
 CGTCCCCAAGTTTCGTGGTACTTCAGGTGCTGGCTCAAAAGGTTGTGGCACTCTGGCTACATCGTTCAACTACGGTGCCATCAAGGCTACCCCGGTCT
 ACTGAGCTGCTCTACAGGATGAAGAGAGCGGAAACTTACTGCCCCAGGCTTTGCTGGCCATCCACCCACAGAGGCTAGACACAAGCAGAAGATCGT
 GGCTCTGTCAAGCAACCCCTCAACTTCGACCTCTTGAAGTTGGCCGGCGATGTGACAGAGCACCAACCAACCACTAA (SEQ ID NO:4)

FIGURE 4D -- Amino Acid sequence for FMDV P1 polyprotein in BV1168

MGAGQSSPATGSQNGTSGIINNYYMQQYQNSMDTQLGDNAISGGSNEGSTDITSTHTTNTQNNDWFSKLASSAFSGLFGALLADKKTEET
TILEDRIILTRNGHTTSTTQSSVGVTVGYATAEDFVSGPNTSGLETRVVQAERFFKTHLFDWVTSDFSGRCHLLELPTDHKGVYGSLLDSYAYMRNG
WDVEVTAVGNQFNGGCLLVAMVPELCSIQKRELYQLTLFPHQFINPRTNMTAHITVPFVGVNRYDQYKVKHPWTILVVMVVAPLTVNTEGAPQJK
VYANIAPTNVHVAGEFPSKEGIFPVACSDGYGGLVTTDPKTADPVYGVKNPPRNQLPGRFTNLLDVAEACPTFLRFEGGVYVTTKTDSDRVLAQ
FDMSLAAKHMSNTLAGLAQYYTQYSGTINPHFMTGPTDAKARYMIAYAPPGMEPPKTPEAAAHCIHAEWDTGLNSKFTFSIPYLSAADYAYTA
SDVAETTINVQGWVCLFQITHGKADGDAVLVLSAGKDFELRLPVDARAETTSAGESADPVTITTTVEDYGGGETQIQRHQHTDVSFIMDRFVKVTPQ
NQINILDLMQIPSHITLVGALLRASTYYFSDLEIAVKHEGDLTWVPNGAPEKGLDNTTNPYAYHKAPLTRALPYTAPHRVLATVYNGECRYSRNAV
NVRGDLQVLAQKVVRTLPTSFNYGAIKATRVTELLYRMKRAETCYCPRLAIHPTEARHKQKIVAPVKQTLNFDLLKLAGDVTEHHHHHHH (SEQ ID
NO:5)

Fig.5A: Expression of single and tandem proteins from FMDV with and without signal peptide

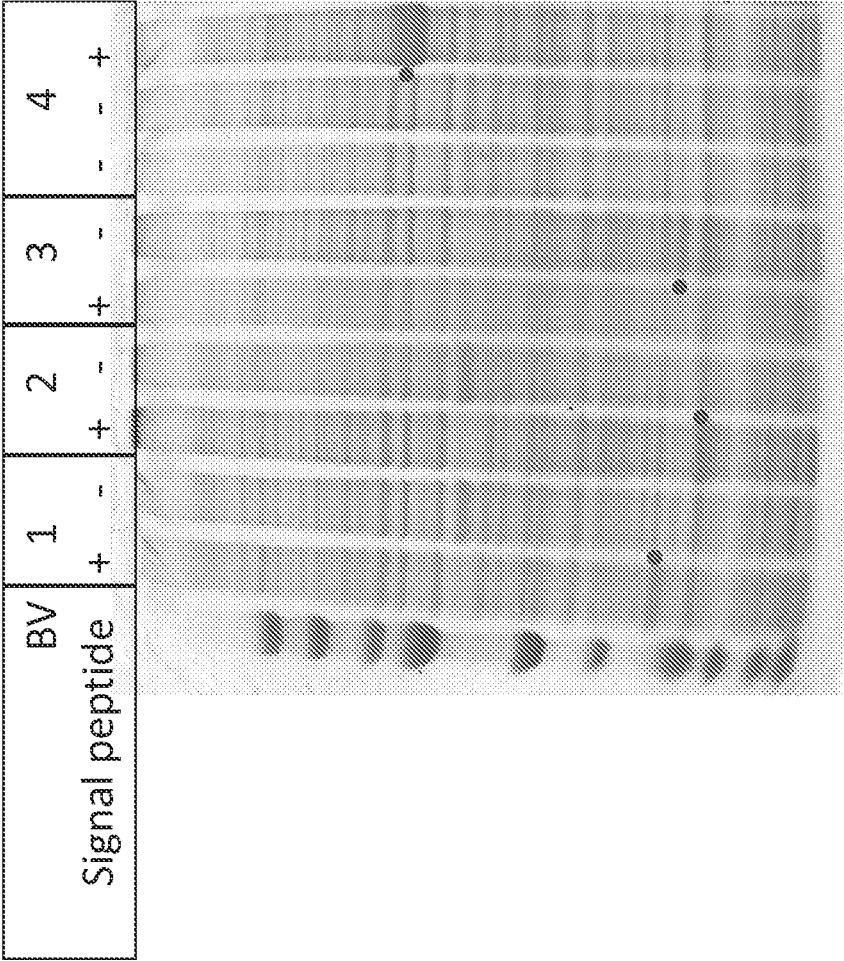


Fig. 5B Vp1 antibody binding to expressed FMDV proteins

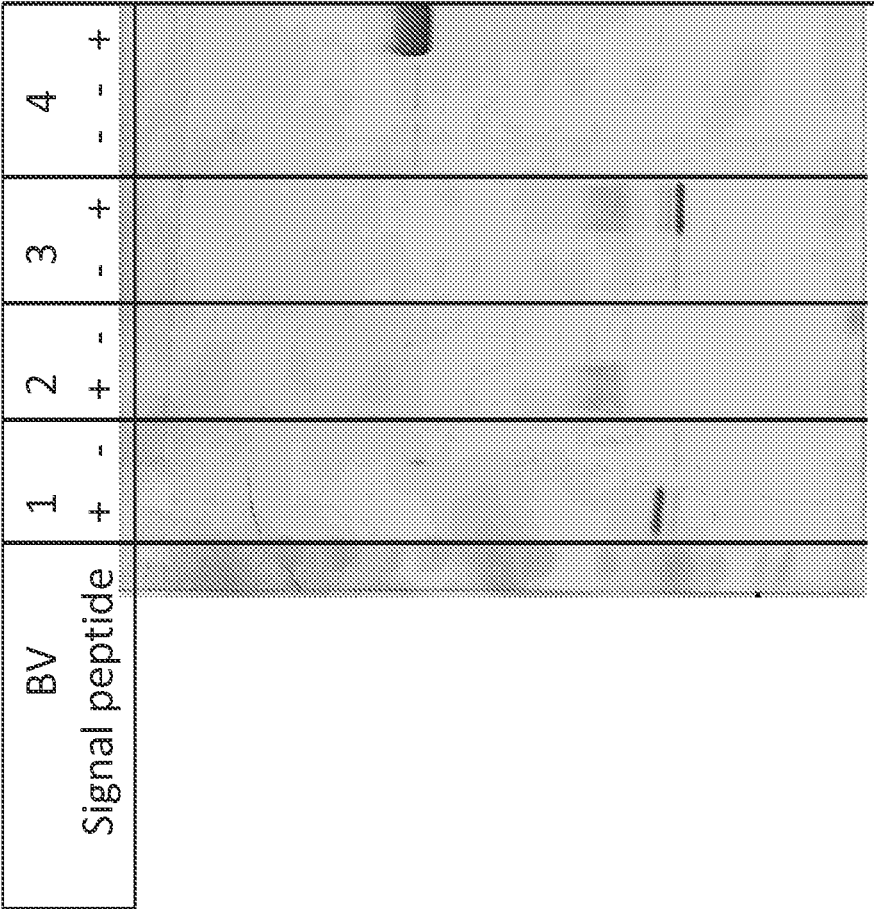


Fig. 5C Vp2 antibody binding to expressed FMDV proteins

