

21. First, answer this question: **WHAT IS cDNA?** (Again, you can do an Internet search to find this information.) cDNA, or complementary DNA, is synthesized from a messenger RNA (mRNA) template using the enzyme reverse transcriptase, representing the DNA copy of the mRNA sequence.

Enter the following cDNA sequence on “blastx”:

```
ACATTGCTTCTGACACAATTGTGTTCCTAGCAACCTCAAACAGACACCATGGTGCATCTGACTC
CTGAGGAGAAGTCTGCCGTTACTGCCCTGTGGGGCAAGGTGAACGTGGATGAAGTTGGTGGTGAG
GCCCTGGGCAG
```

22. **WHAT IS THE SEQUENCE MATCH?** MVHLTPEEKSAVTALWGKVVNDEVGGEALG (beta-globin [Homo sapiens])

Assignment: While still on BLAST, choose “Protein BLAST”. Check the box which says “Align two or more sequences”.

Copy and paste the following sequence into the “Enter Query Sequence” box:

Person 1/Sequence 1:

```
MGAPACALALCVAVAIVAGASSESLGTEQRRVVGRAAEVPGPEPGQQEQLVFGSGDAVELSCPP
PGGGPMGPTVWVKDGTGLVPSERVLVGPQRLQVLNASHEDSGAYSCRQRLTQRVLCHFVSRV
TDAPSSGDDDEDGEDEAEDTGVDTGAPYWTRPERMDKKLLAVPAANTVRFRCPAAGNPTPSIS
WLKNGREFRGEHRIGGIKLRHQWVSLVMESVVPDRGNVTCVVENKFGSIRQTYTLDVLERSP
HRPILQAGLPANQTAVLGSDVEFHCKVYSDAQPHIQWLKHVEVNGSKVGPDPGTPYVTVLKTA
GANTTDKELEVLSLHNVTTFEDAGEYTCLAGNSIGFSHHSAWLVVLPAAEELVEADEAGSVYAG
ILSYGVGFFLFILVVAAVTLCRLRSPPKKGLGSPTVHKISRFLPKRQVSLESNASMSNTPLVRIA
RLSSGEGPTLANVSELELPADPKWELSRARLTGKPLGEGCFGQVVMMAEAIGIDKDRAAKPVT
VAVKMLKDDATDKDLSDLVSEMEMMKMIGKHKNINLLGACTQGGPLYVLVEYAAKGNLRE
FLRARRPPGLDYSFDTCKPPEEQLTFKDLVSCAYQVARGMEYLASQKCIHRDLAARNVLVTE
NVMKIADFGLARDVHNLDYYKKTNGRLPVKWMAPALFDRVYTHQSDVWSFGVLLWEIFT
LGGSPYPGIPVEELFKLLKEGHRMDKPANCTHDLYMIMRECWAAPSQRPTFKQLVEDLDRVL
TVTSTDEYLDLSAPFEQYSPGGQDTPSSSSGDDSVFAHDLPPAPPSSGGSRT
```

Copy and paste the following sequence into the “Enter Subject Sequence” box:

Person 2/Sequence 2:

```
MGAPACALALCVAVAIVAGASSESLGTEQRRVVGRAAEVPGPEPGQQEQLVFGSGDAVELSCPP
PGGGPMGPTVWVKDGTGLVPSERVLVGPQRLQVLNASHEDSGAYSCRQRLTQRVLCHFVSRV
TDAPSSGDDDEDGEDEAEDTGVDTGAPYWTRPERMDKKLLAVPAANTVRFRCPAAGNPTPSIS
WLKNGREFRGEHRIGGIKLRHQWVSLVMESVVPDRGNVTCVVENKFGSIRQTYTLDVLERSP
HRPILQAGLPANQTAVLGSDVEFHCKVYSDAQPHIQWLKHVEVNGSKVGPDPGTPYVTVLKTA
GANTTDKELEVLSLHNVTTFEDAGEYTCLAGNSIGFSHHSAWLVVLPAAEELVEADEAGSVYAG
ILSYRVGFFLFILVVAAVTLCRLRSPPKKGLGSPTVHKISRFLPKRQVSLESNASMSNTPLVRIA
RLSSGEGPTLANVSELELPADPKWELSRARLTGKPLGEGCFGQVVMMAEAIGIDKDRAAKPVT
VAVKMLKDDATDKDLSDLVSEMEMMKMIGKHKNINLL
GACTQGGPLYVLVEYAAKGNLREFLRARRPPGLDYSFDTCKPPEEQLTFKDLVSCAYQVARG
MEYLASQKCIHRDLAARNVLVTE NVMKIADFGLARDVHNLDYYKKTNGRLPVKWMAPAL
FDRVYTHQSDVWSFGVLLWEIFTLGGSPYPGIPVEELFKLLKEGHRMDKPANCTHDLYMIMR
ECWAAPSQRPTFKQLVEDLDRVLTVTSTDEYLDLSAPFEQYSPGGQDTPSSSSGDDSVFAHD
LLPPAPPSSGGSRT
```

Click on the “BLAST” box.

After you receive results, choose the “Description” box for more information about the alignment.

23. **DO YOU SEE ANY DIFFERENCES BETWEEN THE TWO AMINO ACID SEQUENCES?** (Look for a space between same amino acid comparison for both sequences.) YES

24. **IF YOU SAW DIFFERENCES, WHAT WERE THEY?** AT POSTION 381 THERE WAS AN ARGININE ON ONE SEQUENCE AND A GLYCINE ON THE OTHER SEQUENCE. THERE WAS ALSO A GAP AT POSITION 779.

25. **ARE THERE ANY GAPS IN THE SEQUENCE ALIGNMENT?** YES, THE FIRST SEQUENCE IS MISSING AN SERINE AT POSITION 779.