

Self-Quiz 3 Questions

Activity Three: The ORF Finder

Why is there more than one reading frame for a nucleotide sequence?

Some sequences are too long to have only one reading frame

Reading frames overlap one another

There are often more than one start (methionine) codons in a sequence

A codon encompasses 3 nucleotides, one sequence can produce different reading frames depending on which nucleotide is read first

How many reading frames exist for a double-stranded DNA sequence?

Two

Four

Six

Three

Which of the following best describes an Open Reading Frame (ORF)?

A sequence of nucleotides that contain a start and stop codon in any order



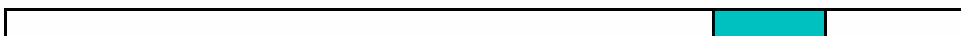

A reading frame that contains a start codon, a number of codons for amino acids, and then a stop codon

A reading frame with multiple start codons

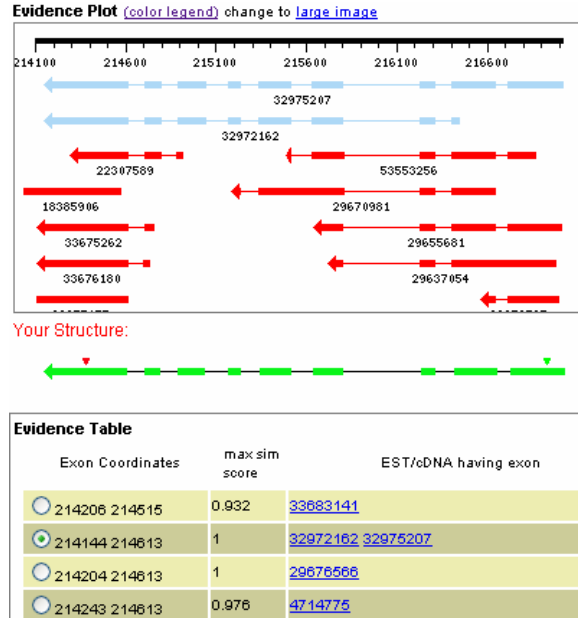
A sequence of nucleotides without any stop codons

Assume that all the following ORF's are generated from the same mRNA transcript.

Which would be the best one to select for the gene annotation?

- A. 
- B. 
- C. 
- D. 

In the following figure, what indicates that an ORF has been selected for the annotation?



The green dot next to the exon in the evidence table
 There is a proposed gene model under the words “Your Structure”
 Multiple EST/cDNA evidence supports the proposed gene model
 The green and red triangles show the protein coding region on the proposed gene model

Which one of the statements below correctly identifies the problem(s) with the selected ORF in the following figure?

Protein Coding Region
start end

mRNA

```
CCAAAATAAAAACTCAATCTCTCTCTCTC
TCTCTCCATCGAGAAACACTAAACTGCTAT
AATCATTACCTCTCTTCGATTTCTCAAACC
CTATCTGGCTCTCTACCCATATGCTTCAGA
TCCGCATTAAAAAGCTAAGTTTTTTGTTA
TGTCTTCTTTCTTATTTGATCAGTTTGT
CTGCTTCACCATTTTAACTGACATTTT
```

[blastn](#) [tblastn](#) [tblastx](#)

Protein

```
RSLLPN*RR*INETPRHRQSH*AVSRHL
DPILLRUVADSLLESKWTITANSRRICGS
ERKISALR*ULDGEAKSGDRRSW*ULRUSI
QIHPQVD*ICSGIASLHDAVER*&QNPNR*
AFVISS*GEGS**LQDSNRERKFR*SRRG
PYF*WIS*RMGRCDTRSWHKRGSKP*W*KC
DENGRTCEQACNCLQERYECCISGSRSD
```

[blastp](#)

- The protein coding region is too long and not a multiple of 3.
- The mRNA transcript does not start with AUG
- The amino acid sequence is interrupted multiple stop codons
- The amino acid sequence does not start with M (methionine) and also contains multiple stop codons

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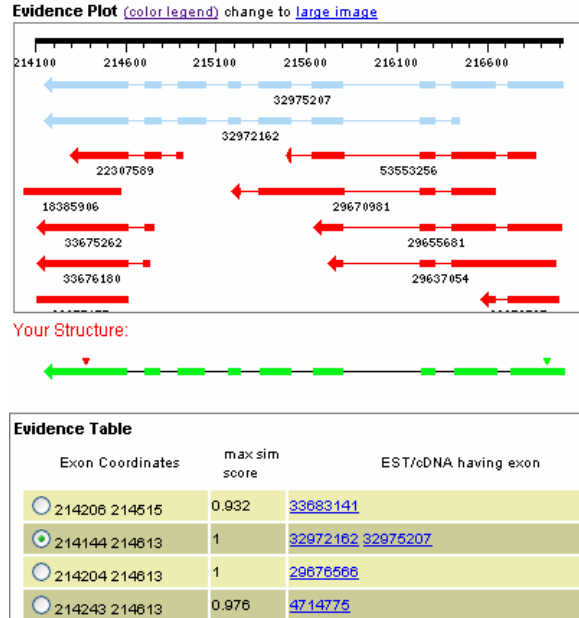
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TGTCTTCTTTCTTATTTGATCAGTTTGT
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```

[blastn](#) [tblastn](#) [tblastx](#)

Protein

```
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ERKISALR*ULDGEAKSGDRRSW*VLRUSI
QIHPVD*ICSGIASLHDAVER*&QNPMR*
AFVISS*GEGS*LQDSNRERKFR*SRRG
PYF*WIS*RMGRCDTRSWHKRGSKP*W*KC
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```

[blastp](#)

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