Gene 20

K L T D A V F K I L E L A A G R D S E T L M D A V D E D V A L A T

S S R T Q S S R S S N W L R D A T P R L \* W T P S T R T S P S P R

E A H G R S L Q D P R T G C G T R L R D S D G R R R R G R R P R H E

15201 GAAGCTCACGGACGCAGTCTTCAAGATCCTCGAACTGGCTGCGGGACGCGACTCCGAGACTCTGATGGACGCCGTCGACGAGGACGTCGCCCTCGCCACG

....:....|....:....|....:....|....:....|....:....|....:....|....:....|....:....|....:....|....:....|

F S V S A T K L I R S S A A P R S E S V R I S A T S S S T A R A V

L L E R V C D E L D E F Q S R S A V G L S Q H V G D V L V D G E G R

S A \* P R L R \* S G R V P Q P V R S R S E S P R R R R P R R G R W

K I L N H W L E E T Q A G E A S S S E D \* S T T T A T P C T R T S G

Here is the slippery sequence. The two Gs in frame 1 and 3 is where the -1 shift takes place. The last base from frame 1 is the first for frame 3.

R S S T T G W R R R K R G K P P A R R T D R R L R R R P V R G L P

D P Q P L A G G D A S G G S L Q L G G L I D D Y G D A L Y A D F R

15301 AAGATCCTCAACCACTGGCTGGAGGAGACGCAAGCGGGGGAAGCCTCCAGCTCGGAGGACTGATCGACGACTACGGCGACGCCCTGTACGCGGACTTCCG

....:....|....:....|....:....|....:....|....:....|....:....|....:....|....:....|....:....|....:....|

F I R L W Q S S S V C A P S A E L E S S Q D V V V A V G Q V R V E

L D E V V P Q L L R L R P F G G A R L V S R R S R R R G T R P S G

S S G \* G S A P P S A L P P L R W S P P S I S S \* P S A R Y A S K R

**Gene 21**

L S T R \* T S R I C S I P P P G S G L S R S W R L S K S C P G R A

V \* V P D E P R G S V R S R L P A R A Y P G P G A Y Q R A A P G G Q

S E Y Q M N L A D L F D P A S R L G P I Q V L A L I K E L P R E G

15401 GTCTGAGTACCAGATGAACCTCGCGGATCTGTTCGATCCCGCCTCCCGGCTCGGGCCTATCCAGGTCCTGGCGCTTATCAAAGAGCTGCCCCGGGAGGGC

....:....|....:....|....:....|....:....|....:....|....:....|....:....|....:....|....:....|....:....|

P R L V L H V E R I Q E I G G G P E P R D L D Q R K D F L Q G P L A

T Q T G S S G R P D T R D R R G A R A \* G P G P A \* \* L A A G P P

D S Y W I F R A S R N S G A E R S P G I W T R A S I L S S G R S P

Here are the protein sequences for genes 20 and 21:

>Snazzy\_Draft gp20

MSKILTLDTIREEADREYGAPVQVQISKDTTVSLKNVMRLRKDVRKDILTQLEAIRTINHKADGDKTEDDAEKLTDAVFKILELAAGRDSETLMDAVDEDVALATKILNHWLEETQAGEASSSED

>Snazzy\_Draft gp21

MNLADLFDPASRLGPIQVLALIKELPREGRFWSEKQGGPQFRGWTDQTYTTAALVNEIRALKFMYLLANTSKDKRRRLTPPEPFPVPRVKPHKAKKYKPGSFGAVAAMRMAASRNRKAQATGR

The fused sequence after the frame shift:

>Snazzy gp20+21

MSKILTLDTIREEADREYGAPVQVQISKDTTVSLKNVMRLRKDVRKDILTQLEAIRTINHKADGDKTEDDAEKLTDAVFKILELAAGRDSETLMDAVDEDVALATKILNHWLEETQAGGSLQLGGLIDDYGDALYADFRSEYQMNLADLFDPASRLGPIQVLALIKELPREGRFWSEKQGGPQFRGWTDQTYTTAALVNEIRALKFMYLLANTSKDKRRRLTPPEPFPVPRVKPHKAKKYKPGSFGAVAAMRMAASRNRKAQATGR

The blastp hit for the fused sequence from Snazzy:

>Violet gp22

MSKILTLDTIREEADREYGAPVQVQISKDTTVSLKNVMRLRKDVRKDILTQLEAIRTINHKADGDKTEADAEKLTDAVFKILELAAGRDSETLMDAVDEDVALATKILNHWLEETQAGGSLQLGGLIDDYGDALYADFRSEYQMNLADLFDPASRLGPIQVLALIKELPREGRFWSEKQGGPQFRGWTDQTYTTAALVNEIRALKFMYLLANTSKDKRRRLTPPEPFPVPRVKPHKAKKYKPGSFGAVAAMRMAASRNRKAQATGR