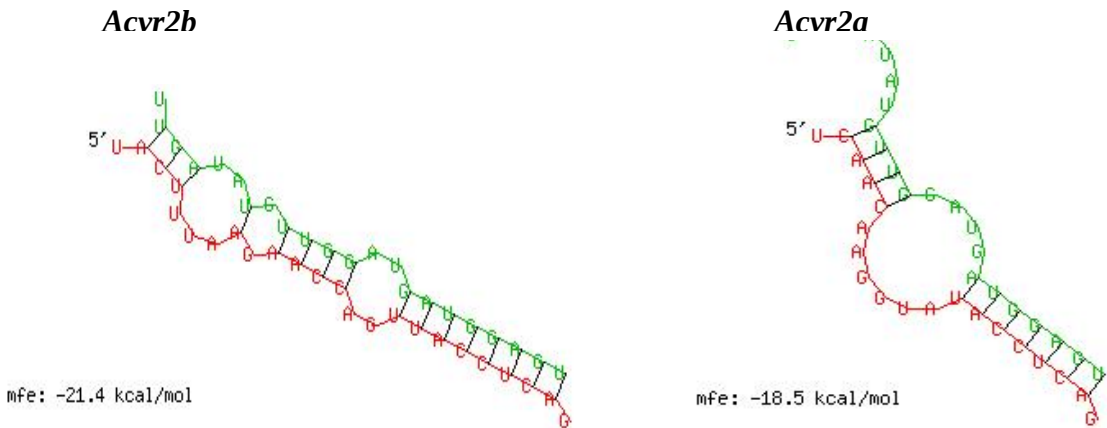


Supplemental Figure 6: Impact of nucleotide modifications on folding and free energy of let-7a-1:Acvr2a and b duplexes. This figure shows a compilation of all of the mmu-let-7a-1 species from the three different tissues in relation to Acvr2a and Acvr2b predicted targets. The mature let-7a-1:Acvr2a and let-7a-1:Acvr2b duplexes with the minimum free energy (mfe) are shown on top. The RNA-folding results and mfe of edited let-7a-1 species is shown subsequently. The numbers at the end of the sequence refers to the copy number of that sequence in the total complement of small RNA sequences from that tissue. The free energy of each duplex is shown next to the folding. These free energies are compiled in Supplemental Table 11A and B.

Mature miRNA
TGAGG TAGT AGGTTGTATAGTT



2nd Base MODIFICATIONS

Ovary -None

βTC-3 -None

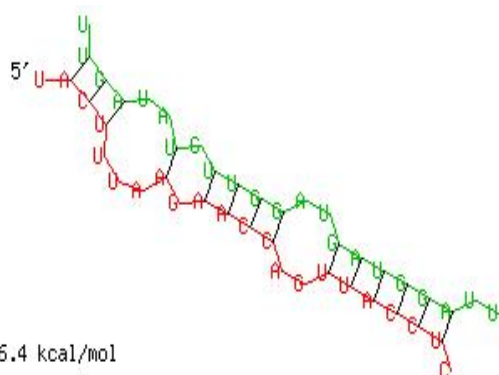
E14.5

TGAGG TAGT AGGTTGTATAGT**
...GAGG TAGT AGGTTGTATAGTT.....12
...GAGG TAGT AGGTTGTATAGT.....1
...TtAGG TAGT AGGTTGTATAGTT.....32
...TaAGG TAGT AGGTTGTATAGTT.....19
...TtAGG TAGT AGGTTGTATAGT.....7

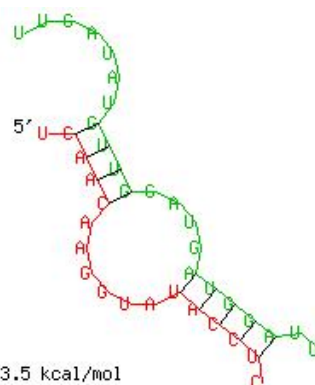
.ATGgAGG TAGT AGGTTGTATAGTT.....6



TtAGGTAGTAGGTTGTATAGTT.....32

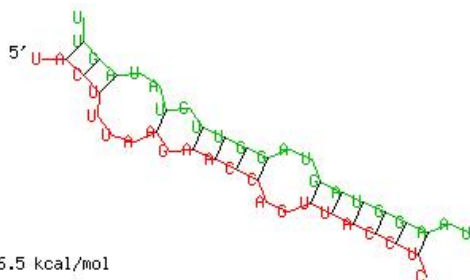


mfe: -16.4 kcal/mol

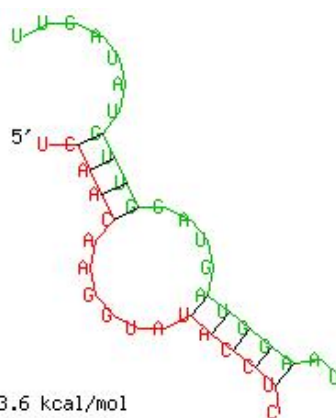


mfe: -13.5 kcal/mol

TaAGGTAGTAGGTTGTATAGTT.....19

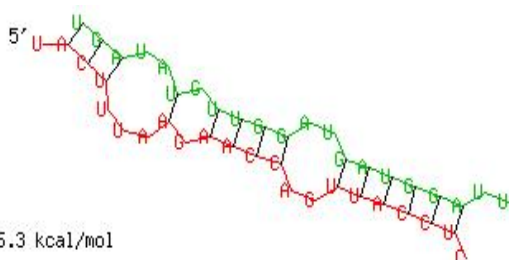


mfe: -16.5 kcal/mol

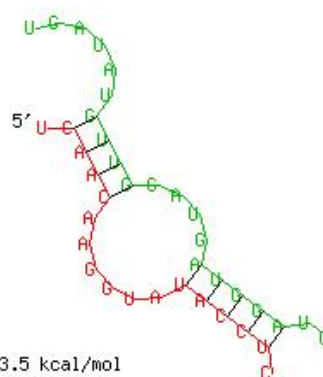


mfe: -13.6 kcal/mol

TtAGGTAGTAGGTTGTATAGT.....7



mfe: -16.3 kcal/mol



mfe: -13.5 kcal/mol

3rd Position MODIFICATIONS

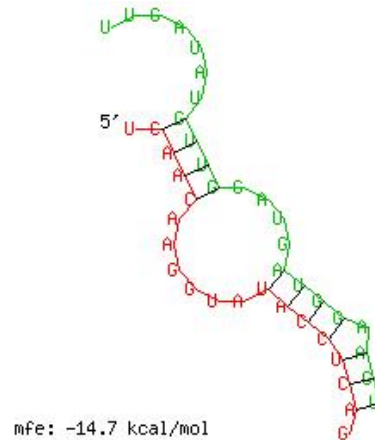
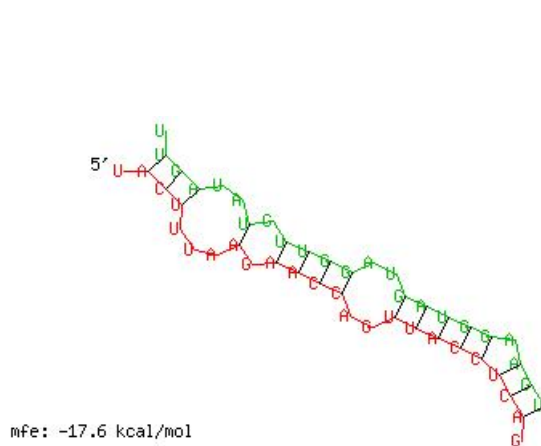
Ovary -None

E14.5 -None

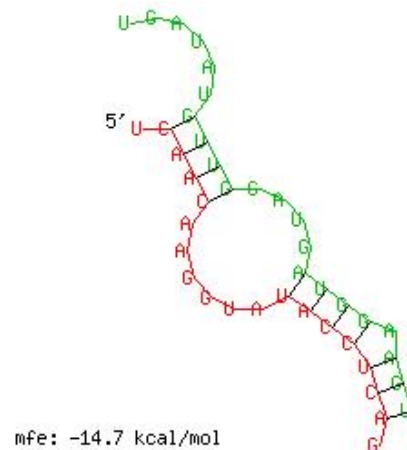
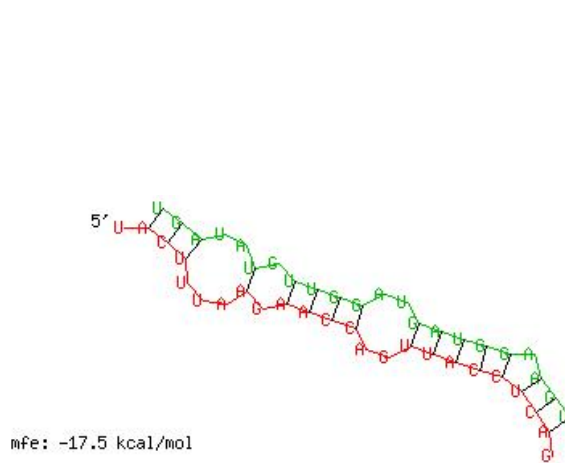
β TC-3

```
***TGAGGTAGTAGGTTGTATAGT*****  
...ATGgAGGTAGTAGGTTGTATAGTT.....6  
...TGAaGGTAGTAGGTTGTATAGTT.....29  
...TGAaGGTAGTAGGTTGTATAGT.....6
```

TGAaGGTAGTAGGTTGTATAGTT.....29



TGAaGGTAGTAGGTTGTATAGT.....6



5th Base MODIFICATIONS

Ovary-None

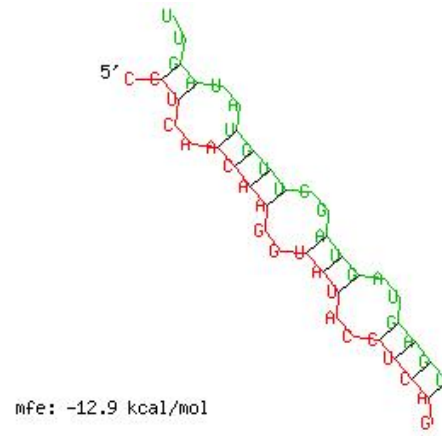
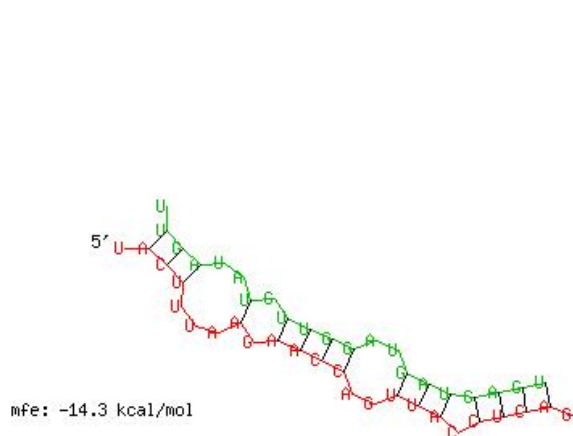
E14.5

TGAGGTAGTAGGTTGTATAGT**

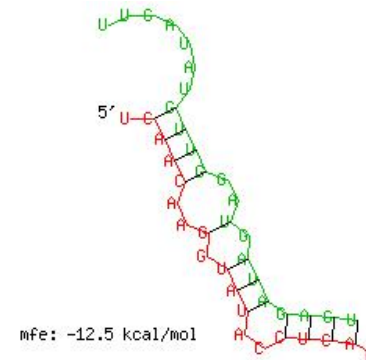
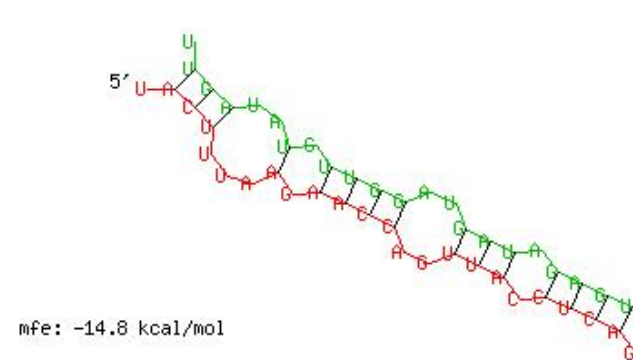
...TGAG-TAGTAGGTTGTATAGTT.....11

...TGAGaTAGTAGGTTGTATAGTT.....12

TGAG-TAGTAGGTTGTATAGTT.....11



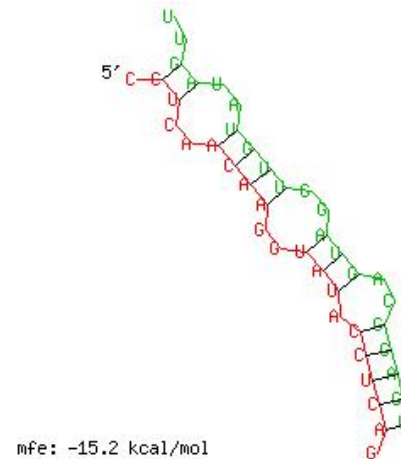
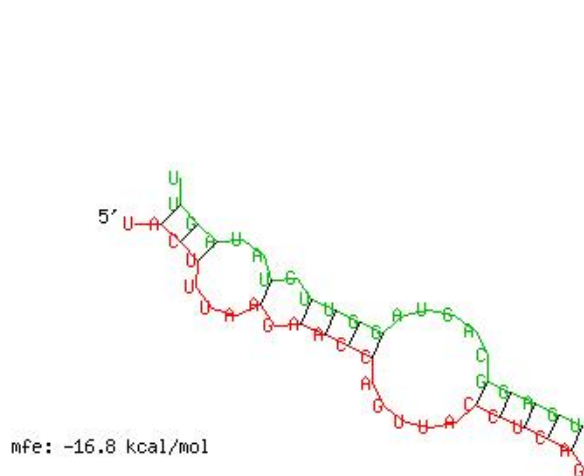
TGAGaTAGTAGGTTGTATAGTT.....12



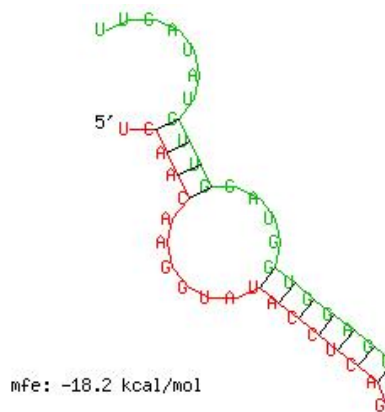
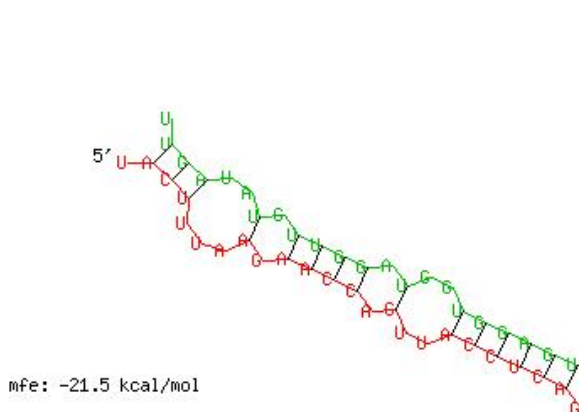
βTC-3

TGAGGTAGTAGGTTGTATAGT**
 ...TGAGGcAGTAGGTTGTATAGTT.....6
 ...TGAGGTgGTAGGTTGTATAGTT.....7
 ...TGAGaTAGTAGGTTGTATAGTT.....15

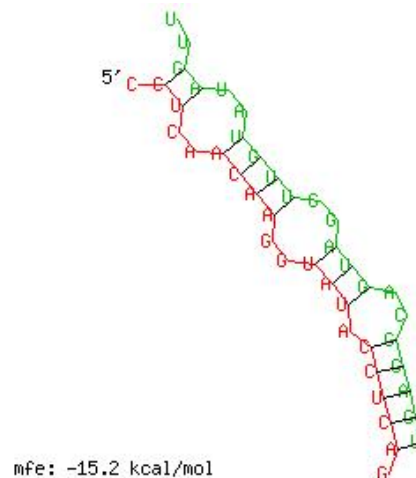
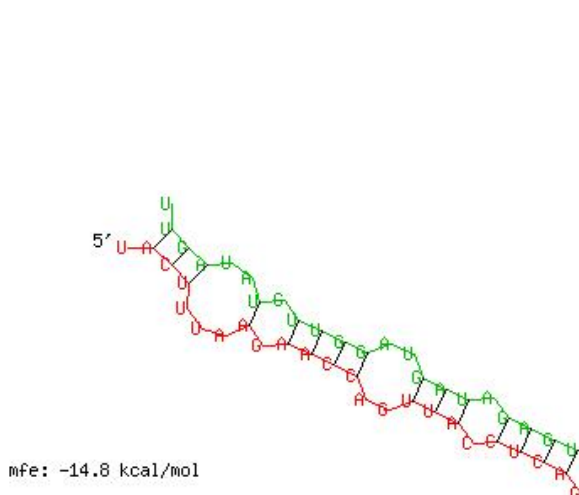
TGAGGcAGTAGGTTGTATAGTT.....6



TGAGGTgGTAGGTTGTATAGTT.....7



TGAGaTAGTAGGTTGTATAGTT.....15



6th Base MODIFICATIONS

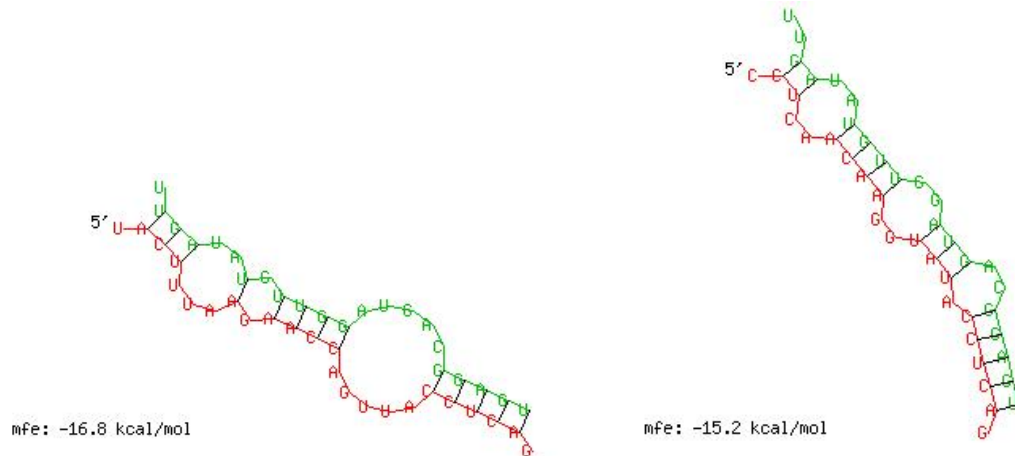
Ovary-None

E14.5-None

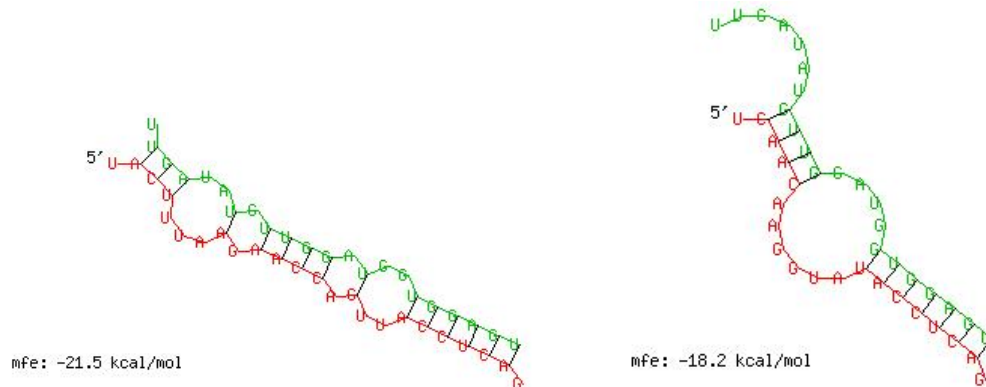
β TC-3

```
***TGAGGTAGTAGGTTGTATAGT*****  
...TGAGGcAGTAGGTTGTATAGTT.....6  
...TGAGGTgGTAGGTTGTATAGTT.....7  
...TGAGaTAGTAGGTTGTATAGTT.....15
```

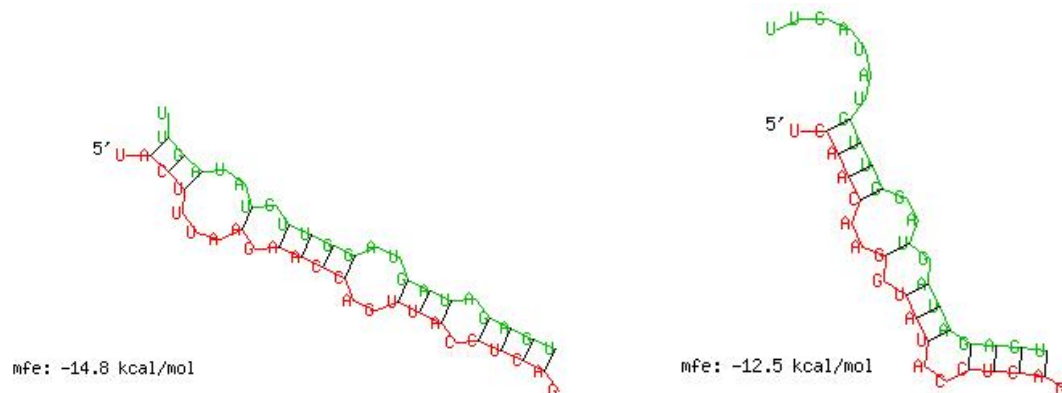
TGAGGcAGTAGGTTGTATAGTT.....6



TGAGGTgGTAGGTTGTATAGTT.....7



TGAGaTAGTAGGTTGTATAGTT.....15

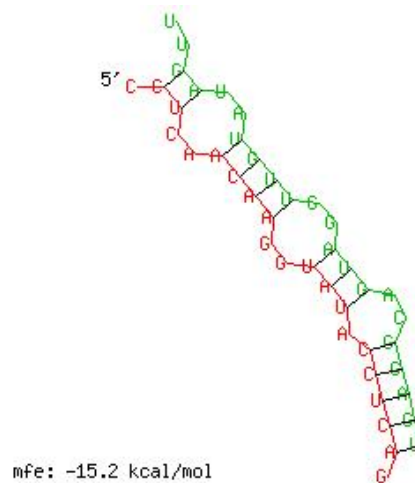
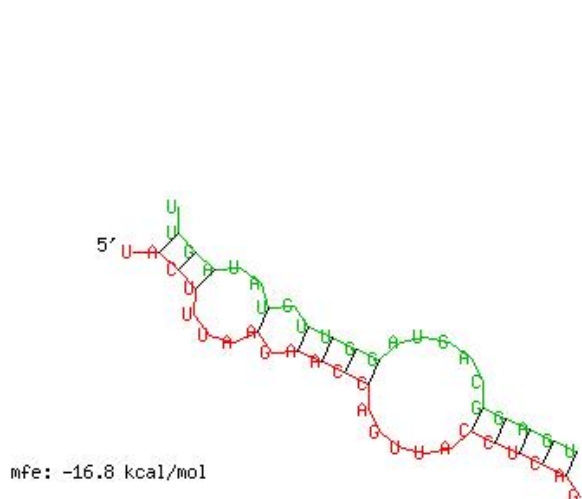


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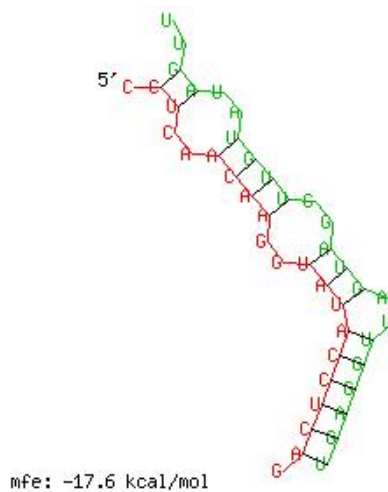
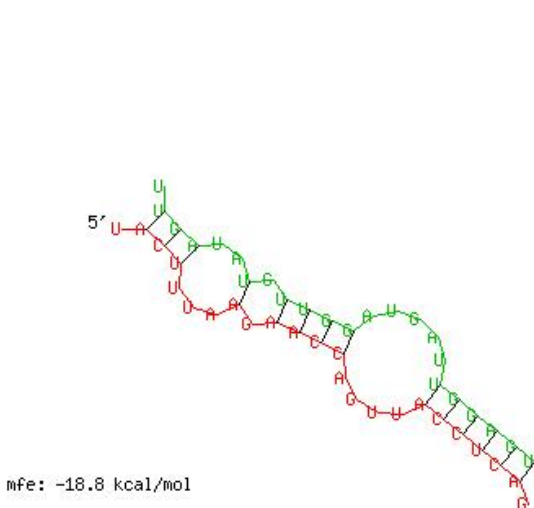
***TGAGGTAGTAGGTTGTATAGT*****
...TGAGGcAGTAGGTTGTATAGTT.....6
...TGAGGTtAGTAGGTTGTATAGTT.....19
...TGAGGTgGTAGGTTGTATAGTT.....7
...TGAGGcAGTAGGTTGTATAGTT.....6

```

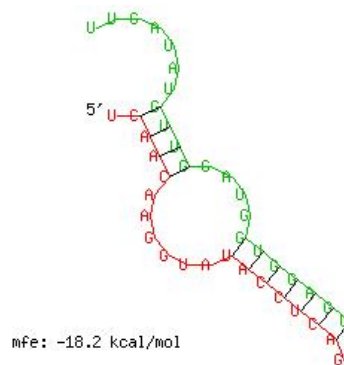
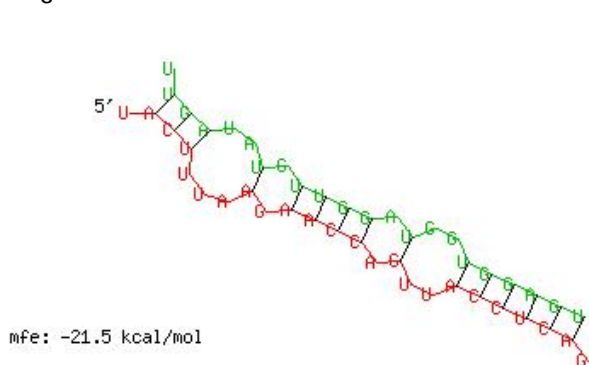
TGAGGcAGTAGGTTGTATAGTT.....6



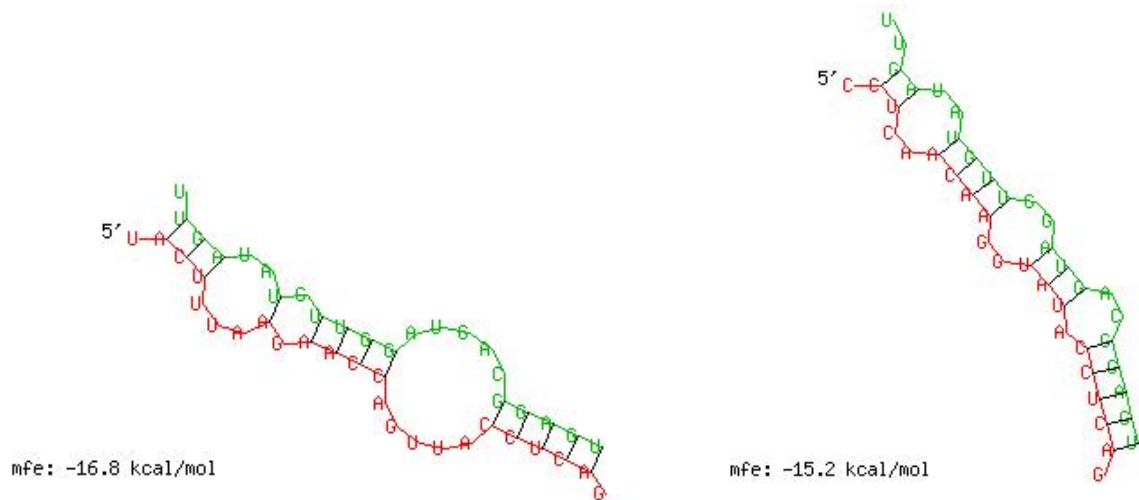
TGAGGTtAGTAGGTTGTATAGTT.....19



TGAGGTgGTAGGTTGTATAGTT.....7



TGAGGcAGTAGGTTGTATAGTT.....6



7th Base MODIFICATIONS

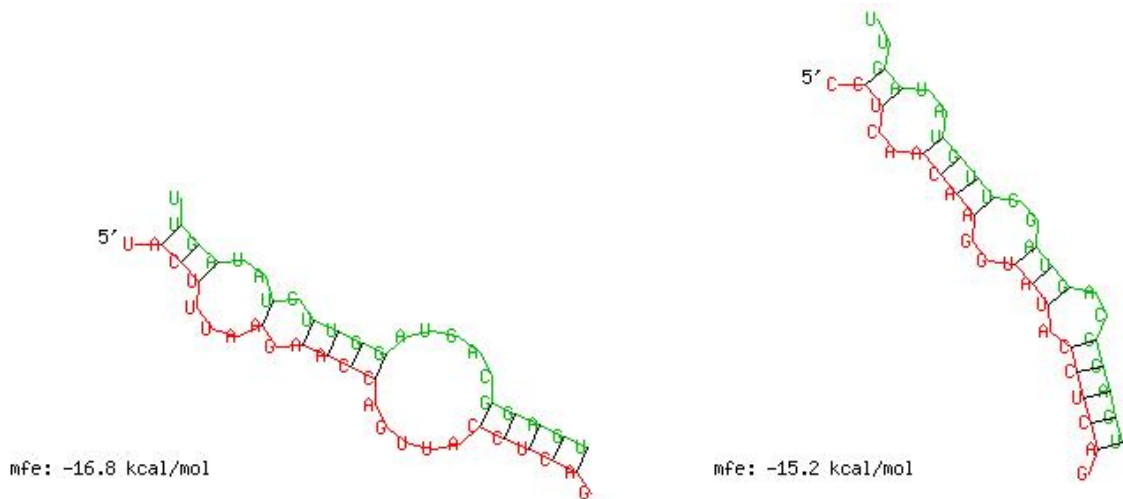
Ovary -None

E14.5 -None

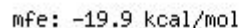
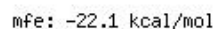
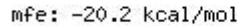
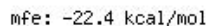
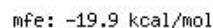
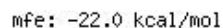
β TC-3

TGAGGTAGTAGGTTGTATAGT**
 ...TGAGGcAGTAGGTTGTATAGTT.....6
 ...TGAGGTgGTAGGTTGTATAGTT.....7
 ...TGAGaTAGTAGGTTGTATAGTT.....15

TGAGGcAGTAGGTTGTATAGTT.....6



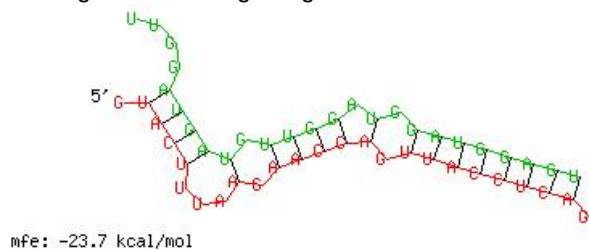
TGAGGTgGTAGGTTGTATAGTT.....7



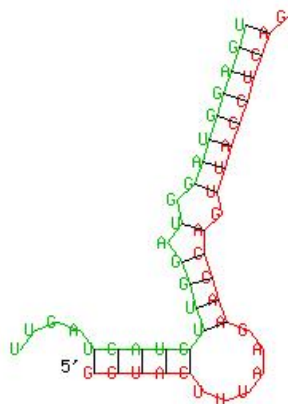
```
*****TGAGGTAGTAGGTTGTATAGT*****
.....TGAGGTAGgTAGGTTGTAgTAGgTT..... 25
.....TGAGGTAGgTAGGTTGTActAGTT..... 11
.....TGAGGTAGgTAGGTTGTATtAGTT..... 17
.....TGAGGTAGgTAGGTTGTATtAGT..... 5
```

.....TGAaGGTAGgTAGGTTGTATAGTT..... 5

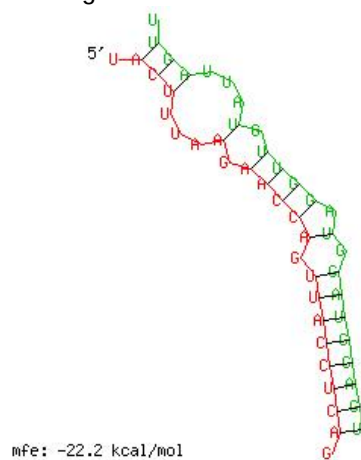
TGAGGTAGgTAGGTTGTAgTAGgTT.....25



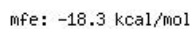
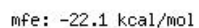
TGAGGTAGgTAGGTTGTActAGTT..... 11



TGAGGTAGgTAGGTTGTATtAGTT..... 17



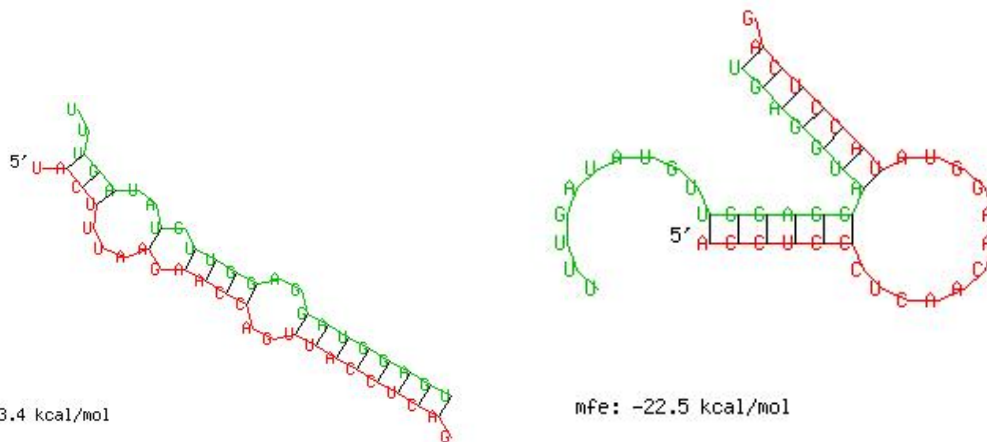
TGAGGTAGgTAGGTTGTATtAGT..... 5



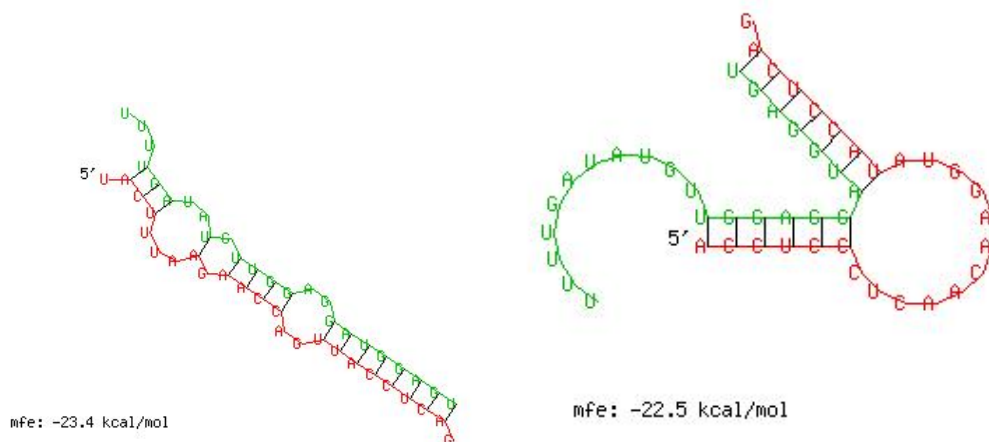
Ovary

.....TGAGGTAGgAGGTTGTATAGTTT.....	1352
.....TGAGGTAGgAGGTTGTATAGTTTT.....	80
.....TGAGGTAGgAGGTTGTATAGTTaT.....	40

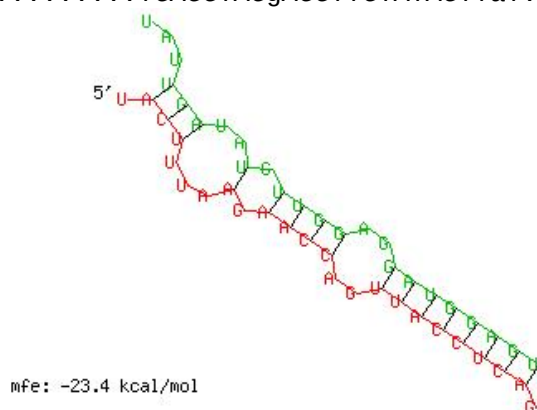
TGAGGTAGgAGGTTGTATAGTTT..... 1352



TGAGGTAGgAGGTTGTATAGTTTT..... 80



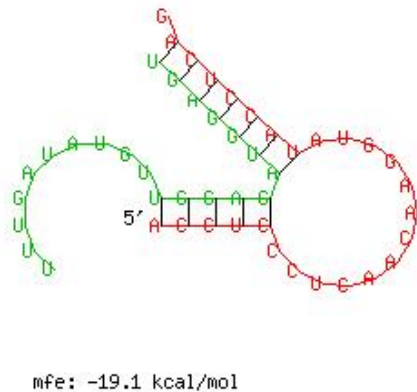
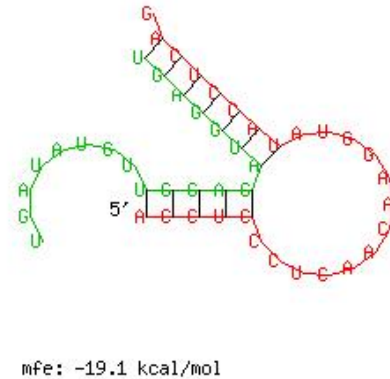
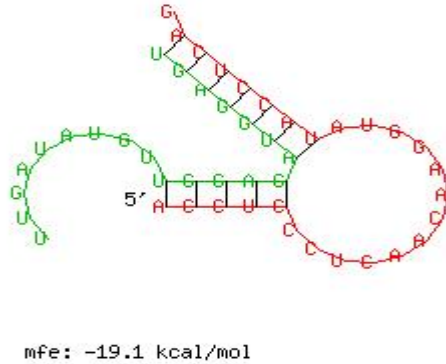
.....TGAGGTAGgAGGTTGTATAGTTaT..... 40



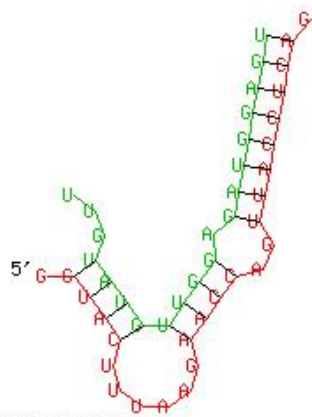
E14.5

*****TGAGGTAGTAGGTTGTATAGT*****	
..... TAGGTTGTATAGTT	1
.....TGAGGTAG-AGGTTGTATAGTT.....	49
.....TGAGGTAG-AGGTTGTATAGT.....	22
.....TGAGGTAG-AGGTTGTATAGTTT.....	6
.....TGAGGTAG-AGGTTGTAT-GTT.....	5
.....TGAGGTAGgAGGTTGTATAGTTT.....	140
.....TGAGGTAGgAGGTTGTATAGTTaT.....	19

TGAGGTAG-AGGTTGTATAGTT..... 49

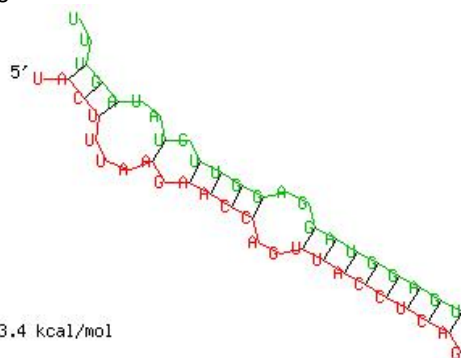


TGAGGTAG-AGGTTGTAT-GTT..... 5



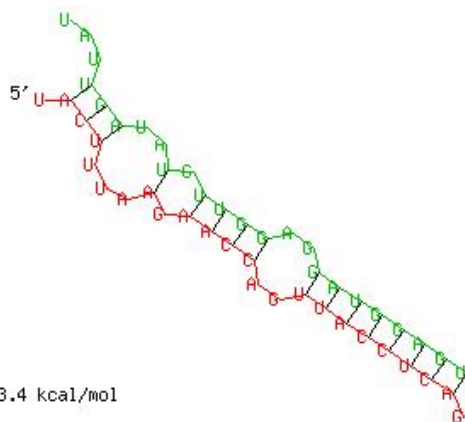
mfe: -21.0 kcal/mol

TGAGGTAGgAGGTTGTATAGTTT..... 140



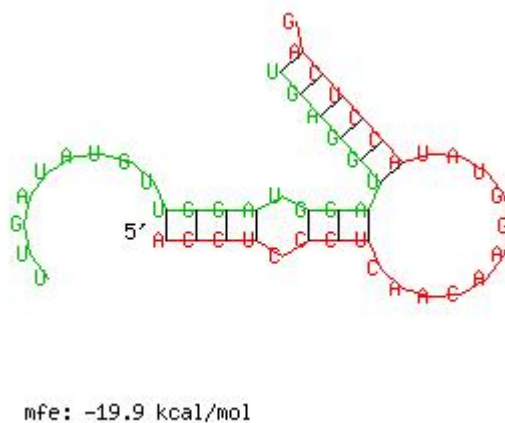
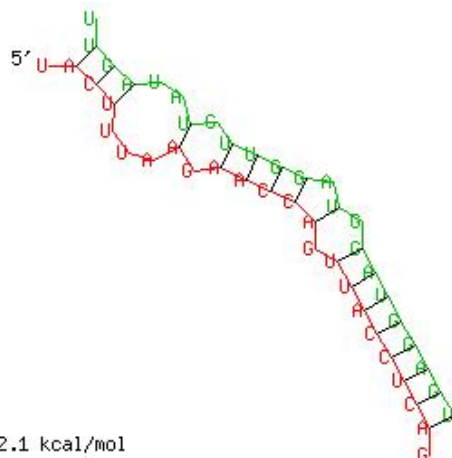
mfe: -23.4 kcal/mol

TGAGGTAGgAGGTTGTATAGTTaT..... 19

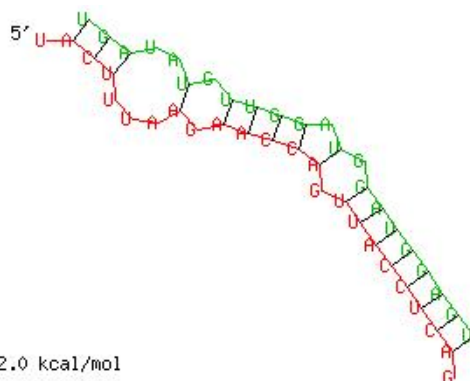


mfe: -23.4 kcal/mol

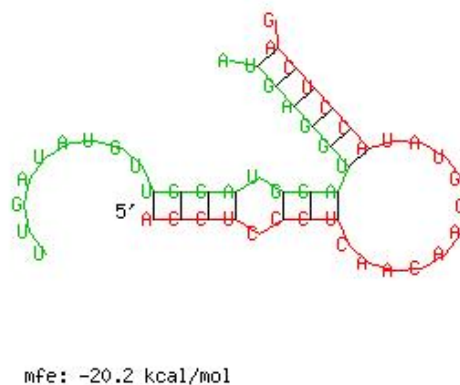
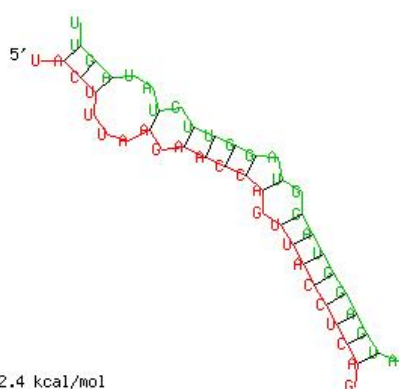
ATGAGGTAGgAGGTTGTATAGTTT..... 6



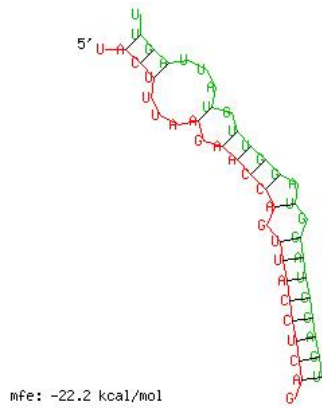
TGAGGTAGgTAGGTTGTATAGT..... 20



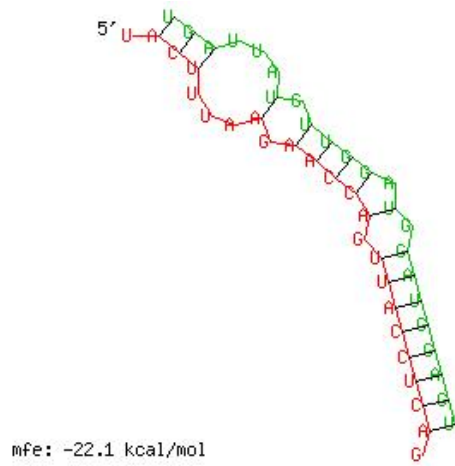
ATGAGGTAGgTAGGTTGTATAGTT..... 9



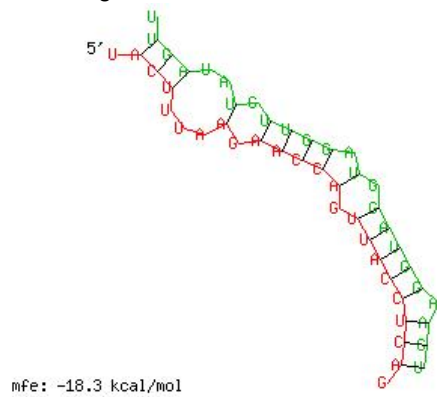
TGAGGTAGgTAGGTTGTATAGTTT..... 7



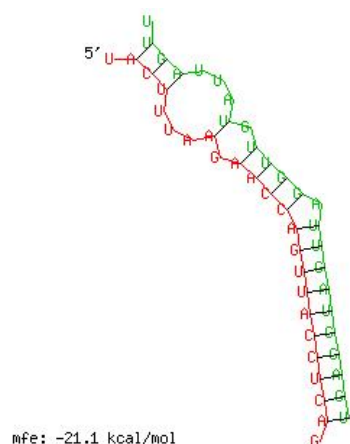
TGAGGTAGgTAGGTTGTATtAGT..... 5



TGAaGGTAGgTAGGTTGTATAGTT..... 5



TGAGGTAGTtAGGTTGTATtAGTT..... 7



10th Base Modifications

Ovary-None

E14.5-None

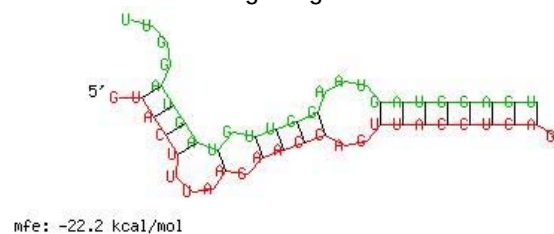
βTC3

```

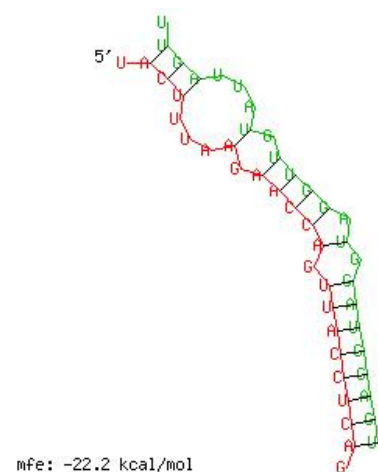
***TGAGGTAGTAGGTTGTATAGT*****
...TGAGGTAGTAaGGTTGTAgTAGgTT..... 5
...TGAGGTAGTAaGGTTGTATtAGTT..... 60
...TGAGGTAGTAaGGTTGTATtAGT..... 17

```

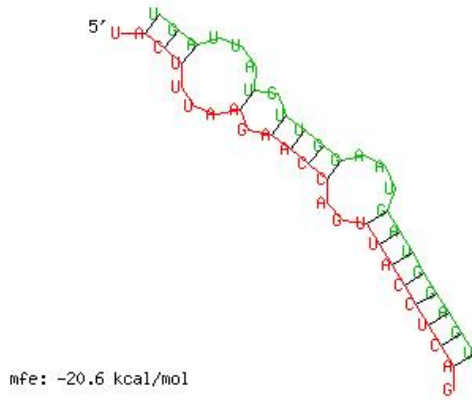
TGAGGTAGTAaGGTTGTAgTAGgTT.....5



TGAGGTAGTAaGGTTGTATtAGTT.....60



TGAGGTAGTAaGGTTGTATtAGT.....17



11th Base Modifications

Ovary - None

E14.5 - None

βTC-3-None

12th Base Modifications

Ovary - None

E14.5

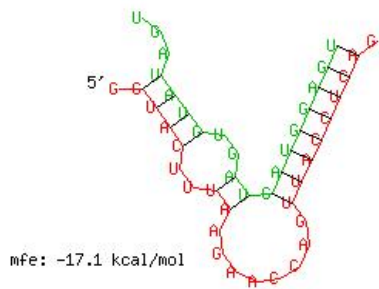
TGAGGTAGTAGGTTGTATAGT**

...TGAGGTAGTAG-TGTATAGT..... 11

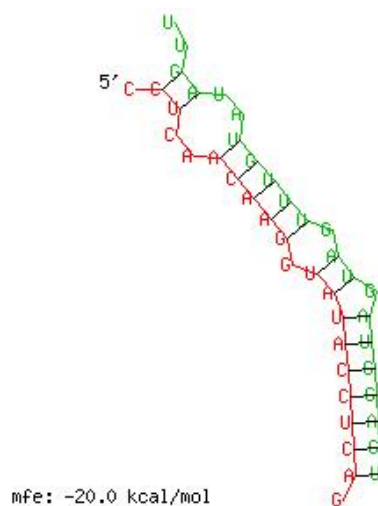
...TGAGGTAGTAG-TGTATAGTT..... 5

...TGAGGTAGTAGtTTGTATAGTT..... 8

TGAGGTAGTAG-TGTATAGTT.....11



TGAGGTAGTAG-TGTATAGTT.....5

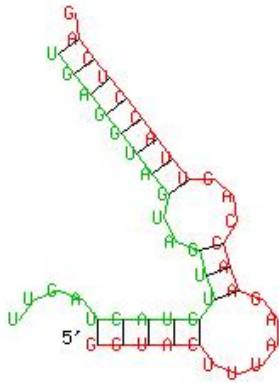


```

***TGAGGTAGTAGTTGTATAGT*****
..TGAGGTAGTAG-T-GTATAGT..... 17
..TGAGGTAGTAG-TTGTAcTAGTT..... 6

```

TGAGGTAGTAG - TTGTAcTAGTT.....6



mfe: -19.2 kcal/mol

13th Base Modifications

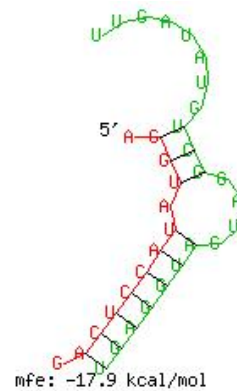
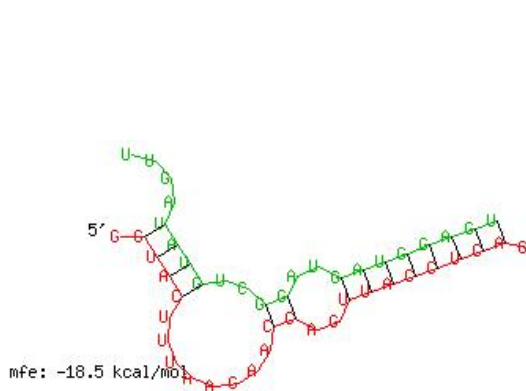
Ovary-None

E14.5-None

β TC-3

TGAGGTAGTAGGTTGTATAGT**
 ...TGAGGTAGTAGGcGTATAGTT..... 10

TGAGGTAGTAGGcGTATAGTT.....10



14th Base Modifications

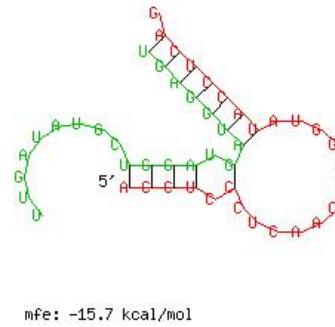
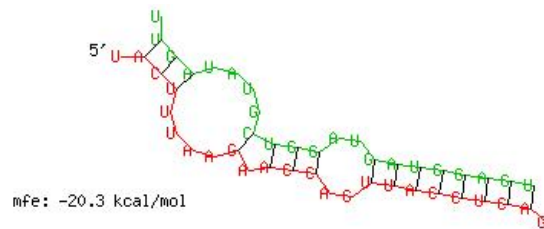
Ovary-None

E14.5

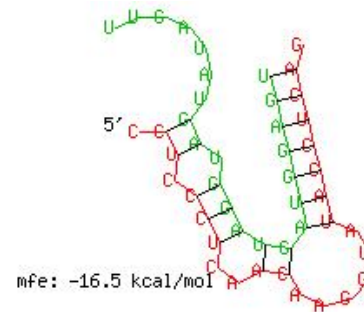
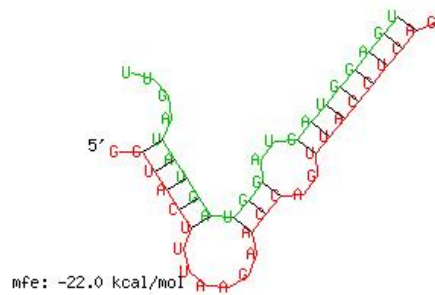
TGAGGTAGTAGGTTGTATAGT**
 ...TGAGGTAGTAGGT-GTATAGT..... 8
 ...TGAGGTAGTAGGTcGTATAGTT..... 6

TGAGGTAGTAGGT-GTATAGT.....8

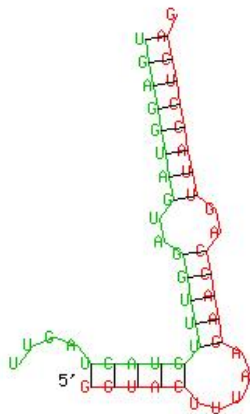
TGAGGTAGTAGGTcGTATAGTT.....7



TGAGGTAGTAGGTaGTATAGTT.....5

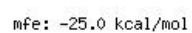


TGAGGTAGTAGGTTtGTAcTAGTT.....28

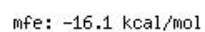


mfe: -25.0 kcal/mol

TGAGGTAGTAGGTTtGTAcTAGgTT.....25

[illegible]

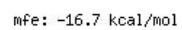
mfe: -25.0 kcal/mol



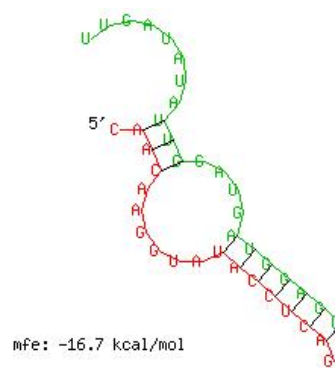
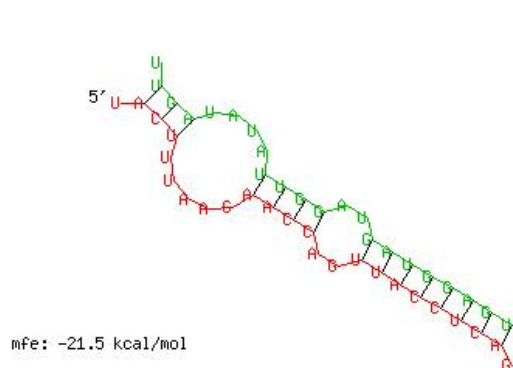
5'

1.4 kcal/mol

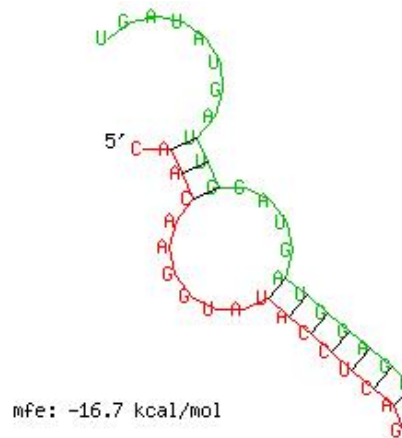
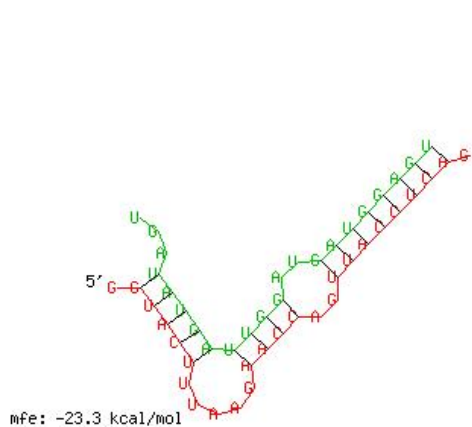
mfe: -21.4 kcal/mol



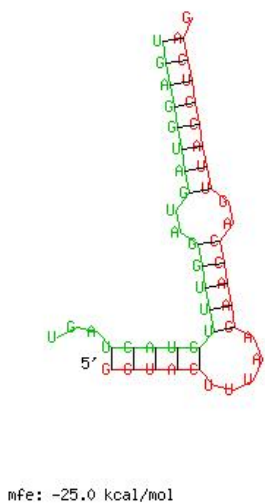
TGAGGTAGTAGGTTaTATAGTT.....25



TGAGGTAGTAGGTTaGTATAGT.....5



TGAGGTAGTAGGTTtGTActAGT.....8



15th Base Modifications

Ovary-None

E14.5-None

βTC-3-None

16th Position Modifications

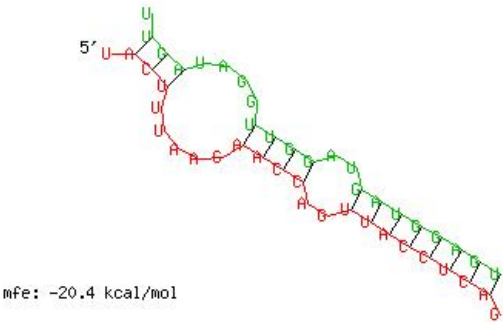
E14.5-None

βTC-3-None

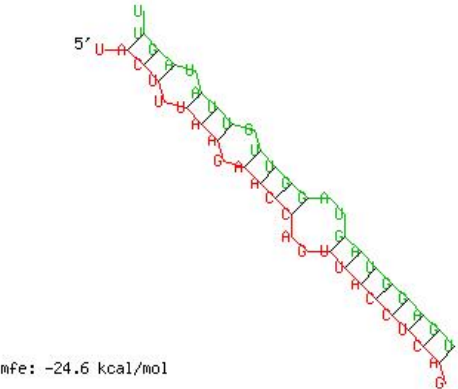
Ovary

*****TGAGGTAGTAGGTTGTATAGT*****	
.....TGAGGTAGTAGGTTGT.....	223
.....TGAGGTAGTAGGTTGgATAGTT.....	12
.....TGAGGTAGTAGGTTGTtATAGTT.....	30
.....TGAGGTAGTAGGTTGTtATAGT.....	7
.....TGAGGTAGTAGGTTGTtAgTAGgTT.....	5
.....TGAGGTAGTAGGTTGTgAaA.....	19

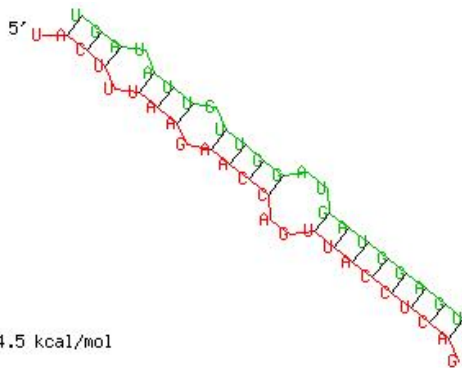
TGAGGTAGTAGGTTGgATAGTT.....12



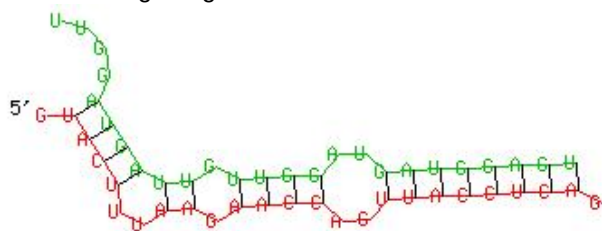
TGAGGTAGTAGGTTGTtATAGTT..... 30



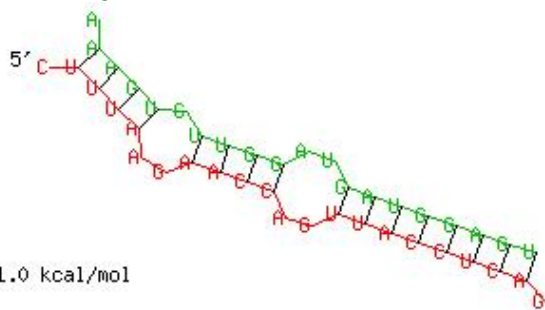
TGAGGTAGTAGGTTGTtATAGT..... 7



TGAGGTAGTAGGTTGTtAgTAGgTT..... 5



TGAGGTAGTAGGTTGTgAaA..... 19



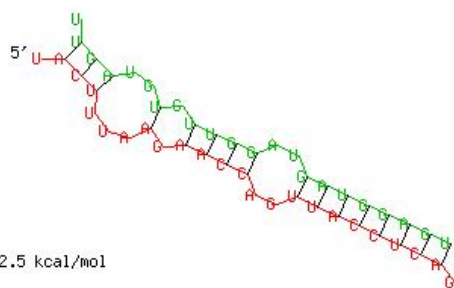
17th Position Modifications

E14.5 - None

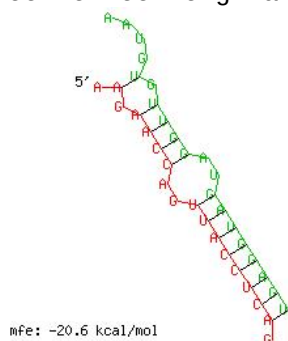
Ovary

```
*****TGAGGTAGTAGGTTGTATAGT*****
.....TGAGGTAGTAGGTTGTA..... 200
.....TGAGGTAGTAGGTTGTgTAGTT..... 66
.....TGAGGTAGTAGGTTGTgTAa..... 49
.....TGAGGTAGTAGGTTGTgTA..... 26
.....TGAGGTAGTAGGTTGTgAaA..... 19
.....TGAGGTAGTAGGTTGTgaA..... 14
.....TGAGGTAGTAGGTTGTgTAGT..... 17
```

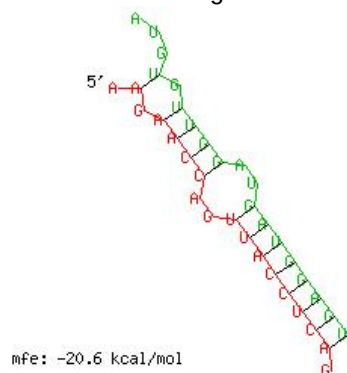
TGAGGTAGTAGGTTGTgTAGTT..... 66



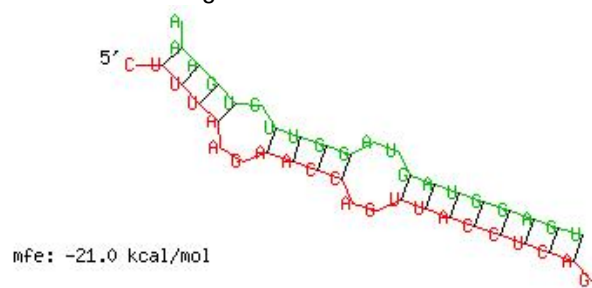
TGAGGTAGTAGGTTGTgTAa..... 49



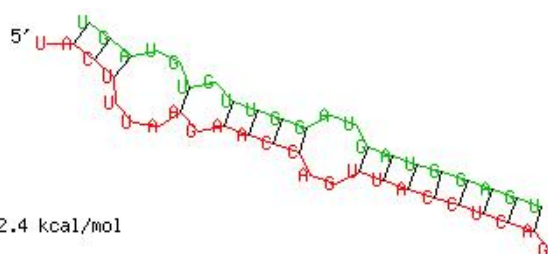
TGAGGTAGTAGGTTGTgTA..... 26



TGAGGTAGTAGGTTGTgAaA..... 19

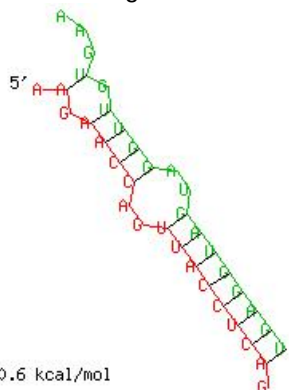


TGAGGTAGTAGGTTGTgTAGT..... 17



mfe: -22.4 kcal/mol

TGAGGTAGTAGGTTGTgaA..... 14



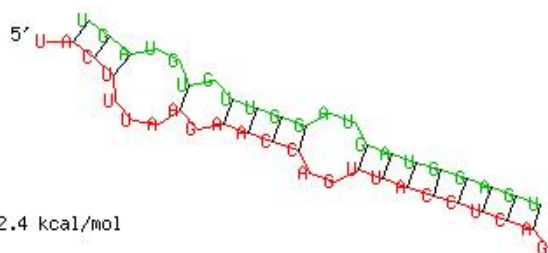
mfe: -20.6 kcal/mol

βTC-3

*****TGAGGTAGTAGGTTGTATAGT*****	
.....TGAGGTAGTAGGTTGTA.....	1
.....TGAGGTAGTAGGTTGTgTAGT.....	11
.....TGAGGTAGTAGGTTGTAgTAGgTT.....	391
.....TGAGGTAGTAGGTTGTAgTAGgT.....	185
.....TGAGGTAGTAGGTTGTAgTAGgTTT.....	34
.....TGAGGTAGTAGGTTGTAgTAGgTTT.....	24
.....TGAGGTAGTAGGTTGTAgTtAGgTT.....	20
.....TGAGGTAGTAGGTTGTAgTAGT.....	20
.....TGAGGTAGTAGGTTGTAgTAGg.....	13
.....ATGAGGTAGTAGGTTGTAgTAGgTT.....	10
.....TGAGGTAGgTAGGTTGTAgTAGgTT.....	25
.....TGAGGTAGTAGGTTGTAgTGT.....	8
.....TGAGGTAGTAGGTTGTtAgTAGgTT.....	5
.....TGAGGTAGTAaGTTGTAgTAGgTT.....	5
.....TGAGGTAGTAGGTTGTActAGTT.....	192
.....TGAGGTAGTAGGTTGTActAGgT.....	19
.....TGAGGTAGTAGGTTGTActAGgTT.....	69
.....TGAGGTAGTAGGTTGTActAGT.....	52
.....TGAGGTAGTAGGTTGTActAGT.....	12
.....TGAGGTAGTAG- TTGTActAGTT.....	6
.....TGAGGTAaGTAGGTTGTActAGTT.....	5
.....TGAGGTAGTAGGTTtGTActAGTT.....	28
.....TGAGGTAGTAGGTTtGTActAGgTT.....	25
.....TGAGGTAGgTAGGTTGTActAGTT.....	11
.....TGAGGTAGTAGGTTtGTActAGT.....	8
.....TGAGGTAGTAG- TTGTActAGT.....	7
.....TGAGGTAGTAGGTTGTAcgTAGgTT.....	36
.....TGAGGTAGTAGGTTGTAcgTAGgTTT.....	8
.....TGAGGTAGTAGGTTGTAcgAGgTT.....	6
.....TGAGGTAGTAGGTTGTAAtTAGTT.....	5
.....TGAGGTAGTAGGTTGTAA TAGT.....	12

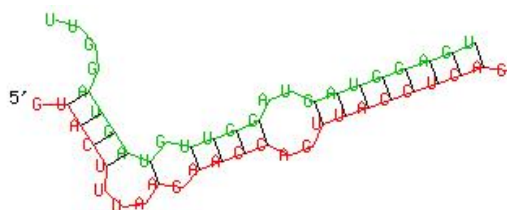
.....TGAGGTAGTAGGTTGTAAaTAGTT..... 9

TGAGGTAGTAGGTTGTgTAGT..... 11



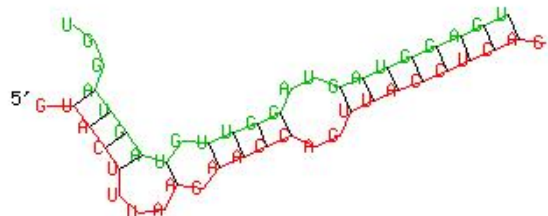
mfe: -22.4 kcal/mol

TGAGGTAGTAGGTTGTAgTAGgTT..... 391



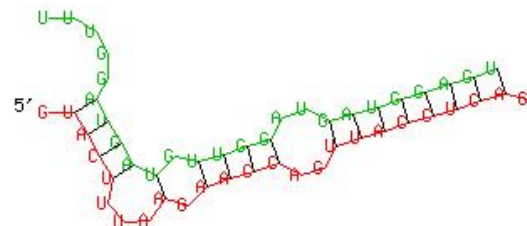
mfe: -23.0 kcal/mol

TGAGGTAGTAGGTTGTAgTAGgT..... 185



mfe: -23.0 kcal/mol

TGAGGTAGTAGGTTGTAgTAGgTTT..... 34



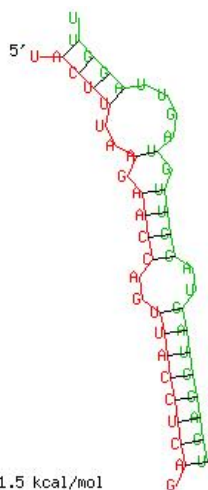
mfe: -23.0 kcal/mol

TGAGGTAGTAGGTTGTAgTAGTT..... 24



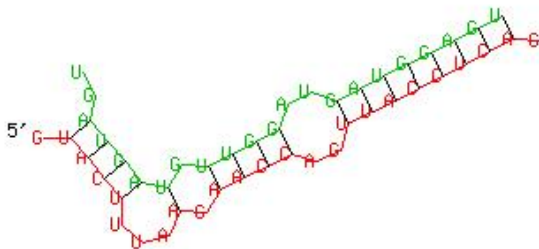
mfe: -23.0 kcal/mol

TGAGGTAGTAGGTTGTAgTtAGgTT..... 20



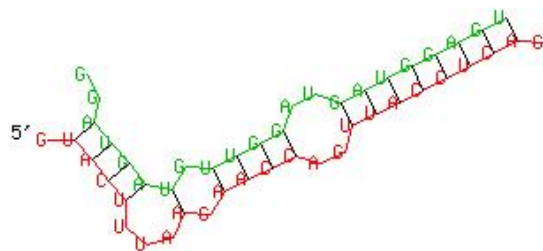
mfe: -21.5 kcal/mol

TGAGGTAGTAGGTTGTAgTAGT..... 20



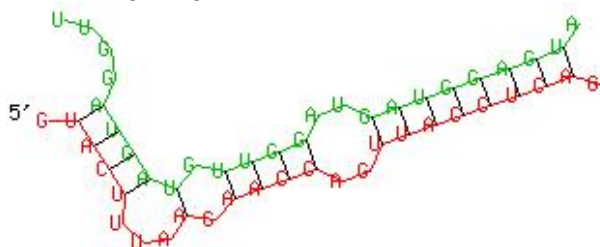
mfe: -23.0 kcal/mol

TGAGGTAGTAGGTTGTAgTAGg..... 13



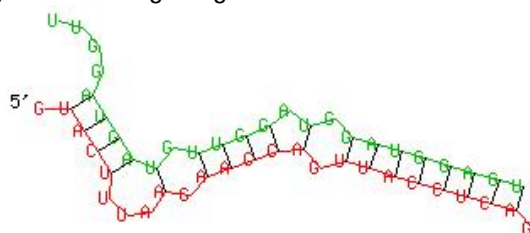
mfe: -23.0 kcal/mol

ATGAGGTAGTAGGTTGTAgTAGgTT..... 10



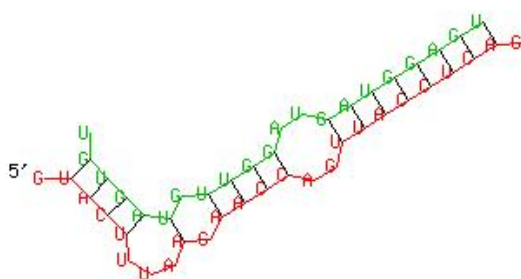
mfe: -23.3 kcal/mol

TGAGGTAGgTAGGTTGTAgTAGgTT..... 25



mfe: -23.7 kcal/mol

TGAGGTAGTAGGTTGTAgTGT..... 8



mfe: -22.5 kcal/mol

TGAGGTAGTAGGTTGTtAgTAGgTT..... 5

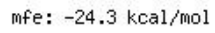
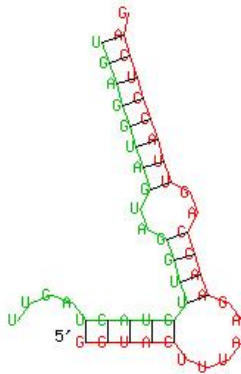
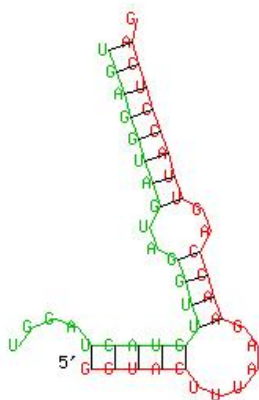


Diagram illustrating the cloverleaf secondary structure of a tRNA molecule. The structure shows the acceptor stem, D arm, anticodon arm, and T arm. The anticodon is 3'-UAC-5'.

TGAGGTAGTAGGTTGTACTAGTT..... 192

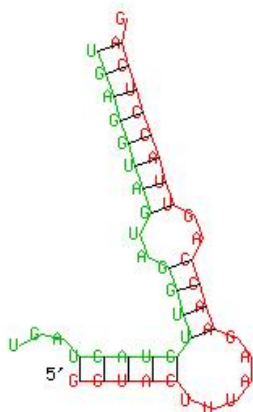


TGAGGTAGTAGGTTGTAcTAGgT..... 19



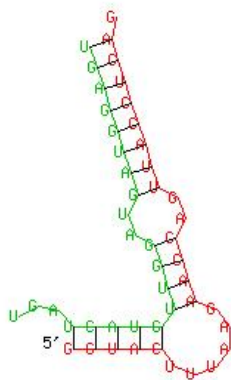
mfe: -23.3 kcal/mol

TGAGGTAGTAGGTTGTActAGgTT..... 69



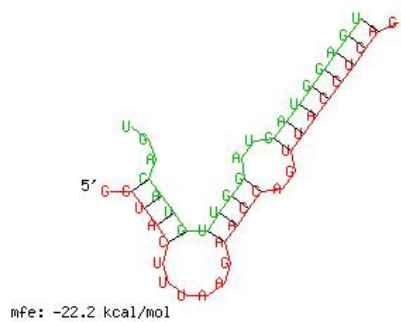
mfe: -23.3 kcal/mol

TGAGGTAGTAGGTTGTActAGT..... 52

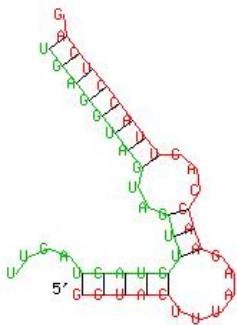


mfe: -23.3 kcal/mol

TGAGGTAGTAGGTTGTAcAGT..... 12

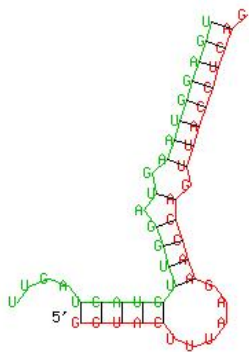


TGAGGTAGTAG-TTGTAcTAGTT.....6



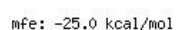
mfe: -19.2 kcal/mol

TGAGGTaaGTAGGTTGTAcTAGTT..... 5



mfe: -24.3 kcal/mol

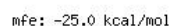
TGAGGTAGTAGGTTtGTAcTAGTT..... 28



mfe: -25.0 kcal/mol

mfe: -24.0 kcal/mol

TGAGGTAGTAGGTTtGTAcTAGT..... 8

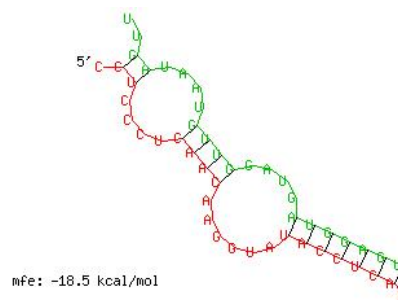
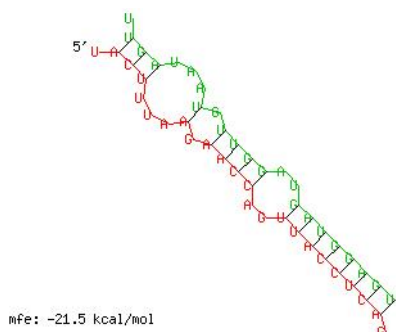


mfe: -19.2 kcal/mol

mfe: -22.2 kcal/mol

TGAGGTAGTAGGTTGTAcgTAGgTTT..... 8





18th Position Modifications

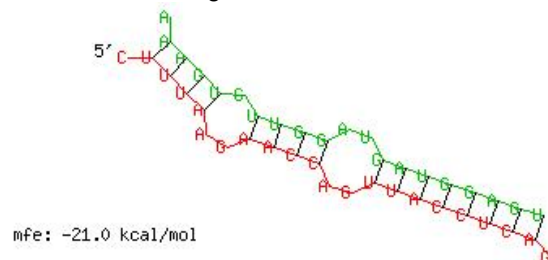
E14.5-None

18th Position Modifications

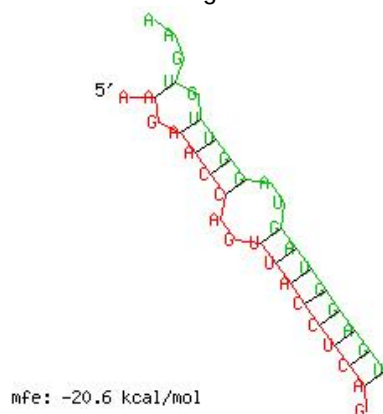
Ovary

*****TGAGGTAGTAGGTTGTATAGTT*****	
.....TGAGGTAGTAGGTTGTAT.....	687
.....TGAGGTAGTAGGTTGTgAaA.....	19
.....TGAGGTAGTAGGTTGTgaA.....	14
.....TGAGGTAGTAGGTTGTaa.....	37
.....TGAGGTAGTAGGTTGTaaA.....	20

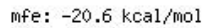
TGAGGTAGTAGGTTGTgAaA..... 19



TGAGGTAGTAGGTTGTgaA..... 14



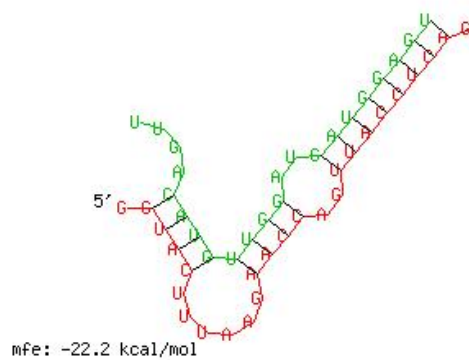
TGAGGTAGTAGGTTGTaa..... 37

[illegible]

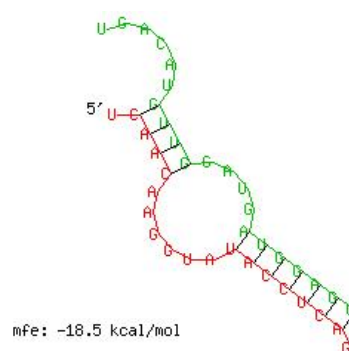
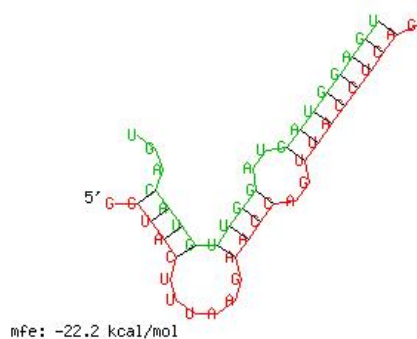
mfe: -20.6 kcal/mol

*****TGAGGTAGTAGGTTGTATAGT*****	
.....TGAGGTAGTAGGTTGTAT.....	1
.....TGAGGTAGTAGGTTGTAcAGTT.....	51
.....TGAGGTAGTAGGTTGTAcAGT.....	12
.....TGAGGTAGTAGGTTGTAcAGgTT.....	8
.....TGAGGTAGTAGGTTGTAgTGT.....	8
.....TGAGGTAGTAGGTTGTATTAGTT.....	211
.....TGAGGTAGTAGGTTGTATTAGT.....	117
.....TGAGGTAGTAaGGTTGTATTAGTT.....	60
.....TGAGGTAGTAGGTTGTATTAGgTT.....	55
.....TGAGGTAGTAGGTTGTATTAGgT.....	26
.....TGAGGTAGTAGGTTGTAgTtAGgTT.....	20
.....TGAGGTAGgTAGGTTGTATTAGTT.....	17
.....TGAGGTAGTAaGGTTGTATTAGT.....	17
.....TGAGGTAGTAGGTTGTATTAG.....	16
.....TGAGGTAGTtAGGTTGTATTAGTT.....	7
.....TGAGGTAGgTAGGTTGTATTAGT.....	5
.....TGAGGTAGTAGGTTGTAAtTAGTT.....	5
.....TGAGGTAGTAGGTTGTAcgAGgTT.....	6

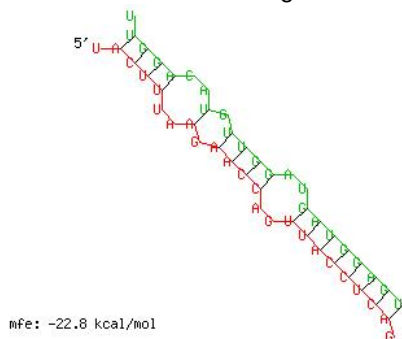
TGAGGTAGTAGGTTGTACAGTT..... 51



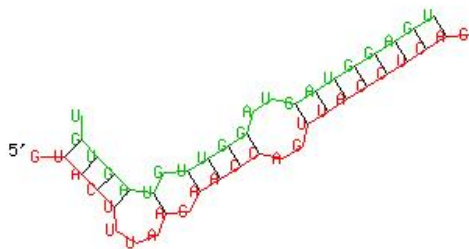
TGAGGTAGTAGGTTGTAcAGT..... 12



TGAGGTAGTAGGTTGTAcAGgTT..... 8

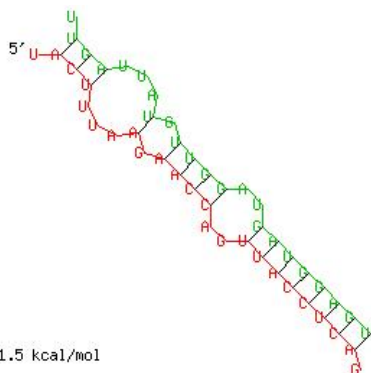


TGAGGTAGTAGGTTGTAgTGT..... 8



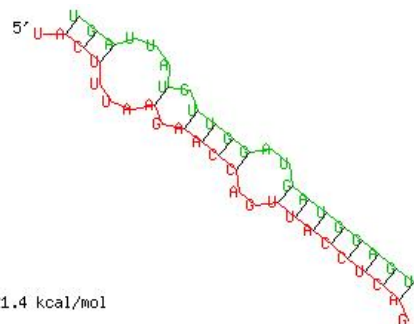
mfe: -22.5 kcal/mol

TGAGGTAGTAGGTTGTATtAGTT..... 211



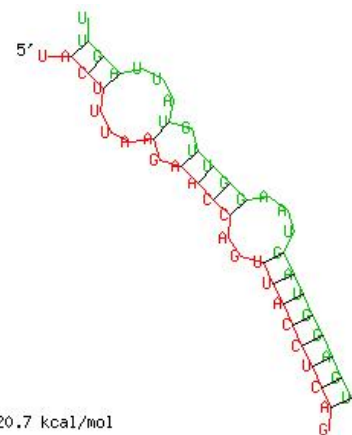
mfe: -21.5 kcal/mol

TGAGGTAGTAGGTTGTATtAGT..... 117



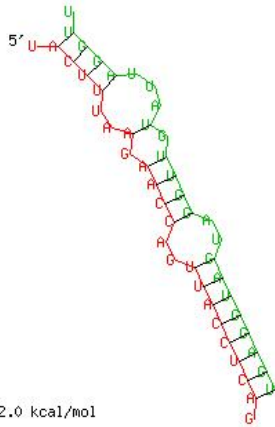
mfe: -21.4 kcal/mol

TGAGGTAGTAaGGTTGTATtAGTT..... 60



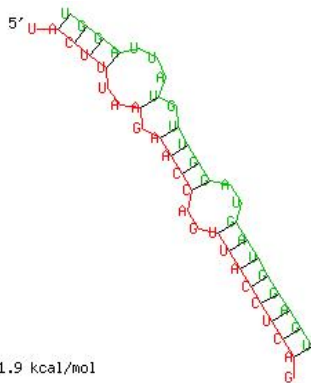
mfe: -20.7 kcal/mol

TGAGGTAGTAGGTTGTATtAGgTT..... 55



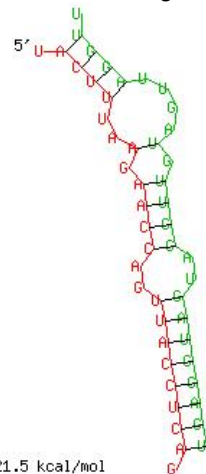
mfe: -22.0 kcal/mol

TGAGGTAGTAGGTTGTATtAGgT..... 26



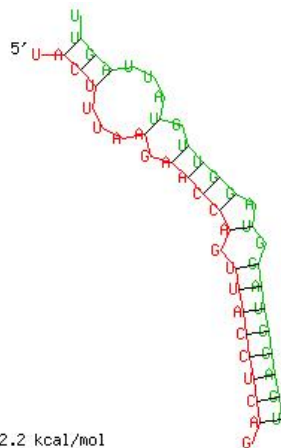
mfe: -21.9 kcal/mol

TGAGGTAGTAGGTTGTAgTtAGgTT..... 20



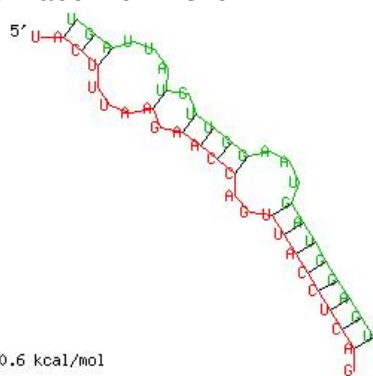
mfe: -21.5 kcal/mol

TGAGGTAGgTAGGTTGTATtAGTT..... 17



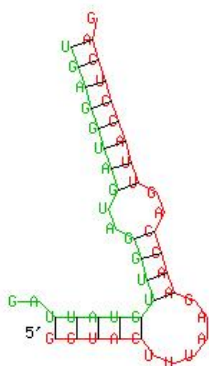
mfe: -22.2 kcal/mol

TGAGGTAGTAaGGTTGTATtAGT..... 17



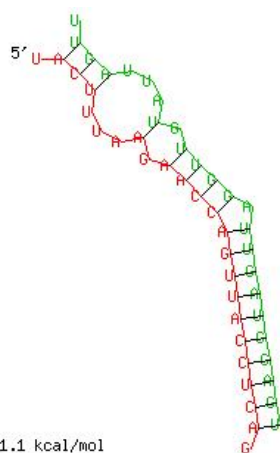
mfe: -20.6 kcal/mol

TGAGGTAGTAGGTTGTATtAG..... 16



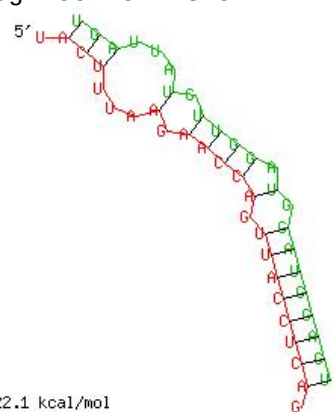
mfe: -20.9 kcal/mol

TGAGGTAGTtAGGTTGTATtAGTT..... 7



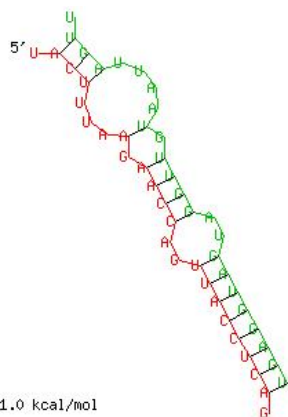
mfe: -21.1 kcal/mol

TGAGGTAGgTAGGTTGTATtAGT..... 5



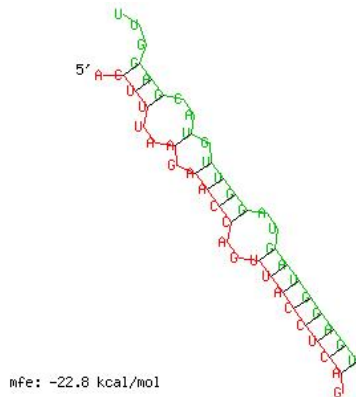
mfe: -22.1 kcal/mol

TGAGGTAGTAGGTTGTAaTtAGTT..... 5



mfe: -21.0 kcal/mol

TGAGGTAGTAGGTTGTAcgAGgTT..... 6

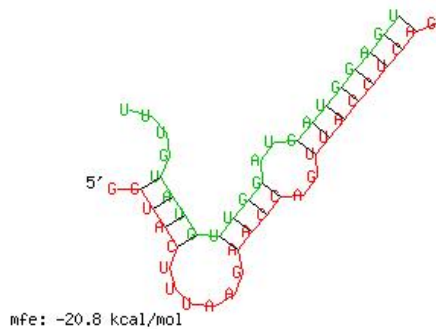


19th Position Modifications

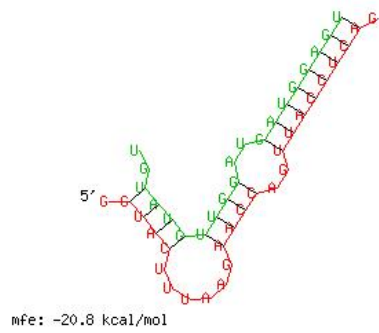
Ovary

*****TGAGGTAGTAGGTTGTATAGTT*****	
.....TGAGGTAGTAGGTTGTATA.....	263
.....TGAGGTAGTAGGTTGTAT-GTTT.....	59
.....TGAGGTAGTAGGTTGTAT-GT.....	49
.....TGAGGTAGTAGGTTGTAT-GTT.....	40
.....TGAGGTAGTAGGTTGTATTtGTT.....	77
.....TGAGGTAGTAGGTTGTATTt.....	43
.....TGAGGTAGTAGGTTGTATTtGT.....	17
.....TGAGGTAGTAGGTTGTATTtG.....	11
.....TGAGGTAGTAGGTTGTATcGTT.....	20
.....TGAGGTAGTAGGTTGTATTt.....	15
.....TGAGGTAGTAGGTTGTATAa.....	58
.....TGAGGTAGTAGGTTGTgTAa.....	49
.....TGAGGTAGTAGGTTGTATAt.....	30

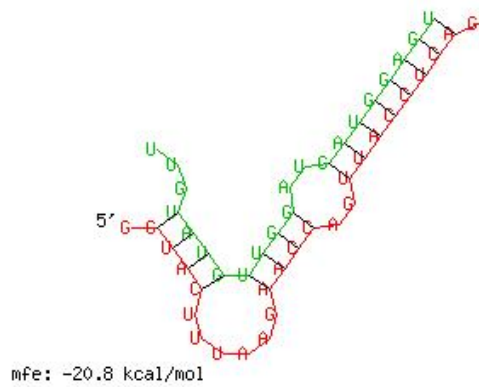
TGAGGTAGTAGGTTGTAT-GTTT..... 59



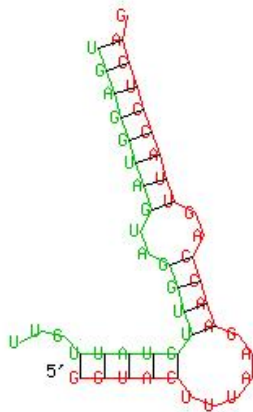
TGAGGTAGTAGGTTGTAT-GT..... 49



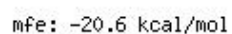
TGAGGTAGTAGGTTGTAT-GTT..... 40



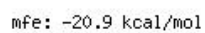
TGAGGTAGTAGGTTGTATTGTT..... 77



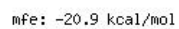
TGAGGTAGTAGGTTGTATT..... 43



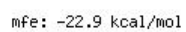
TGAGGTAGTAGGTTGTATtGT..... 17



TGAGGTAGTAGGTTGTATtG..... 11



TGAGGTAGTAGGTTGTATcGTT..... 20



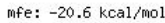
0.6 kcal/mol

mfe: -20.6 kcal/mol

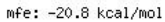
A diagram of a branched RNA molecule. The 5' end is labeled on the left. The molecule consists of several interconnected loops and stems, with nucleotides represented by letters (A, U, G, C) at the vertices of the structure.

mfe: -20.8 kcal/mol

TGAGGTAGTAGGTTGTgTAa..... 49



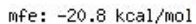
TGAGGTAGTAGGTTGTATAt..... 30



E14.5

*****TGAGGTAGTAGGTTGTATAGT*****	
.....TGAGGTAGTAGGTTGTATA.....	1
.....TGAGGTAGTAGGTTGTAT-GTT.....	54
.....TGAGGTAGTAGGTTGTAT-GT.....	29
.....TGAGGTAG-AGGTTGTAT-GTT.....	5
.....TGAGGTAGTAGGTTGTATTAGT.....	48
.....TGAGGTAGTAGGTTGTATTAGTT.....	31
.....TGAGGTAGTAGGTTGTATAaGTT.....	6

TGAGGTAGTAGGTTGTAT-GTT..... 54



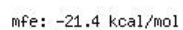
TGAGGTAGTAGGTTGTAT-GT..... 29



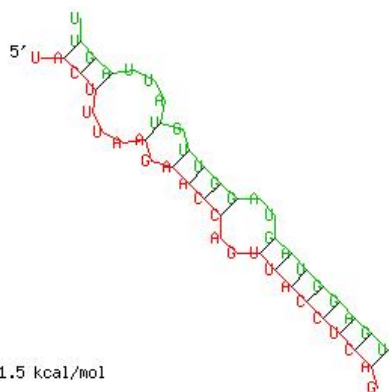
5



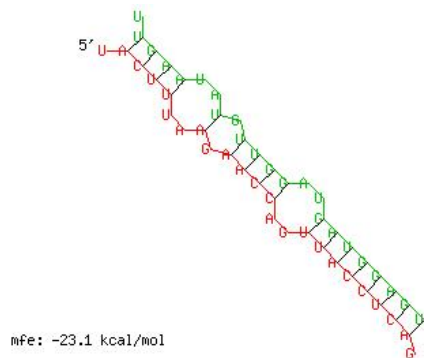
48



31



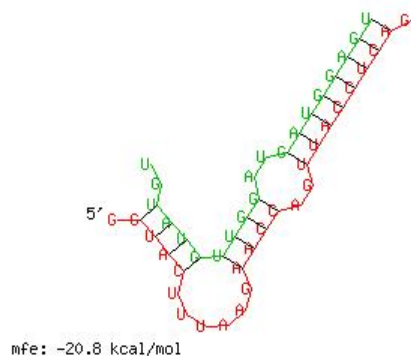
TGAGGTAGTAGGTTGTATAaGTT..... 6



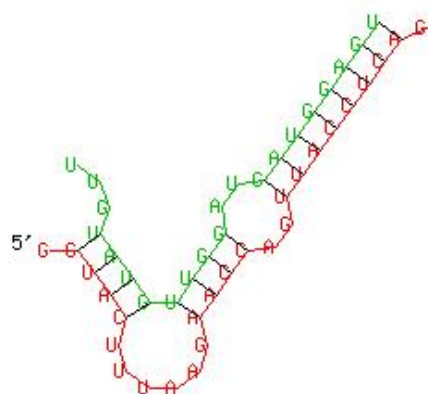
βTC-3

*****TGAGGTAGTAGGTTGTATAGT*****
TGAGGTAGTAGGTTGTATA..... 3
TGAGGTAGTAGGTTGTAT-GT..... 12
TGAGGTAGTAGGTTGTAT-GTT..... 8
TGAGGTAGTAGGTTGTATTtGTT..... 12
TGAGGTAGTAGGTTGTAgTGT..... 8
TGAGGTAGTAGGTTGTATAaGTT..... 31
TGAGGTAGTAGGTTGTATAaGT..... 9

TGAGGTAGTAGGTTGTAT-GT..... 12

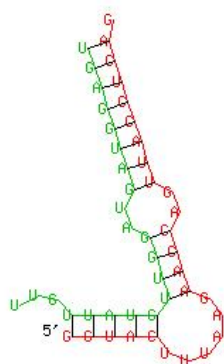


TGAGGTAGTAGGTTGTAT-GTT..... 8



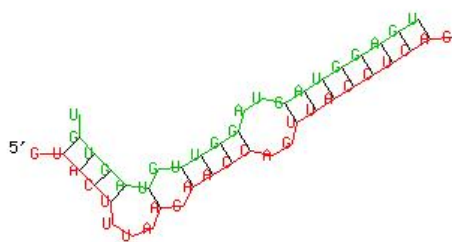
mfe: -20.8 kcal/mol

TGAGGTAGTAGGTTGTATTtGTT..... 12



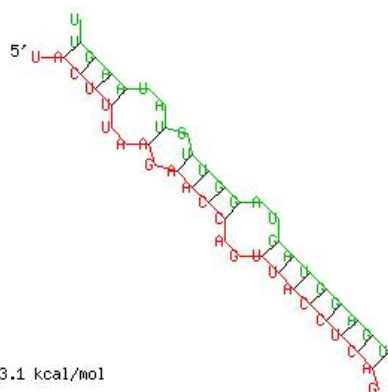
mfe: -20.9 kcal/mol

TGAGGTAGTAGGTTGTAgTGT..... 8

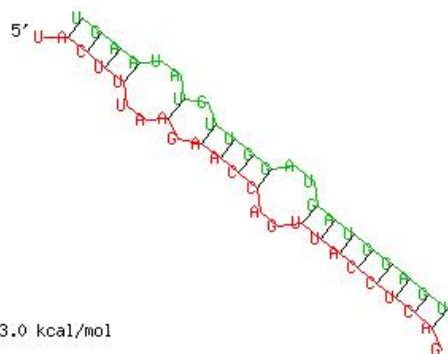


mfe: -22.5 kcal/mol

TGAGGTAGTAGGTTGTATAaGTT..... 31



TGAGGTAGTAGGTTGTATAaGT..... 9



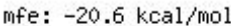
20th Base MODIFICATIONS

βTC-3-None

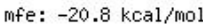
Ovary

TGAGGTAGTAGGTTGTATAGTT**	
...TGAGGTAGTAGGTTGTATA.....	263
...TGAGGTAGTAGGTTGTAT-GTTT.....	59
...TGAGGTAGTAGGTTGTAT-GT.....	49
...TGAGGTAGTAGGTTGTAT-GTT.....	40
...TGAGGTAGTAGGTTGTATtGTT.....	77
...TGAGGTAGTAGGTTGTATt.....	43
...TGAGGTAGTAGGTTGTATtGT.....	17
...TGAGGTAGTAGGTTGTATtG.....	11
...TGAGGTAGTAGGTTGTATcGTT.....	20
...TGAGGTAGTAGGTTGTATtt.....	15
...TGAGGTAGTAGGTTGTATAa.....	58
...TGAGGTAGTAGGTTGTgTAa.....	49
...TGAGGTAGTAGGTTGTATat.....	30
...TGAGGTAGTAGGTTGTgAaA.....	19
...TGAGGTAGTAGGTTGTgaA.....	14

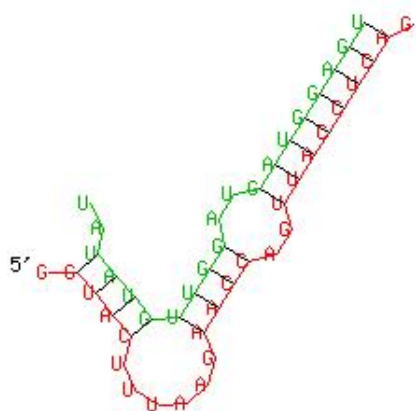
TGAGGTAGTAGGTTGTATtt.....15



TGAGGTAGTAGGTTGTATAa.....58

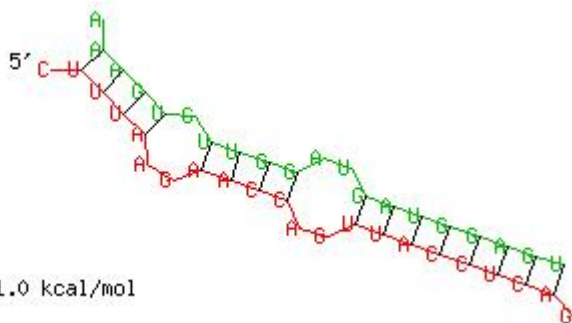


TGAGGTAGTAGGTTGTATAt.....30



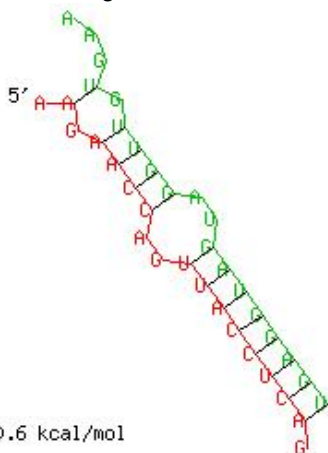
mfe: -20.8 kcal/mol

TGAGGTAGTAGGTTGTgAaA.....19



mfe: -21.0 kcal/mol

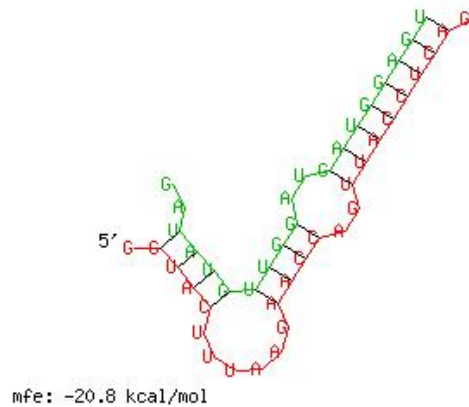
TGAGGTAGTAGGTTGTgaA.....14



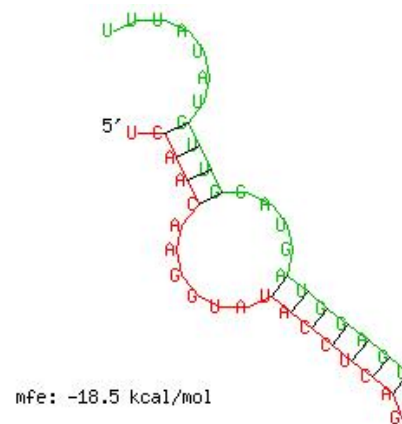
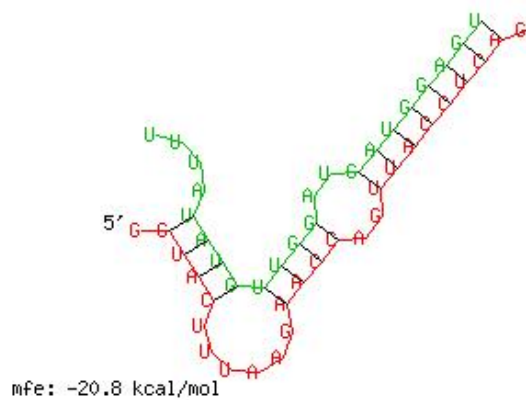
mfe: -20.6 kcal/mol

TGAGGTAGTAGGTTGTATAGTT**
 ...TGAGGTAGTAGGTTGTATAG.....1053
 ...TGAGGTAGTAGGTTGTATAtTT.....15

TGAGGTAGTAGGTTGTATAG.....1053



TGAGGTAGTAGGTTGTATAtTT.....15



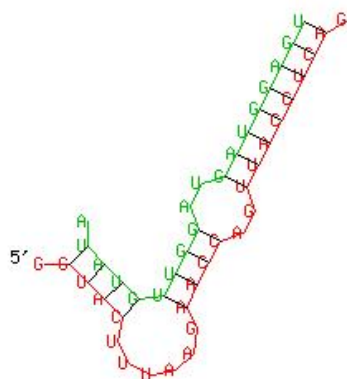
E14.5

```

***TGAGGTAGTAGGTTGTATAGT*****
...TGAGGTAGTAGGTTGTATA.....1
...TGAGGTAGTAGGTTGTAT-GTT.....54
...TGAGGTAGTAGGTTGTAT-GT.....29
...TGAGGTAG-AGGTTGTAT-GTT.....5
...TGAGGTAGTAGGTTGTATtAGT.....48
...TGAGGTAGTAGGTTGTATtAGTT.....31
...TGAGGTAGTAGGTTGTATAaGTT.....6

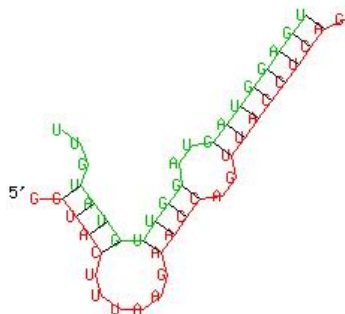
```

TGAGGTAGTAGGTTGTATA.....1



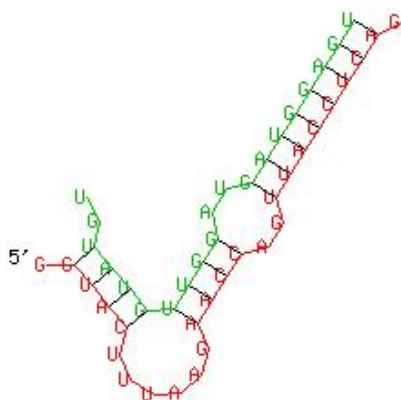
mfe: -20.8 kcal/mol

TGAGGTAGTAGGTTGTAT-GTT.....54



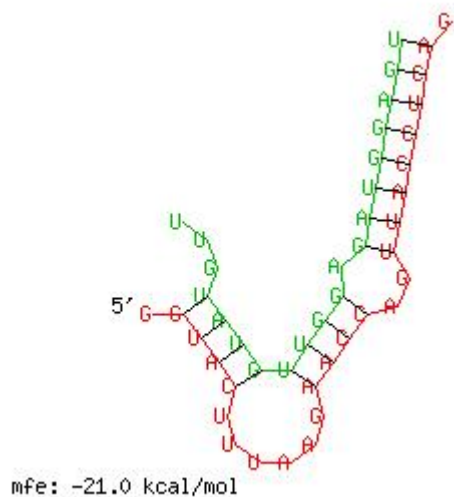
mfe: -20.8 kcal/mol

TGAGGTAGTAGGTTGTAT-GT.....29

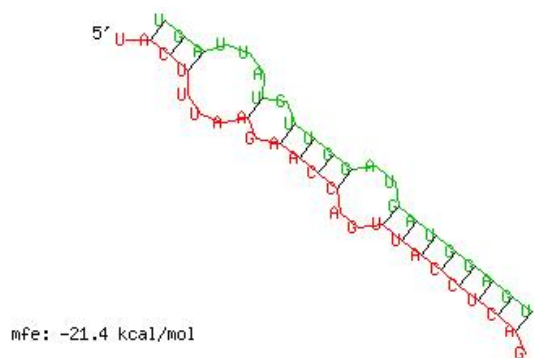


mfe: -20.8 kcal/mol

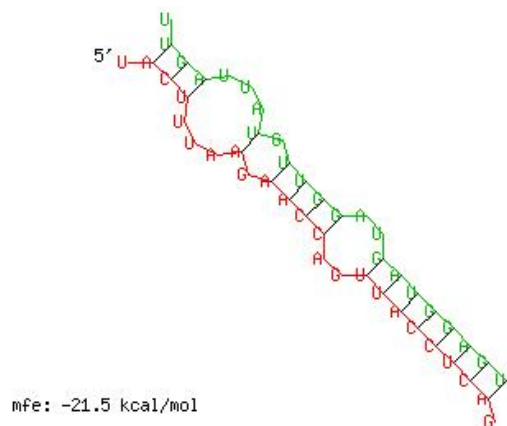
TGAGGTAG-AGGTTGTAT-GTT..... 5



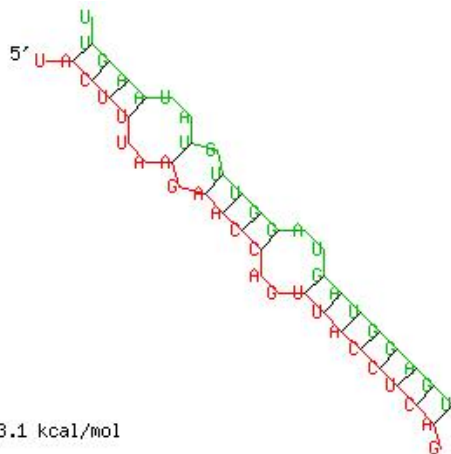
TGAGGTAGTAGGTTGTATtAGT.....48



TGAGGTAGTAGGTTGTATtAGTT.....31



TGAGGTAGTAGGTTGTATAaGTT.....6



21st Base MODIFICATIONS

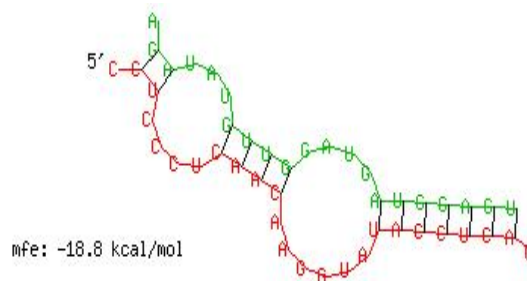
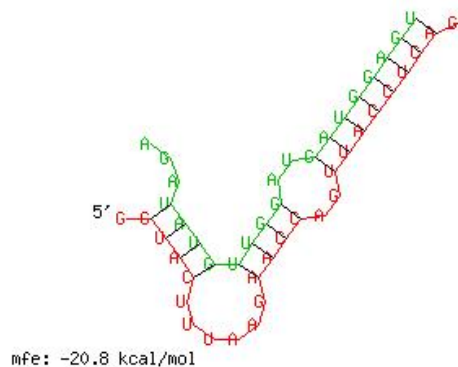
E14.5 -None

Ovary

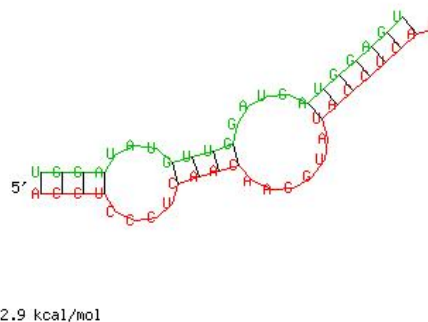
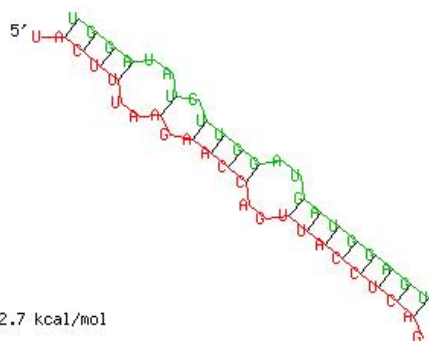
TGAGGTAGTAGGTTGTATAGTT**

...TGAGGTAGTAGGTTGTATAGT.....	4159
...TGAGGTAGTAGGTTGTATAGa.....	56
...TGAGGTAGTAGGTTGTATAGgT.....	18
...TGAGGTAGTAGGTTGTATAGTaT.....	18
...TGAGGTAGTAGGTTGTATAGTa.....	77

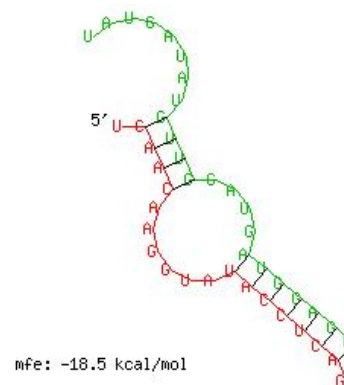
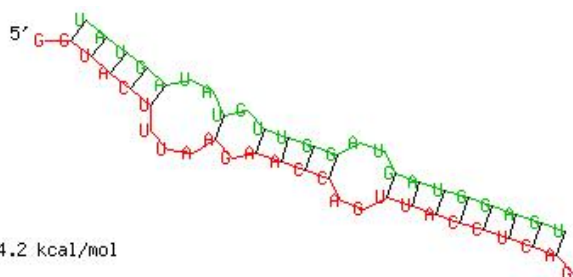
TGAGGTAGTAGGTTGTATAGa.....56



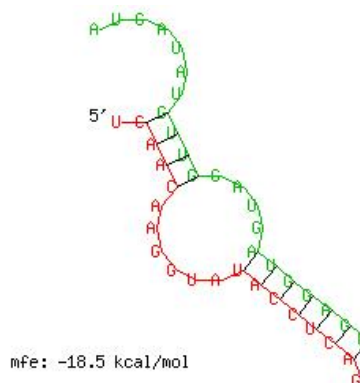
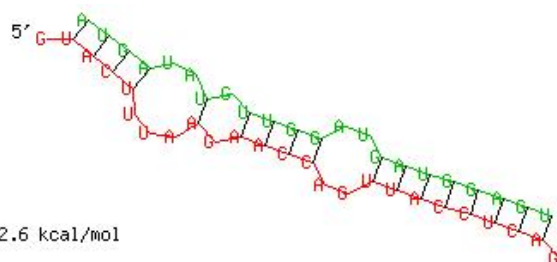
TGAGGTAGTAGGTTGTATAGgT.....18



TGAGGTAGTAGGTTGTATAGTaT.....18



TGAGGTAGTAGGTTGTATAGTa.....77



βTC-3

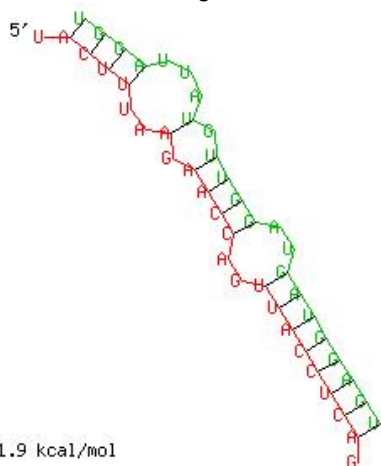
```

***TGAGGTAGTAGGTTGTATAGT*****
...TGAGGTAGTAGGTTGTATA.....3
...TGAGGTAGTAGGTTGTAT-GT.....12
...TGAGGTAGTAGGTTGTAT-GTT.....8
...TGAGGTAGTAGGTTGTATtAGTT.....211
...TGAGGTAGTAGGTTGTATtAGT.....117
...TGAGGTAGTAGGTTGTATtAGgTT.....55
...TGAGGTAGTAGGTTGTATtAGgT.....26
...TGAGGTAGTAGGTTGTATtAGgTT.....55
...TGAGGTAGTAGGTTGTATtGTT.....12

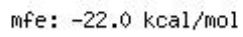
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...TGAGGTAGTAGGTTGTAgTGT.....8
 ...TGAGGTAGTAGGTTGTAcgTAGgTT.....36
 ...TGAGGTAGTAGGTTGTAcgTAGgTT.....36
 ...TGAGGTAGgTAGGTTGTAgTAGgTT.....25
 ...TGAGGTAGTAGGTTGTAcgTAGgTTT.....8
 ...TGAGGTAGTAGGTTGTtAgTAGgTT.....5
 ...TGAGGTAGTAGGTTGTAcgAGgTT.....6
 ...TGAGGTAGTAaGGTTGTAgTAGgTT.....5
 ...TGAGGTAGTAGGTTGTAcgAGgTT.....6
 ...TGAGGTAGTAGGTTtGTAcTAGTT.....28
 ...TGAGGTAGTAGGTTtGTAcTAGgTT.....25
 ...TGAGGTAGgTAGGTTGTAcTAGTT.....11
 ...TGAGGTAGTAGGTTtGTAcTAGT.....8
 ...TGAGGTAaGTAGGTTGTAcTAGTT.....5
 ...TGAGGTAGTAaGGTTGTAttAGTT.....60
 ...TGAGGTAGTAGGTTGTAgTtAGgTT.....20
 ...TGAGGTAGgTAGGTTGTAttAGTT.....17
 ...TGAGGTAGTAaGGTTGTAttAGT.....17
 ...TGAGGTAGTtAGGTTGTAttAGTT.....7
 ...TGAGGTAGTtAGGTTGTAttAGTT.....7
 ...TGAGGTAGgTAGGTTGTAttAGT.....5
 ...TGAGGTAGTAGGTTGTAAttAGTT.....5
 ...TGAGGTAGTAG-TTGTAcTAGT.....7
 ...TGAGGTAGTAGGTTGTATAaGT.....9
 ...TGAGGTAGTAGGTTGTATAaGT.....31

TGAGGTAGTAGGTTGTAttAGgT.....26

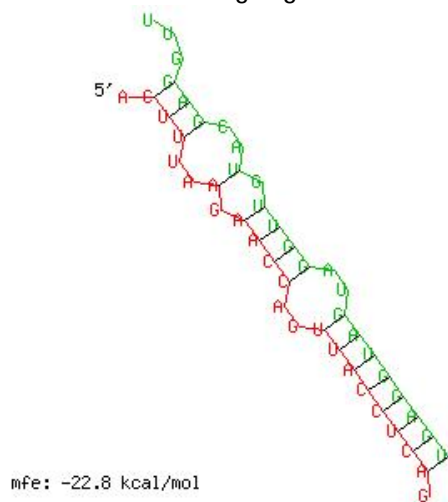
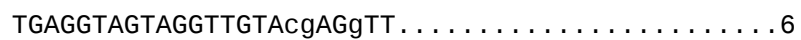
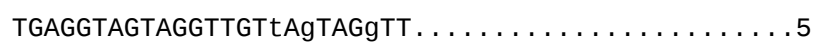


TGAGGTAGTAGGTTGTAttAGgTT.....55

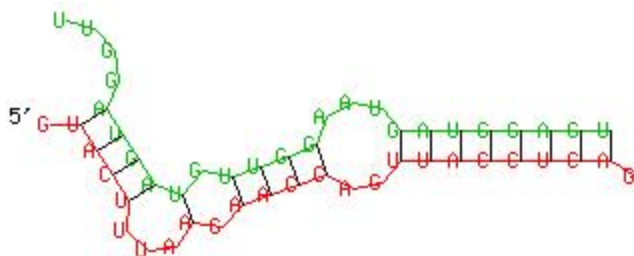


5'-
2.2 kcal/mol

TGAGGTAGTAGGTTGTAcgTAGgTTT.....8



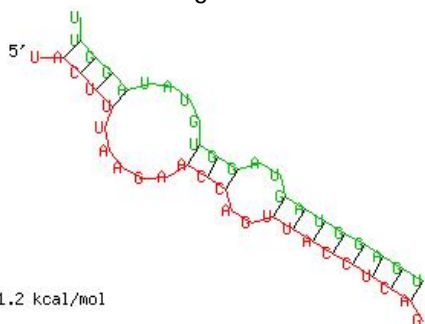
TGAGGTAGTAaGGTTGTAgTAGgTT.....5



mfe: -22.2 kcal/mol

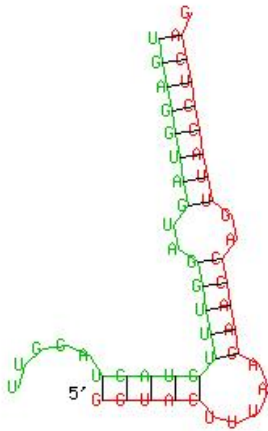
TGAGGTAGTAGGTTGTATAGT**	
...TGAGGTAGTAGGT.....	1
...TGAGGTAGTAGGT-GTATAGT.....	23
...TGAGGTAGTAGGT-GTATAGTT.....	21
...TGAGGTAGTAG-T-GTATAGT.....	17
...TGAGGTAGTAGGT-GTATAGgTT.....	11
...TGAGGTAGTAGGTCGTATAGTT.....	7
...TGAGGTAGTAGGTaGTATAGTT.....	5
...TGAGGTAGTAGGTTtGTAcTAGTT.....	28
...TGAGGTAGTAGGTTtGTAcTAGgTT.....	25
...TGAGGTAGTAGGTTtGTAcTAGgTT.....	25
...TGAGGTAGTAGGTTcGTATAGTT.....	6
...TGAGGTAGTAGGTTaTATAGT.....	6
...TGAGGTAGTAGGTTaTATAGTT.....	25
...TGAGGTAGTAGGTTaGTATAGT.....	5

TGAGGTAGTAGGT-GTATAGgTT.....11



mfe: -21.2 kcal/mol

TGAGGTAGTAGGTTtGTAcTAGgTT.....25



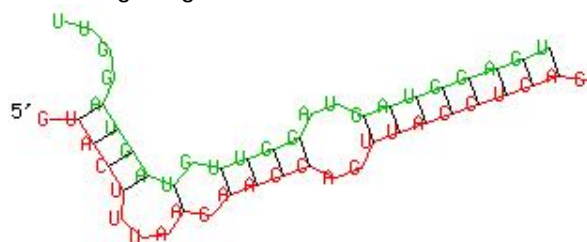
mfe: -25.0 kcal/mol

```

***TGAGGTAGTAGGTTGTATAGT*****
...TGAGGTAGTAGGTTGTA.....1
...TGAGGTAGTAGGTTGTAT-GT.....12
...TGAGGTAGTAGGTTGTAT-GTT.....8
...TGAGGTAGTAGGTTGTAgTAGT.....20
...TGAGGTAGTAGGTTGTAgTAGgTT.....391
...TGAGGTAGTAGGTTGTAgTAGgT.....185
...TGAGGTAGTAGGTTGTAgTAGgTTT.....34
...TGAGGTAGTAGGTTGTAgTAGTT.....24
...TGAGGTAGTAGGTTGTAgTAGg.....13
...ATGAGGTAGTAGGTTGTAgTAGgTT.....10
...TGAGGTAGTAGGTTGTActAGTT.....192
...TGAGGTAGTAGGTTGTActAGgT.....19
...TGAGGTAGTAGGTTGTActAGgTT.....69
...TGAGGTAGTAGGTTGTActAGT.....52
...TGAGGTAGTAGGTTGTAcAGTT.....51
...TGAGGTAGTAGGTTGTAcgTAGgTT.....36
...TGAGGTAGTAGGTTGTAcAGT.....12
...TGAGGTAGTAG-TTGTActAGT.....7
...TGAGGTAGTAGGTTGTAAaTAGT.....12
...TGAGGTAGTAGGTTGTAAaTAGTT.....9
...TGAGGTAGTAGGTTGTATtAGTT.....211
...TGAGGTAGTAGGTTGTATtAGgTT.....55
...TGAGGTAGTAGGTTGTATtAGT.....117
...TGAGGTAGTAGGTTGTtATAGTT.....30
...TGAGGTAGTAGGTTGTATtAGgT.....26
...TGAGGTAGTAGGTTGTATtAG.....16
...TGAGGTAGTAGGTTGTATtGTT.....12
...TGAGGTAGTAGGTTGTtATAGT.....7
...TGAGGTAGTAGGTTGTgTAGT.....11
...TGAGGTAGTAGGTTGTgTAGT.....11
...TGAGGTAGTAaGGTTGTAgTAGgTT.....5
...TGAGGTAGgTAGGTTGTAgTAGgTT.....25
...TGAGGTAGTAGGTTtGTActAGTT.....28
...TGAGGTAGTAGGTTtGTActAGgTT.....25
...TGAGGTAGTAGGTTtGTActAGT.....8
...TGAGGTAGTAGGTTtGTActAGT.....8

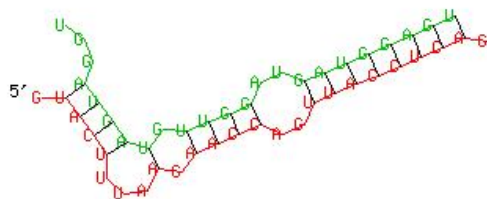
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TGAGGTAGTAGGTTGTAgTAGgTT.....391



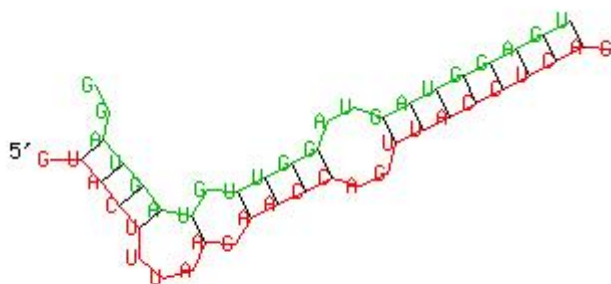
mfe: -23.0 kcal/mol

TGAGGTAGTAGGTTGTAgTAGgT.....185



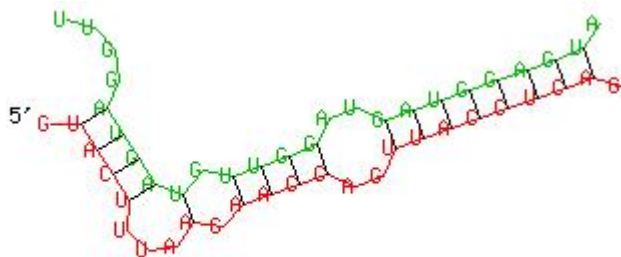
mfe: -23.0 kcal/mol

TGAGGTAGTAGGTTGTAgTAGg.....13



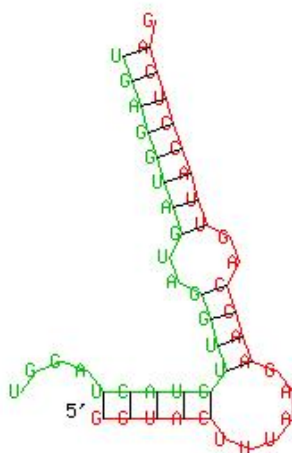
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ATGAGGTAGTAGGTTGTAgTAGgTT.....10



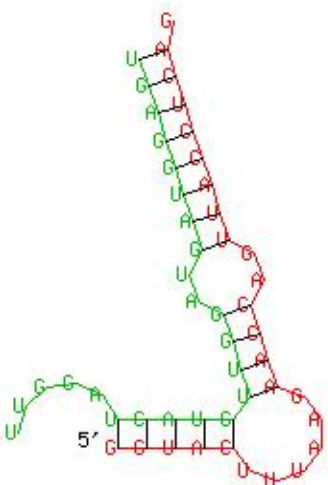
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TGAGGTAGTAGGTTGTActAGgT.....19



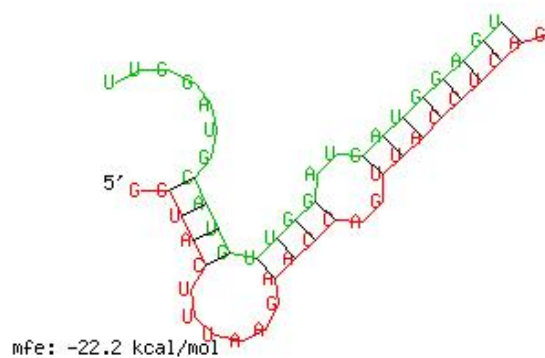
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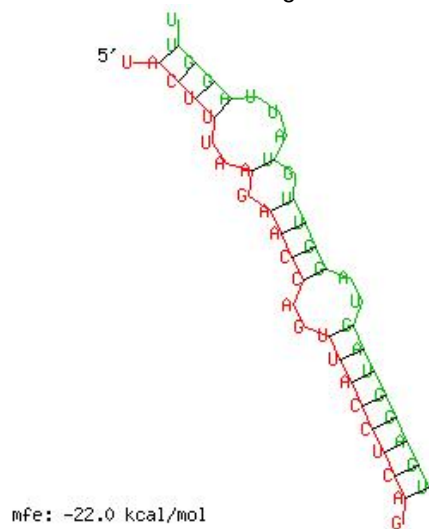


mfe: -23.3 kcal/mol

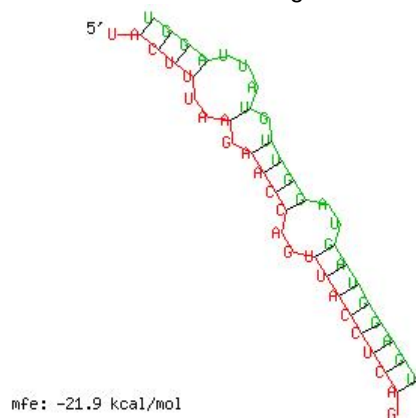
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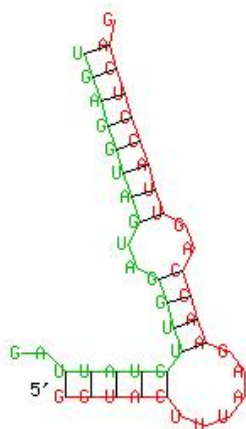
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TGAGGTAGTAGGTTGTATTAGgT.....26

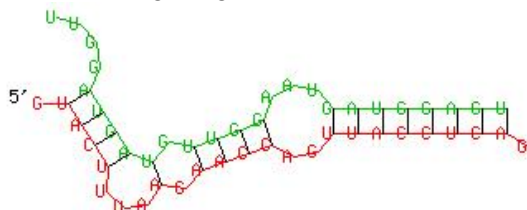


TGAGGTAGTAGGTTGTATTAG.....16



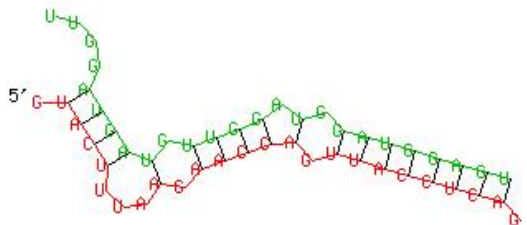
mfe: -20.9 kcal/mol

TGAGGTAGTAaGGTTGTAgTAGgTT.....5



mfe: -22.2 kcal/mol

TGAGGTAGgTAGGTTGTAgTAGgTT.....25



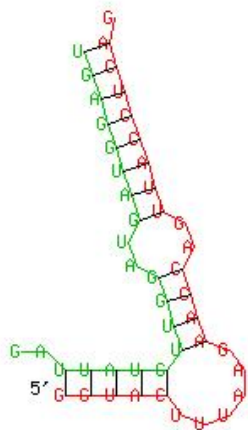
mfe: -23.7 kcal/mol

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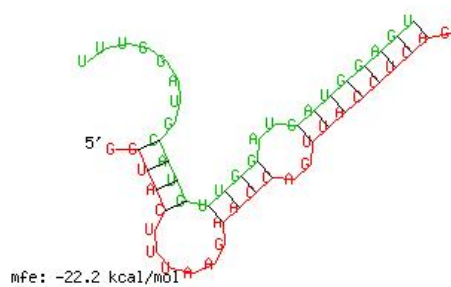
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...TGAGGTAGTAGGTTGTAT-GT.....12
...TGAGGTAGTAGGTTGTAT-GTT.....8
...TGAGGTAGTAGGTTGTATtGTT.....12
...TGAGGTAGTAGGTTGTATtGTT.....12
...TGAGGTAGTAGGTTGTATtAGTT.....211
...TGAGGTAGTAGGTTGTATtAGT.....117
...TGAGGTAGTAGGTTGTATtAGgTT.....55
...TGAGGTAGTAGGTTGTATtAGgTT.....55
...TGAGGTAGTAGGTTGTATtAGgT.....26
...TGAGGTAGTAGGTTGTATtAG.....16
...TGAGGTAGTAGGTTGTAgTGT.....8
...TGAGGTAGTAGGTTGTAgTGT.....8
...TGAGGTAGTAGGTTGTAcgTAGgTTT.....8
...TGAGGTAGTAGGTTGTAcgTAGgTT.....36
...TGAGGTAGgTAGGTTGTAgTAGgTT.....25
...TGAGGTAGTAGGTTGTAcgAGgTT.....6
...TGAGGTAGTAaGGTTGTAgTAGgTT.....5
...TGAGGTAGTAGGTTGTtAgTAGgTT.....5
...TGAGGTAGTAGGTTtGTActAGgTT.....25
...TGAGGTAGTAGGTTtGTActAGTT.....28
...TGAGGTAGgTAGGTTGTActAGTT.....11
...TGAGGTAGTAGGTTtGTActAGT.....8
...TGAGGTAaGTAGGTTGTActAGTT.....5
...TGAGGTAGTtAGGTTGTATtAGTT.....7
...TGAGGTAGTAaGGTTGTATtAGTT.....60
...TGAGGTAGTAGGTTGTAgTAGgTTT.....34
...TGAGGTAGTAGGTTGTAgTAGTT.....24
...TGAGGTAGTAGGTTGTAgTtAGgTT.....20
...TGAGGTAGTAGGTTGTAgTAGT.....20
...TGAGGTAGTAGGTTGTAgTAGgT.....185
...TGAGGTAGTAGGTTGTAgTAGg.....13
...ATGAGGTAGTAGGTTGTAgTAGgTT.....10
...TGAGGTAGTAG-TTGTActAGTT.....6

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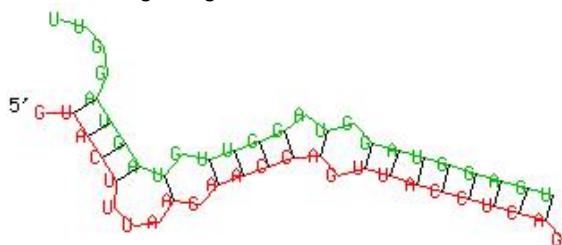
mfe: -20.9 kcal/mol

TGAGGTAGTAGGTTGTAcgTAGgTTT.....8



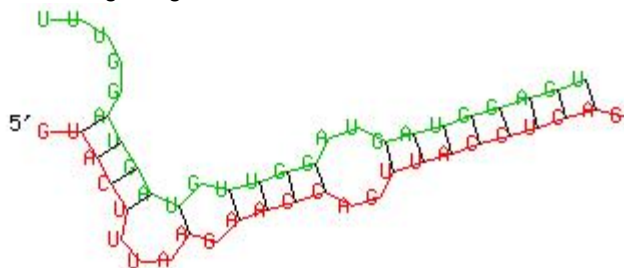
mfe: -22.2 kcal/mol

TGAGGTAGgTAGGTTGTAgTAGgTT.....25



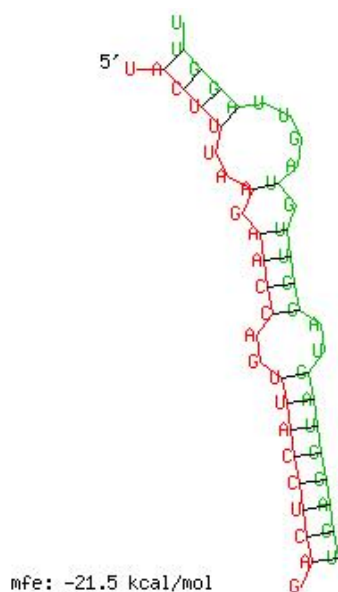
mfe: -23.7 kcal/mol

TGAGGTAGTAGGTTGTAgTAGgTTT.....34

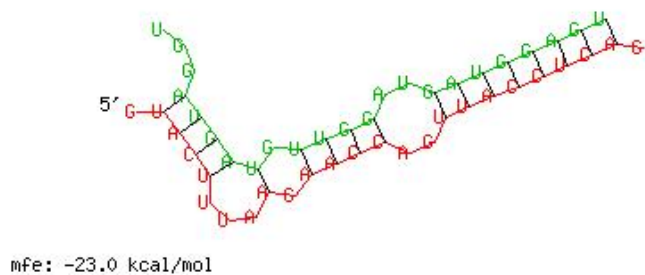


mfe: -23.0 kcal/mol

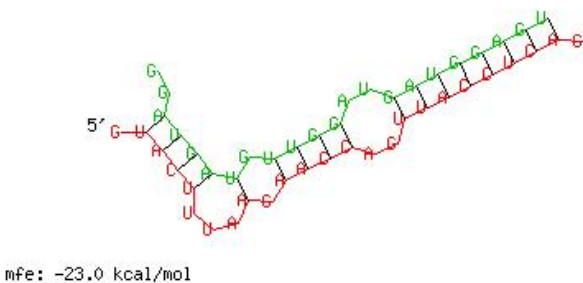
TGAGGTAGTAGGTTGTAgTtAGgTT.....20



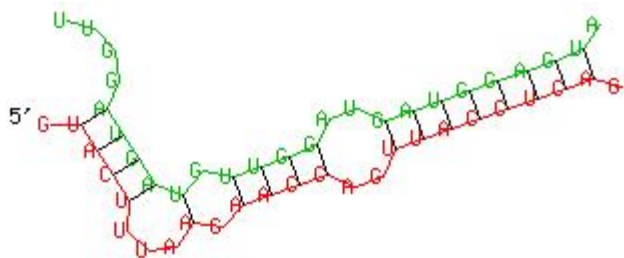
TGAGGTAGTAGGTTGTAgTAGgT.....185



TGAGGTAGTAGGTTGTAgTAGg.....13

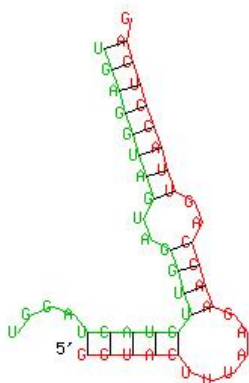


ATGAGGTAGTAGGTTGTAgTAGgTT.....10



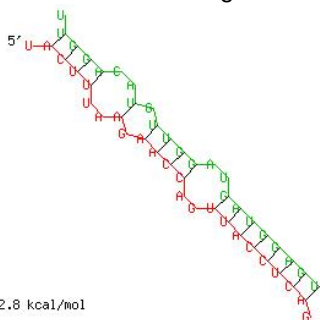
mfe: -23.3 kcal/mol

TGAGGTAGTAGGTTGTActAGgT.....19



mfe: -23.3 kcal/mol

TGAGGTAGTAGGTTGTAcAGgTT.....8



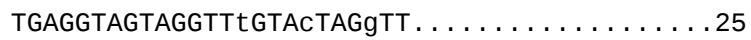
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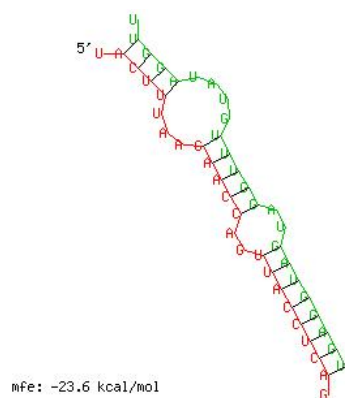
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***TGAGGTAGTAGGTTGTATAGT*****
...TGAGGTAGTAGGT - GTATAGT .....23
...TGAGGTAGTAGGT - GTATAGTT .....21
...TGAGGTAGTAG - T - GTATAGT .....17
...TGAGGTAGTAGGT - GTATAGgTT .....11
...TGAGGTAGTAG - T - GTATAGTT .....10
...ATGAGGTAGTAGGT - GTATAGT .....10
...ATGAGGTAGTAGGT - GTATAGTT .....7
...TGAGGTAGTAGGTcGTATAGTT .....7
...TGAGGTAGTAGGTTtGTActAGTT .....28
...TGAGGTAGTAGGTTtGTActAGgTT .....25
...TGAGGTAGTAGGTTtGTATAGTT .....10
...TGAGGTAGTAGGTTtGTActAGT .....8

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TGAGGTAGTAGGT-GTATAGgTT.....11





TGAGGTAGTAGGTTaGTATAGgTT.....5

