

Bioinformatics: Life Sciences on Your Computer

Practice Problems - Part 1

These problems cover molecular biology basics and PubMed. Answers are listed below the final question. Please feel free to discuss approaches using the discussion forum.

1. Suppose you have a messenger RNA sequence of:

A U U C G G A U U A G A U U A

- What is the corresponding DNA sequence on the template strand?
- What is the corresponding DNA sequence of the nontemplate (coding) strand?

2. Given the RNA sequence below, find the start codon and list the first four amino acids using the genetic code.

A C G A U G C U C G G A C C G U U A A C G

- Go to PubMed and perform the following searches (list the number of records for each):
 - Donald Coffey
 - coffey
 - coffey d
 - coffey ds
 - coffey, ds
 - What does this tell you about the format for an author search? What is the difference between using one initial and using two initials?
- In PubMed, try the following searches (list number of records for each):
 - vogelstein b
 - coffey ds, vogelstein b
 - coffey ds AND vogelstein b
 - What does this tell you about how to use the AND operator?
- In PubMed, try the following searches (list number of records for each):
 - anfinzen
 - anfinzen cb
 - anfinzen NOT anfinzen cb
 - Look at the first record for the final search (anfinzen NOT anfinzen cb). There is no author named Anfinzen on that paper. Where is "Anfinzen" on that paper?
- In PubMed, try the following searches (list number of records for each):
 - anfinzen
 - anfinzen [auth]
 - anfinzen NOT anfinzen [auth]
 - anfinzen NOT anfinzen [au]

- e. What does adding [auth] do for the search? How does this search compare to question 5?
7. Go to the MeSH database and type in “serine protease” (without quotes). The first hit is the preferred term. Open that record in order to search PubMed. To search PubMed, click Add to search builder. Then click “Search PubMed.”
- a. How many records?
- b. Narrow the search in part a to find all articles on the topic whose authors include someone named Eschenberg (sp?). You are not sure of the spelling of Dr. Eschenberg’s name. Specifically, you do not know whether it is spelled –berg or –burg. How many records?
- Hint: For spelling, you can use the OR Boolean operator or you can truncate the name with an asterisk.
- c. Within those results, find the most recent paper in which S. Eschenburg is a first author. Pull up the abstract. Name the inhibitor of subtilisin DY.

Answers

Note that answers can vary slightly, depending on the time/date of searches.

- 1.a. Template T A A G C C T A A T C T A A T
b. nontemplate A T T C G G A T T A G A T T A
2. Methionine, Leucine, Glycine, Proline (met - leu - gly - pro) or MLGP
3. a. 17
b. 3911
c. 352
d. 219
e. 1
f. lastname followed by one or two initials, do not use commas.
- 4.a. 481
b. 3
c. 3
d. Finds papers in which both are authors
- 5.a. 282
b. 183
c. 99
d. First sentence of the abstract
- 6.a. 282
b. 220
c. 62
d. 62
e. [auth] limits the search to the author field. This search finds all mentions of Anfinsen outside the author field. The previous search finds all Anfinsen mentions that are not mentioned as C.B. Anfinsen.
7. a. 181,944
b. 7 if you used eschenb* [au]

c. N-benzyloxycarbonyl-Ala-Pro-Phe-chloromethyl ketone