

# [Target prediction](https://assignbuster.com/target-prediction/)

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UMUC BIOT630 Lecture 10 Exercise – “ Due Version” Question a Using miRBase (http www. mirbase. org), what is the accession number for “ mmu-mir-223”? Answer = The accession number for “ mmu-mir-223” is MI0000703.
Question 1. b
Overlooking the record provided as your answer to Question 1. a, what “ Gene Family” does “ mmu-mir-223” belong to?
Answer = “ mmu-mir-223” belongs to MIPF0000067; mir-223 (23 sequences) gene family.
Question 1. c
What gene does “ mmu-mir-223” fall within?
Answer = The “ mmu-mir-223” is an RNA gene” or a “ non-coding RNA gene (ncRNA) involved in gene regulation.
Question 1. d
What type of gene feature does “ mmu-mir-223” fall in?
Answer = “ mmu-mir-223” is a microRNA (miRNA) gene.
Question 1. e
What is the genomic position, or coordinates, for “ mmu-mir-223”?
Answer = “ mmu-mir-223” can be genetically mapped to ChrX: 93438156-93438265 bp, + strand
Question 1. f
What is the “ Stem-loop” sequence for “ mmu-mir-223”?
Answer = The “ Stem-loop” sequence for “ mmu-mir-223” is:
UCUGGCCAUCUGCAGUGUCACGCUCCGUGUAUUUGACAAGCUGAGUUGGACACUCUGUGUGGUAGAGUGUCAGUUUGUCAAAUACCCCAAGUGUGGCUCAUGCCUAUCAG
Question 1. g
What is the “ Mature” sequence for “ mmu-mir-223”?
Answer = The “ Mature” sequence for “ mmu-mir-223” is:
> mmu-miR-223-3p MIMAT0000665
UGUCAGUUUGUCAAAUACCCCA
> mmu-miR-223-5p MIMAT0017056
CGUGUAUUUGACAAGCUGAGUUG
Question 2. a
Using TargetScanHuman (http://www. targetscan. org/vert\_50/), species set to “ Mouse”, and all other search criteria kept at default settings, how many “ conserved targets”, “ conserved sites”, and “ poorly conserved sites” are there for “ mmu-miR-223”?
Answer = There are 150 conserved targets, with a total of 154 conserved sites and 43 poorly conserved sites for “ mmu-miR-223”.
Question 2. b
In the target list exists “ F3”. What sites does “ mir-223” bind in the 3’ UTR for this mRNA? To answer, click on the corresponding “ Site in UTR” link. Then, copy paste screen shot. The sites will be designated as outlined boxes.
Answer =
Question 2. c
Of the total number of “ miR-223” binding sites that occur in the “ F3” 3’ UTR (see you’re your answer to Question 2. b), how many are “ Conserved”?
Answer = Of the total number of “ miR-223” binding sites that occur in the “ F3” 3’ UTR, only one is conserved.
Question 2. d
Of the “ Conserved” “ miR-223” binding sites in the “ F3” 3’ UTR, what appears to be the consensus sequence in the miRNA that binds the mRNA target sequence?
Answer = Of the “ Conserved” “ miR-223” binding sites in the “ F3” 3’ UTR, the consensus sequence in the miRNA that binds the mRNA target sequence is AACUGAC.
Question 3. a
Using your answer to Question 1. f in conjunction with Mfold (http://mfold. rna. albany. edu/? q= mfold/RNA-Folding-Form), what is the secondary structure prediction? To answer, keep all parameter settings set to default, scroll down to bottom of form and click on “ Fold RNA”. After, open/copy/paste the “ Vienna” formatted prediction for Structure 1.
Answer =
Structure 1: Folding bases 1 to 110 of mmu-mir-223 stem-loop sequence
Initial ΔG = -44. 50
The “ Vienna” formatted prediction for Structure 1 is as follows:
UCUGGCCAUCUGCAGUGUCACGCUCCGUGUAUUUGACAAGCUGAGUUGGACACUCUGUGUGGUAGAGUGUCAGUUUGUCAAAUACCCCAAGUGUGGCUCAUGCCUAUCAG
.((((......(((..((((((((....((((((((((((((......(((((((((.....)))))))))))))))))))))))....))))))))...)))...))))(-44. 50)

Question 3. b
What does the 2D rendering for the Structure 1 prediction look like? To answer, open/copy/paste the “ pdf” or “ png” formatted prediction for Structure 1.
Answer = The 2D rendering for the Structure 1 prediction looks as shown below.
Question 4. a
Given the following RNA “ Stem-Loop” sequence:
> What am I?
CGGGGUUGGUUGUUAUCUUUGGUUAUCUAGCUGUAUGAGUGGUGUGGAGUCUUCAUAAAGCUAGAUAACCGAAAGUAAAAAUAACCCCA
What miRNA family does the miRBase “ Search” feature (http://www. mirbase. org/search. shtml) say it is likely a member of? To answer, review the search results, explore the recorded family entries in the corresponding records, report the consensus entry as your answer.
Answer = Upon search against miRNA sequences, the miRNA’s are a member of “ MIPF0000014; mir-9” miRNA family. The consensus sequence is: ucuuugguuaucuagcuguauga
Question 4. b
Using the same RNA “ Stem-Loop” sequence in Question 4. a, what miRNA family does the Rfam “ Search” feature (http://rfam. sanger. ac. uk/search) say it is likely a member of?
Answer = the miRNA’s are a member of mir-9/mir-79 (RF00237) microRNA precursor family.
Question 4. c
Per your answers to Questions 4. a and 4. b, would you say Rfam and miRBase provide similar or different results?
Answer = Definitely, both of them produce the same results.