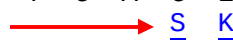


NT:
SHV 1: TATATTCGCCTGTGTATTATCTCCCTGTTAGCCACCCTGCCGCTGGCGGTACACGCCAGCCCGCAGCCGCTTGAGCAAATTAAGCGAAAGCCAGCTG
SHV 5: TATATTCGCCTGTGTATTATCTCCCTGTTAGCCACCCTGCCGCTGGCGGTACACGCCAGCCCGCAGCCGCTTGAGCAAATTAAGCGAAAGCCAGCTG
AA: Y I R L C I I S L L A T L P L A V H A S P Q P L E Q I K L S E S Q L
7
TCGGGCCGCGTAGGCATGATAGAAATGGATCTGGCCAGCGGCCGCACGCTGACCGCCTGGCGCGCCGATGAACGCTTTCCCATGATGAGCACCTTTAAAGTA
TCGGGCCGCGTAGGCATGATAGAAATGGATCTGGCCAGCGGCCGCACGCTGACCGCCTGGCGCGCCGATGAACGCTTTCCCATGATGAGCACCTTTAAAGTA
S G R V G M I E M D L A S G R T L T A W R A D E R F P M M S T F K V
41
GTGCTCTGCGGCGCAGTGCTGGCGCGGGTGGATGCCGGTGACGAACAGCTGGAGCGAAAGATCCACTATCGCCAGCAGGATCTGGTGGACTACTCGCCGGTC
GTGCTCTGCGGCGCAGTGCTGGCGCGGGTGGATGCCGGTGACGAACAGCTGGAGCGAAAGATCCACTATCGCCAGCAGGATCTGGTGGACTACTCGCCGGTC
V L C G A V L A R V D A G D E Q L E R K I H Y R Q Q D L V D Y S P V
75
AGCGAAAAACACCTTGCCGACGGCATGACGGTCGGCGAACTCTGCGCCGCCGCCATTACCATGAGCGATAACAGCGCCGCCAATCTGCTACTGGCCACCGTC
AGCGAAAAACACCTTGCCGACGGCATGACGGTCGGCGAACTCTGCGCCGCCGCCATTACCATGAGCGATAACAGCGCCGCCAATCTGCTACTGGCCACCGTC
S E K H L A D G M T V G E L C A A A I T M S D N S A A N L L L A T V
109
GGCGGCCCCGAGGATTGACTGCCTTTTTGCGCCAGATCGGCGACAACGTCAACCGCCTTGACCGCTGGGAAACGGAAGTGAATGAGGCGCTTCCCGGCGAC
GGCGGCCCCGAGGATTGACTGCCTTTTTGCGCCAGATCGGCGACAACGTCAACCGCCTTGACCGCTGGGAAACGGAAGTGAATGAGGCGCTTCCCGGCGAC
G G P A G L T A F L R Q I G D N V T R L D R W E T E L N E A L P G D
143
GCCCCGACACCACTACCCCGGCCAGCATGGCCGCGACCCTGCGCAAGCTGCTGACCAGCCAGCGTCTGAGCGCCCGTTTCGCAACGGCAGCTGCTGCAGTGG
GCCCCGACACCACTACCCCGGCCAGCATGGCCGCGACCCTGCGCAAGCTGCTGACCAGCCAGCGTCTGAGCGCCCGTTTCGCAACGGCAGCTGCTGCAGTGG
A R D T T T P A S M A A T L R K L L T S Q R L S A R S Q R Q L L Q W
176
ATGGTGGACGATCGGGTCGCCGGACCGTTGATCCGCTCCGTGCTGCCGGCGGGCTGGTTTATCGCCGATAAGACCGGAGCTGGCGAGCGGGGTGCGCGCGGG
ATGGTGGACGATCGGGTCGCCGGACCGTTGATCCGCTCCGTGCTGCCGGCGGGCTGGTTTATCGCCGATAAGACCGGAGCTAGCAAGCGGGGTGCGCGCGGG
M V D D R V A G P L I R S V L P A G W F I A D K T G A G E R G A R G
211


NT^a: nucleotide sequence; AA: amino acid sequence

Figure 4.5 Partial nucleotide and amino acid sequences of SHV-1 and SHV-5 depicting the point mutations at amino acid positions 238 and 240.

Nucleotide mutations are underlined in red and the resulting amino acid change underlined in blue.

^a Amino acid residues are numbered according to the numbering system of Ambler *et al.*, (1981).

A, alanine; C, cysteine; D, aspartic acid; E, glutamic acid; F, phenylalanine; G, glycine; H, histidine; I, isoleucine; K, lysine; L, leucine; M, methionine; N, asparagine; P, proline; Q, glutamine; R, arginine; S, serine; T, threonine; V, valine; W, tryptophan.