

You need to work on the exercise and send the report (word/PDF/txt files) to the TA of your respective group via email by 11:30 AM. Please only add your “roll number” as filename. Subject of the email should be “**IC251-Tutorial4-Roll number**” (please add your roll number in the subject line).

Exercise:**Part A:** Downloading spike protein sequences from UniProt database.

1. Open UniProt database.
2. Search “spike protein of MERS virus”.
3. Write the UniProt ID of the top 5 entries.
4. Download and save the FASTA formatted sequence of the first entry in text file (name the file **sequence1.txt**).
5. Repeat the steps 2 to 4 but here for “spike protein of SARS Coronavirus” (instead of MERS), write top 5 IDs and save first entry file (name the first entry as **sequence2.txt**).
6. Repeat again the steps 2 to 4 but here for “spike protein of SARS Coronavirus 2”, write top 5 IDs and save first entry (name the first entry as **sequence3.txt**).
7. Repeat again the steps 2 to 4 but here for “spike protein of Murine Coronavirus”, write top 5 IDs and save first entry (name the first entry as **sequence4.txt**).
8. Repeat again the steps 2 to 4 but here for “spike protein of Avian infectious bronchitis virus”, write top 5 IDs and save first entry (name the first entry as **sequence5.txt**).
9. The FASTA sequence text files include: sequence1, sequence2, sequence3, sequence4 and sequence5.
10. Copy these sequences in one word file (for tutorial report purpose only).

Part B: Performing local alignment using BLAST.

1. Open BLAST program.
2. Select Protein BLAST.
3. Select to align two sequences.
4. Perform pairwise alignment of the five sequences (downloaded from UniProt) using BLAST:
 - i. Align sequence1 with sequence 2
 - ii. Align sequence 1 with 3
 - iii. Align sequence 1 with 4
 - iv. Align sequence 1 with 5
 - v. Align sequence 2 with 3
 - vi. Align sequence 2 with 4
 - vii. Align sequence 2 with 5
 - viii. Align sequence 3 with 4
 - ix. Align sequence 3 with 5
 - x. Align sequence 4 with 5
5. For each alignment result, write the identity, positive and e- values in word file in Table format.
6. Send these results in **one word file** (that include UniProt ids as reported in Part A, point 10 of Part A and point 5 of part B) in one mail to the TA of your group.

After the exercise is complete, email the word file containing your answers and the sequence alignment file with '.txt' extension to the TA of your group by 11:30 AM.

- **Group A:** TA: Pranchal Shrivastava (pranchals@iitbhlai.ac.in), Room 109, Roll no. 11840100, 12041040, 12140010 to 12140880.
- **Group B:** TA: Shivani Thakur (shivanithakur@iitbhlai.ac.in), Room 309: Roll no. 12140890 to 12141790.

Note:

1. **Subject of email should be:** IC251 Tutorial Roll number.
2. **File name should be:** Roll number.