```
khr mutant 1 (1 strains)
                            MGHLAILFSIIAVWNIATAVASSDSIYLKGHRVGQDIDSLYRVYDNGTMYPVTFNEWLNDLTGM<mark>D</mark>DLATNNATILKRDSSDVSCVNETCQYVDYHVDDEG
                                                                                                                                                     100
khr mutant 2 (5 strains)
                            <u>MGHLAILFSIIAVWNIATAVASSDS</u>IYLKGHRVGQDIDSLYRVYDNGTMYPVTFNEWLNDLTGM<mark>D</mark>DLATNNATILKRDSSDVSCVNETCQYVDYHVDDEC
                                                                                                                                                     100
khr mutant 3 (2 strains)
                            MGHLAILFSIIAVWNIATAVASSDSIYLKGHRVGQDIDSLYRVYDNGTMYPVTFNEWLNDLTGM<mark>D</mark>DLATNNATILKRDSSDVSCVNETCQYVDYHVDDEG
                                                                                                                                                     100
                            MGHLAILFSIIAVWNIATAVASSDSIYLKGHRVGQDIDSLYRVYDNGTMYPVTFNEWLNDLTGMNDLATNNATILKRDSSDVSCVNETCQYVDYHVDDEG
                                                                                                                                                     100
khr mutant 6 (2 strains)
                            {	t MGHLAILFSIIAVWNIATAVASSDSIYLKGHRVGQDIDSLYRVYDN<math>{	t V}TMYPVTFNEWLNDLTGMNDLATNNATILKRDSSDVSCVNETCQYVDYHVDDEG
khr mutant 13 (5 strains)
                                                                                                                                                     100
khr mutant 5 (6 strains)
                            MGHLAILFSIIAVWNIATAVASSDSIYLKGHRVGQDIDSLYRVYDN<del>G</del>TMYPVTFNEWLNDLTGMNDLATNNATILKRDSSDVSCVNETCQYVDYHVDDEG
                                                                                                                                                     100
khr mutant 7 (20 strains)
                            MGHLAILFSIIAVWNIATAVASSDSIYLKGHRVGQDIDSLYRVYDNGTMYPVTFNEWLNDLTGMNDLATNNATILKRDSSDVSCVNETCQYVDYHVDDEG
                                                                                                                                                     100
                            <u>MGHLAILFSIIAVWNIATAVASSDS</u>IYLKGHRVGQDIDSLYRVYDNGTMYPVTFNEWLNDLTĞMNDLATNNATILKRDSSDVSCVNETCQYVDYHVDDEG
khr mutant 8 (1 strains)
                                                                                                                                                     100
khr mutant 4 (1 strains)
                            MGHLAILFSIIAVWNIATAVASSDSIYLKGHRVGQDIDSLYRVYDNGTMYPVTFNEWLNDLTGMNDLATNNATIL<u>KRDSSDVSCVNETCQYVDYHVDDEG</u>
                                                                                                                                                     100
khr mutant 10 (1 strains)
                            MGHLAILFSIIAVWNIATAVASSDSIYLKGHRVGQDIDSLYRVYDNGTMYPVTFNEWLNDLTGMNDLATNNATILKRDSSDVSCVNETCQYVDYHVDDEG
                                                                                                                                                     100
khr mutant 11 (1 strains)
                            MGHLAILFSIIAVWNIATAVASSDSIYLKGHRVGQDIDSLYRVYDNGTMYPVTFNEWLNDLTGMNDLATNNATILKRDSSDVSCVNETCQYVDYHVDDEG
                                                                                                                                                     100
khr mutant 12 (1 strains)
                            MGHLAILFSIIAVWNIATAVASSDSIYLKGHRVGQDIDSLYRVYDNGTMYPVTFNEWLNDLTGMNDLATNNATILKRDSSDVSCVNETCQYVDYHVDDEG
                                                                                                                                                     100
khr mutant 9 (1 strains)
                                                                                                                                                     100
                            MGHLAILFSIIAVWNIATAVASSDSIYLKGHRVGQDIDSLYRVYDNGTMYPVTFNEWLNDLTGMNDLATNNATILKRDSSDVSCVNETCQYVDYHVDDEG
consensus
                            khr mutant 1 (1 strains)
                            VI<mark>N</mark>IDISTYRIPVEWDNGSAGNASYGVSKRDTKYETFCKKKICGINVSGFCNAYDFAVPAFDFGGNVYNLVSGITDRIKEATKRDKTECLGYELDHVRID
                                                                                                                                                     200
khr mutant 2 (5 strains)
                            \mathtt{VI}\overline{\mathtt{T}}\mathtt{IDISTYRIPVEWDNGSAGNASYGVSKRDTKYETFCKKKICGINVSGFCNAYDFAVPAFDFGGNVYNLVSGITDRIKEATKRDKTECLGYELDHVRID
                                                                                                                                                     200
                            VITIDISTYRIPVEWDNGSAGNASYGVSKRDTKYETFCKKKICGINVSGFCNAYDFAVPAFDFGGNVYNLVSGITDRIKE<mark>V</mark>TKRDKTECLGYELDHVRID
khr mutant 3 (2 strains)
                                                                                                                                                     200
                            {	t VITIDISTYRIPVEWDNGSAGNASYGVSKRDTKYETFCKKKICGINVSGFCNAYDFAVPAFDFGGN<math>{	t A}{	t YNLVSGITDRIKE}{	t A}{	t TKRDKTECLGYELDHVRID}
                                                                                                                                                     200
khr mutant 6 (2 strains)
                            {	t VITIDISTYRIPVEWDNGSAGNASYGVSKRDTKYETFCKKKICGINVSGFCNAYDFAVPAFDFGGNar{V}YNLVSGITDRIKEATKRDKTECLGYELDHVRID
                                                                                                                                                     200
khr mutant 13 (5 strains)
                            VITIDISTYRIPVEWDNGSAGNASYGVSKRDTKYETFCKKKICGIN<mark>T</mark>SGFCNAYDFAVPAFDFGGNVYNLVSGITDRIKEATKRDKTECLGYELDHVRID
khr mutant 5 (6 strains)
                                                                                                                                                     200
khr mutant 7 (20 strains)
                            VITIDISTYRIPVEWDNGSAGNASYGVSKRDTKYETFCKKKICGINVSGFCNAYDFAVPAFDFGGNVYNLVSGITDRIKEATKRDKTECLGYELDHVRID
                                                                                                                                                     200
                            VITIDISTYRIPVEWDNGSAGNASYGVSKRDTKYETFCKKKICGINVSGFCNAYDFAVPAFDFGGNVY<mark>S</mark>L<mark>A</mark>S<mark>DII</mark>DRIKEATKRDKTECLGYELDHVRID
khr mutant 8 (1 strains)
                                                                                                                                                     200
                            VITIDISTIKIT VEWBNOSKONADI OVBIKBITI OKKKICGINVSGFCNAYDFAVPAFDFGGNVY<mark>SLA</mark>S<mark>DII</mark>DRIK<mark>G</mark>ATKRDKTECL<mark>R</mark>YELDHVRID
khr mutant 4 (1 strains)
                                                                                                                                                     200
                            <u>VITIDISTYRIPVEWDNGSAGNASYGVSKRDTKYETFCKKKICGINVSGFCNAYDFAVPAFDFGGNVY<mark>S</mark>L<mark>A</mark>S<mark>DII</mark>DRIK<mark>G</mark>ATKRDKTECL<mark>R</mark>YELDHVRID</u>
                                                                                                                                                     200
khr mutant 10 (1 strains)
                            <u>VITIDISTYRIPVEWDNGSAGNASYGVSKRD</u>TKYETFCKKKICGINVSGFCNAYDFAVPAFDFGGNVY<mark>S</mark>L<mark>A</mark>S<mark>DII</mark>DRIK<mark>G</mark>ATKRDKTECL<mark>R</mark>YELDHVRID
khr mutant 11 (1 strains)
                                                                                                                                                     200
                           VITIDISTYRIPVEWDNGSAGNASYGVSKRDTKYETFCKKKICGINVSGFCNAYDFAVPAFDFGGNVY<mark>S</mark>L<mark>A</mark>S<mark>D</mark>I<mark>I</mark>DRIK<mark>GT</mark>TKRDKTECL<mark>R</mark>YELDHVRID
                                                                                                                                                     200
khr mutant 12 (1 strains)
                            <u>VITIDISTYRIPVEWDNGSAGNASYGVSKRDTKYETFCKKKICGINVSGFCNAYDFAVPAFDFGGNVY<mark>SLA</mark>S<mark>DII</mark>DRIK<mark>G</mark>ATKRDKTECLGYELDHVRID</u>
khr mutant 9 (1 strains)
                                                                                                                                                     200
consensus
khr mutant 1 (1 strains)
                            PAVDWSIFISTWKQGSANCDTQASADSLKCAAQKALESEHNHQKTAFCIHLDNGGSFNLDIRLISELSFSKYNPWALPCPKDKGSNSWQVVSDCFQ
                                                                                                                                                 296
khr mutant 2 (5 strains)
                            PAVDWSIFISTWKQGSANCDTQASADSLKCAAQKALESEHNHQKTAFCIHLDNGGSFNLDIRLISELSFSKYNPWALPCPKDKGSNSWQVVSDCFQ
                                                                                                                                                 296
                            PAVDWSIFISTWKQGSANCDTQASADSLKCAAQKALESEHNHQKTAFCIHLDNGGSFNLDIRLISELSFSKYNPWALPCPKDKGSNSWQVVSDCFQ
                                                                                                                                                 296
khr mutant 3 (2 strains)
khr mutant 6 (2 strains)
                            PAVDWSIFISTWKQGSANCDTQASADSLKCAAQKALESEHNHQKTAFCIHLDNGGSFNLDIRLISELSFSKYNPWALPCPKDKGSNSWQVVSDCFQ
                                                                                                                                                 296
                            PAVDWSIFISTWKQGSANCDTQASADSLKCAAQKALESEHNHQKTAFCIHLDNGGSFNLDIRLISELSFSKY<u>NPWALPCPKDKGSNSWQVVSDCF</u>Q
khr mutant 13 (5 strains)
                                                                                                                                                 296
khr mutant 5 (6 strains)
                            PAVDWSIFISTWKQGSANCDTQASADSLKCAAQKALESEHNHQKTAFCIHLDNGGSFNLDIRLISELSFSKYNPWALPCPKDKGSNSWQVVSDCFQ
                                                                                                                                                 296
khr mutant 7 (20 strains)
                            PAVDWSIFISTWKQGSANCDTQASADSLKCAAQKALESEHNHQKTAFCIHLDNGGSFNLDIRLISELSFSKYNPWALPCPKDKGSNSWQVVSDCFQ
                                                                                                                                                 296
                            PAVDWSIFISTWKQGSANCDTQASADSLKCAAQKALESEHNHQKTAFCIHLDNGGSFNLDIRLISELSFSKYNPWALPCPKDKGSNSWQVVSDCFQ
                                                                                                                                                 296
khr mutant 8 (1 strains)
                            PAVDWSIFISTWKQGPAN<mark>Y</mark>DTQASADSLKCAAQKALESEHNHQKTAFCIHLDNGGSFNLDIRLISELSFSKYNPWALPCPKDK<mark>D</mark>SNSWQVVSDCFQ
                                                                                                                                                 296
khr mutant 4 (1 strains)
                            PAVDWSIFISTWKQG<mark>P</mark>AN<mark>Y</mark>DTQASAD<mark>N</mark>LKCAAQKALESEHNHQKTAFCIHLDNGGSFNL<u>DIRLISELSFSKYNPWALPCPKDK<mark>D</mark>SNSWQVVSDCF</u>Q
                                                                                                                                                 296
khr mutant 10 (1 strains)
khr mutant 11 (1 strains)
                            PAVDWSIFISTWKQG<mark>P</mark>AN<mark>Y</mark>DTQASADSLKCAAQKALESEHNHQKTAFCIHLDNGGSFNLDIRLISELSFSKYNPWALPCPKDK<mark>D</mark>SNSWQVVSDCFQ
                                                                                                                                                 296
                            PAVDWSIFISTWKQG<mark>P</mark>AN<mark>Y</mark>DTQASADSLKCAAQKALESEHNHQKTAFCIHLDNGGSFNLDIRLISELSFSKYNPWALPCPKDK<mark>D</mark>SNSWQVVSDCFQ
                                                                                                                                                 296
khr mutant 12 (1 strains)
khr mutant 9 (1 strains)
                            PAVDWSIFISTWKQG<mark>P</mark>AN<mark>Y</mark>DTQASADSLKCAAQKALESEHNHQKTAFCIHLDNGGSFNLDIRLISELSFSKYNPWALPCPKDK<mark>D</mark>SNSWQVVSDCFQ
                                                                                                                                                296
```

consensus

non-conserved
 similar

 $\overline{X}$   $\geq$  50% conserved