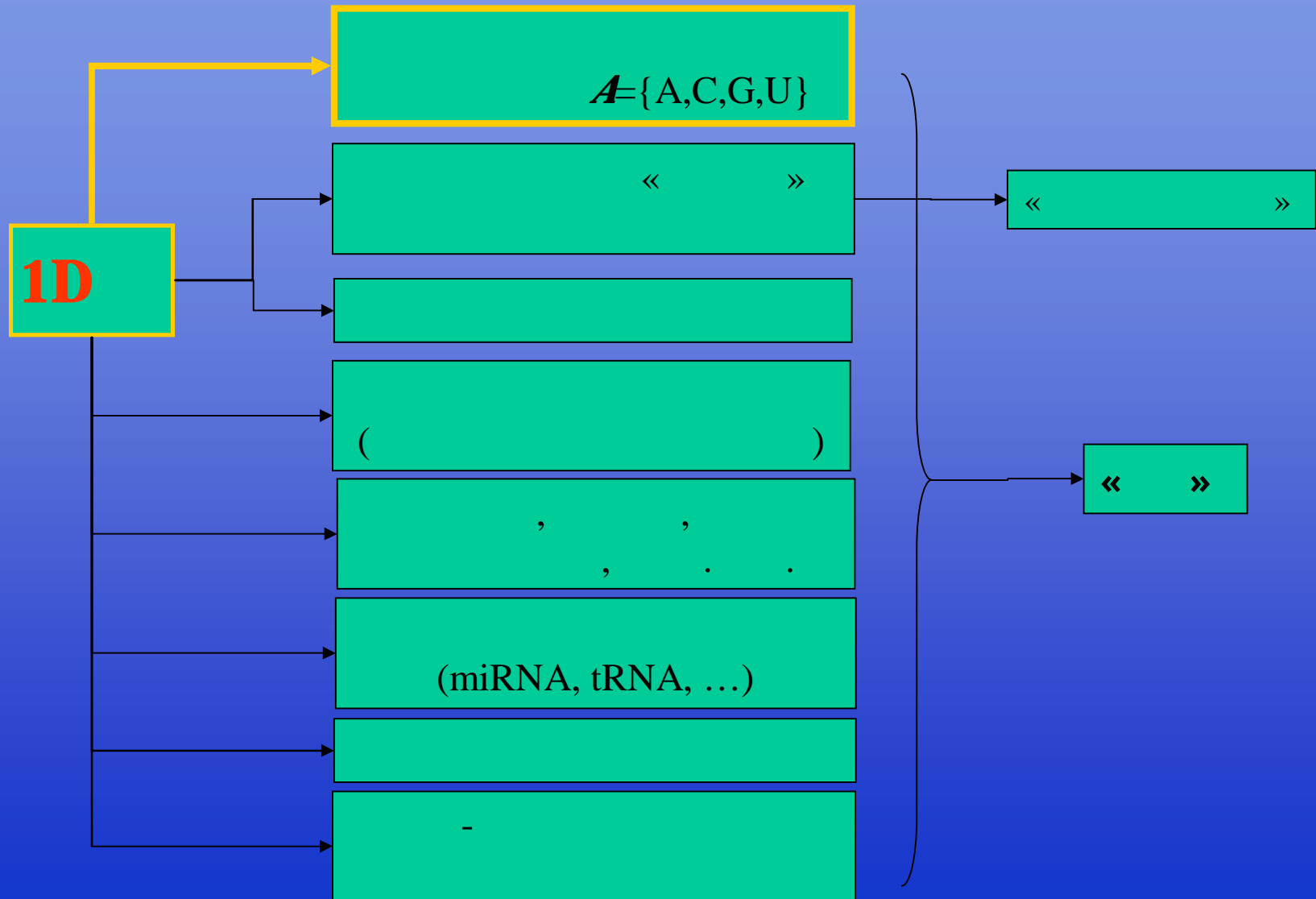
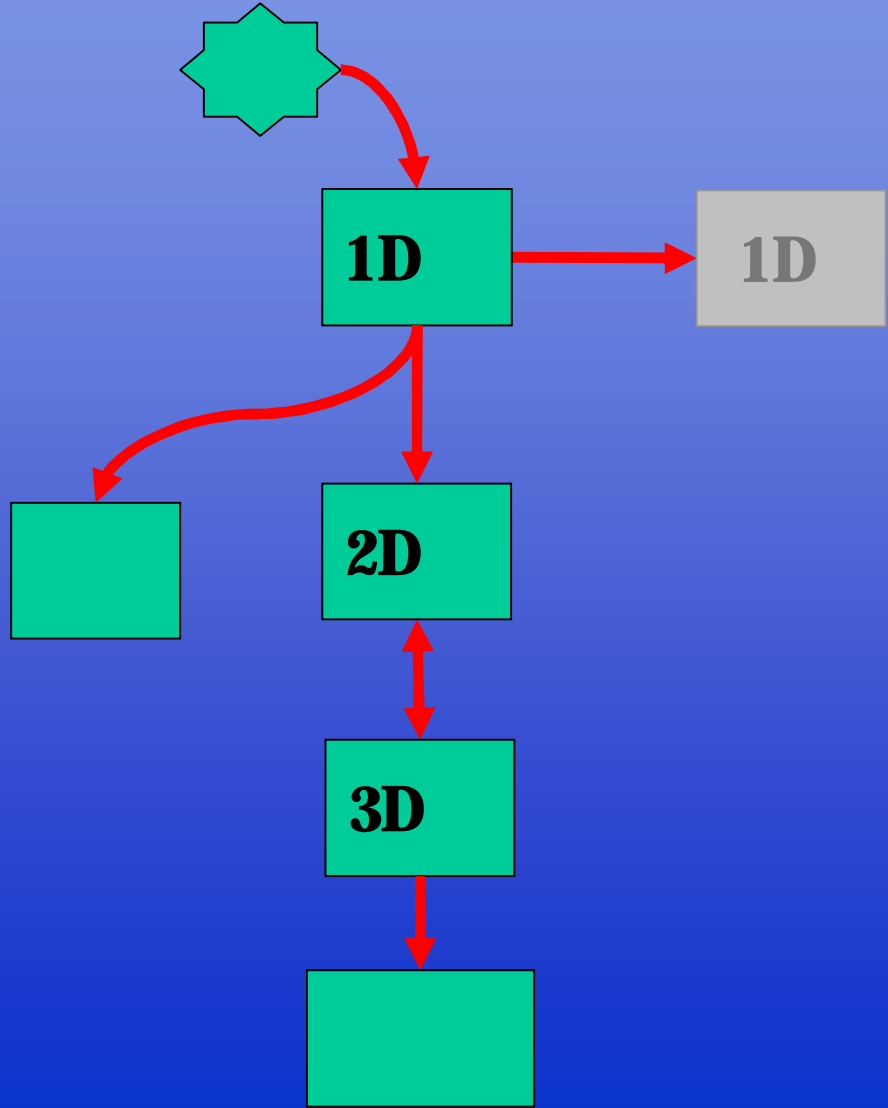
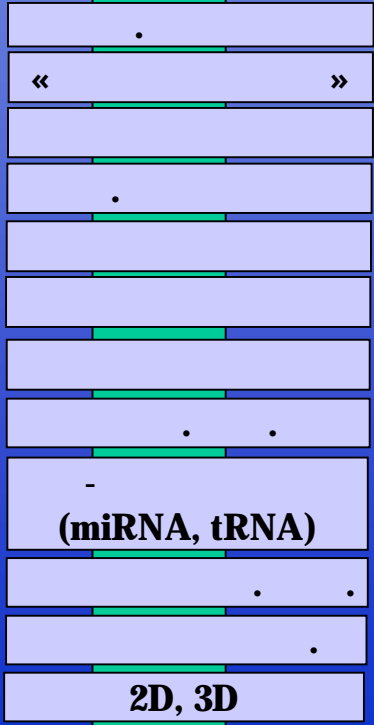


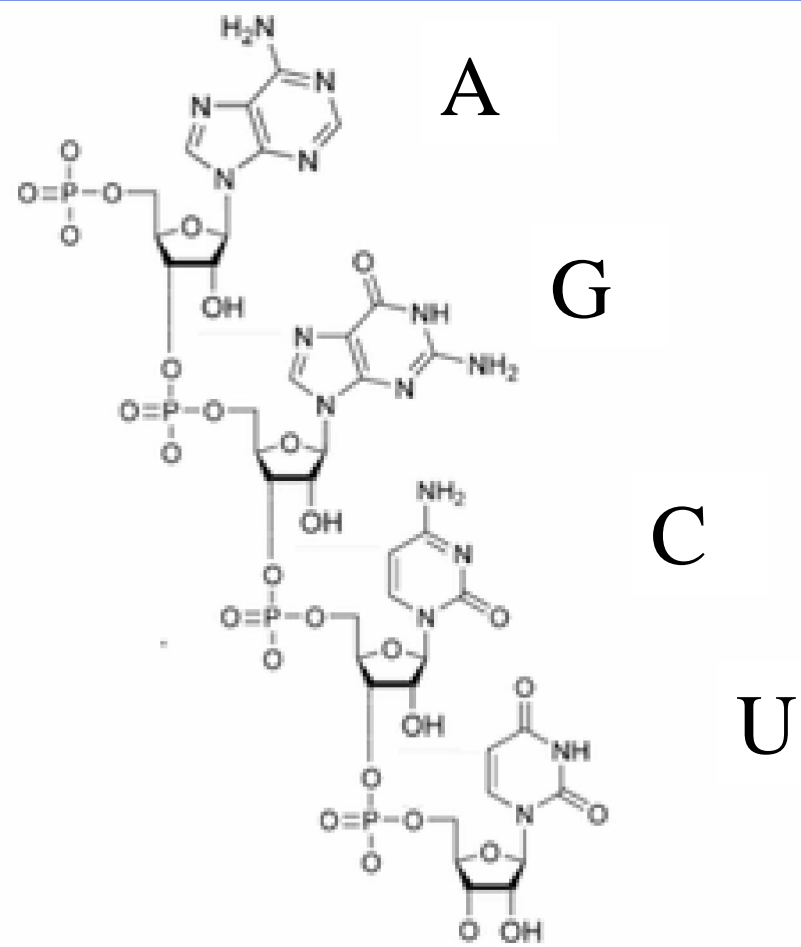
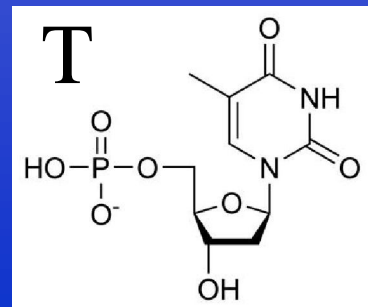
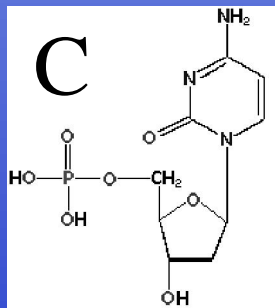
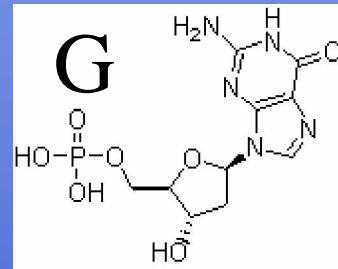
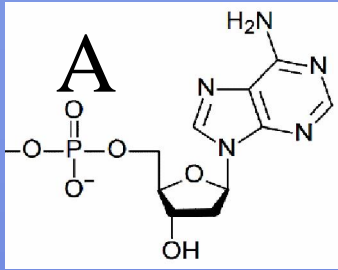
«1D»



1D



?



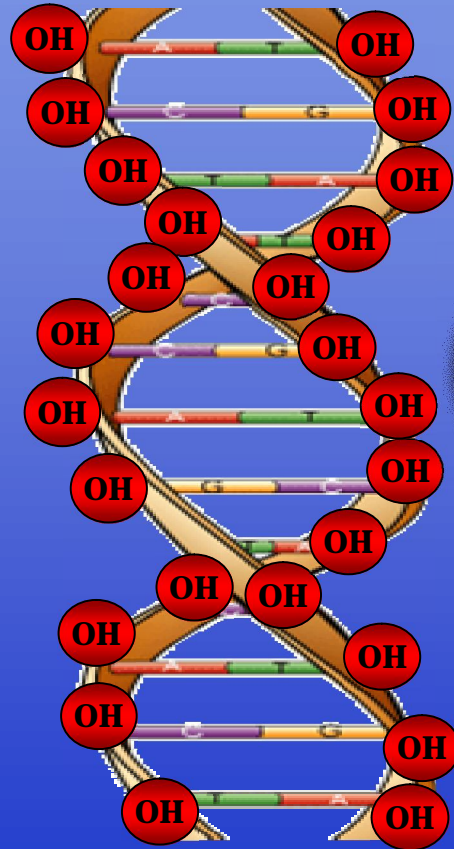
•

,

•

(2D)

(3D),



-

?

...



<u>()</u>	.	.	
<u>Messenger RNA</u>	mRNA		
<u>Ribosomal RNA</u>	rRNA		
<u>Signal recognition particle RNA</u>	7SL RNA, SRP RNA		
<u>Transfer RNA</u>	tRNA		
<u>Transfer-messenger RNA</u>	tmRNA	« »	.

()	.	.	.
<u>Small nuclear RNA</u>	snRNA		,
<u>Small nucleolar RNA</u>	snoRNA		,
<u>Ribonuclease P</u>	RNase P	«fine tuning»	
<u>Ribonuclease MRP</u>	RNase MRP	« » ,	
<u>Y RNA</u>	-	,	
<u>Telomerase RNA</u>	-		

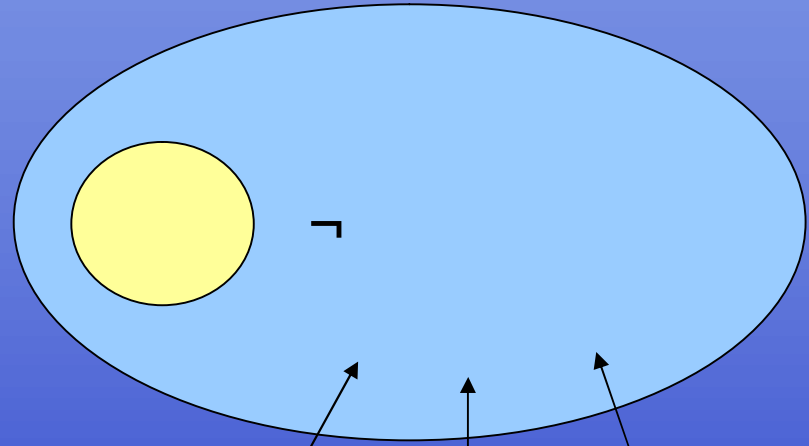
()	.	.	
<u>Antisense RNA</u>	aRNA	,	
<u>Long noncoding RNA</u>	LNC RNA	, , siRNA	
<u>MicroRNA</u>	miRNA		
<u>Retrotransposon</u>	-		
<u>Piwi-interacting RNA</u>	piRNA		
<u>Small interfering RNA</u>	siRNA		
<u>Trans-acting siRNA</u>	tasiRNA		

« / ̄ »

•

- *Pol III,*
- *Pol I,*
- *Pol II*

:



•

- *C.elegans*
- ~29,600 , 620

- *Saccharomyces cerevisiae*
- ~8000 , 275

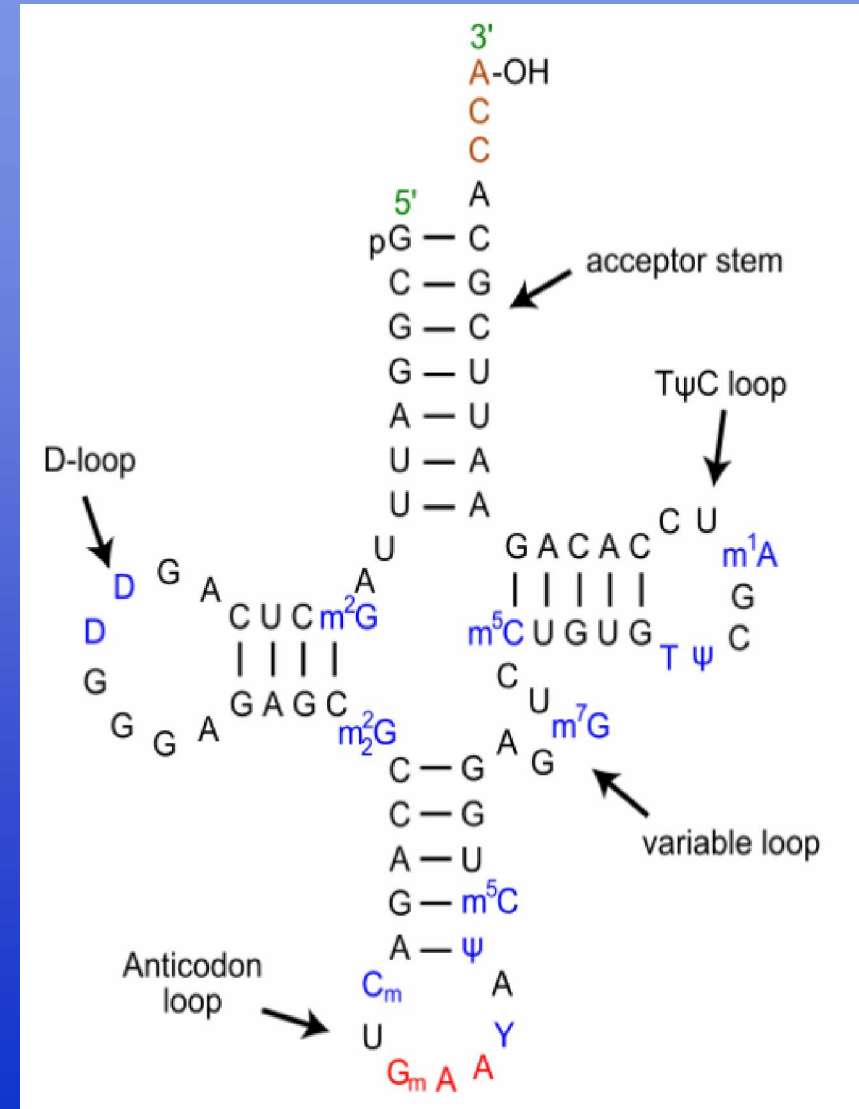
-
- ~27,000 , 519

snoRNA

snRNA

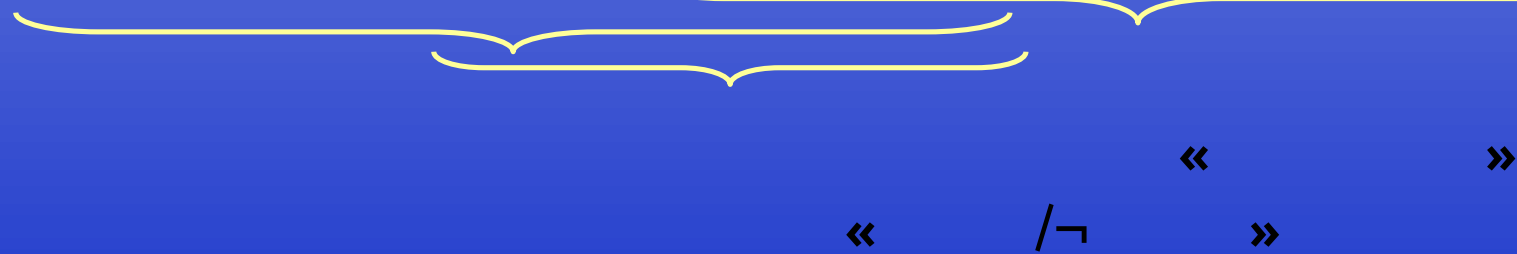
rRNA

- 5' - 3' : 7bp,
- CCA « » : 3 , 3'-
- D- : 4 bp (D)
- - : 5bp
- « »
- - : 5bp , ()

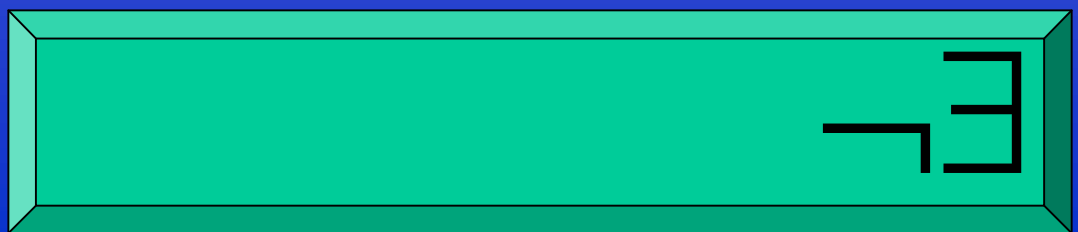


•
•

	10	20	30	40	50	60	70
Eco-Ile-CAT	GGCCCTTTAGCTCAGTGGTTAG	-AGCAGGCGACTCATAAATCGCTTGGT	CGCTGGTTCAAGTC	-CAGCAAGGGCCA	---		
Eco-Ile-CAT	GGCCCTTTAGCTCAGTGGTTAG	-AGCAGGCGACTCATAAATCGCTTGGT	CGCTGGTTCAAGTC	-CAGCAGGGGCCA	---		
RB69-Ile-CAT	GGCCCTGTAGCTCAACGGTTAG	CAGCAGTCCCCTCATAAAGGGAAAGGT	TACCAGTTCGAATC	-TGGTCTGGGTCA	---		
T4-Ile-CAT	GGCCCTGTAGCTCAATGGTTAG	CAGCAGTCCCCTCATAAAGGGAAAGGT	TACCAGTTCAAAATC	-TGGTCTGGGTCA	---		
RB69-Ile-CAT	GGCCCTGTAGCTCAACGGTTAG	CAGCAGTCCCCTCATAAAGGGAAAGGT	TACCAGTTCGAATC	-TGGTCTGGGTCA	---		
RB43-Ile-CAT	GGCCCTTTAGCTCAATTTGGTAG	-AGCGAAACCCCTCATAAAGGGTGTGGT	TTCCGGTTCGAGTca	CGGAAGGGGCCACCA	A		
44RR-Ile-CAT	GGCCCTGTAGCTAGACGGTTCA	-AGCAGGCGGCTCATAAACCGC	-TCGTAGCAGGTT	CGATTC	-CTGCCAGGGCCACCA		
Aeh1-Ile-CAT	GGCCCCGTAGCTGGAGGGTTTT	-AGCGTGGGCTCATAAACCGCTTGA	-TGTGGGTT	CGATTC	-CCACCGGGCCACCA		
Aeh1-Ile-GAT	AGTCCCCTAGCTCAG-AGGTAG	-AGGCCCGTGGCTGATAAACCGCGGAT	GTGGATGGTTCGATAC	-CATTCGGGACTACCA	A		
44RR-Ile-GAT	AGTGGATTAGCTCAGTAGGTAG	-AGCACTCGACCGATAATCGAGAGCGCACT	GGTTCGACCC	-CAGTATCCACTACCA	A		
Aeh1-Met-CAT	GGTGCATTAGCTCAGT-GGTAGAGCTG	-CGGTTTCATACGCCGTGGT	CGGTAGTTCGAATC	-TACCATGCACCA	CCA		
Aeh1-Met-CAT	TGCGAGTTGGAGAAGTCCGGTATCTCGTT	AGCCTCATAAAGCTAAAGGT	CGGTGGTTCGAATC	-CACCACTCGCAT	---		
44RR-Met-CAT	TGGGAGGTAGAGGAGAGGGTGGTGGTGGTGGGGT	CATAATGCCGGAAATCGGGTGGTGGGAATC	-CATGCCCTCGGATGCA	---	---		
tRNA_identity	C	T	A	C	G		G



NB!



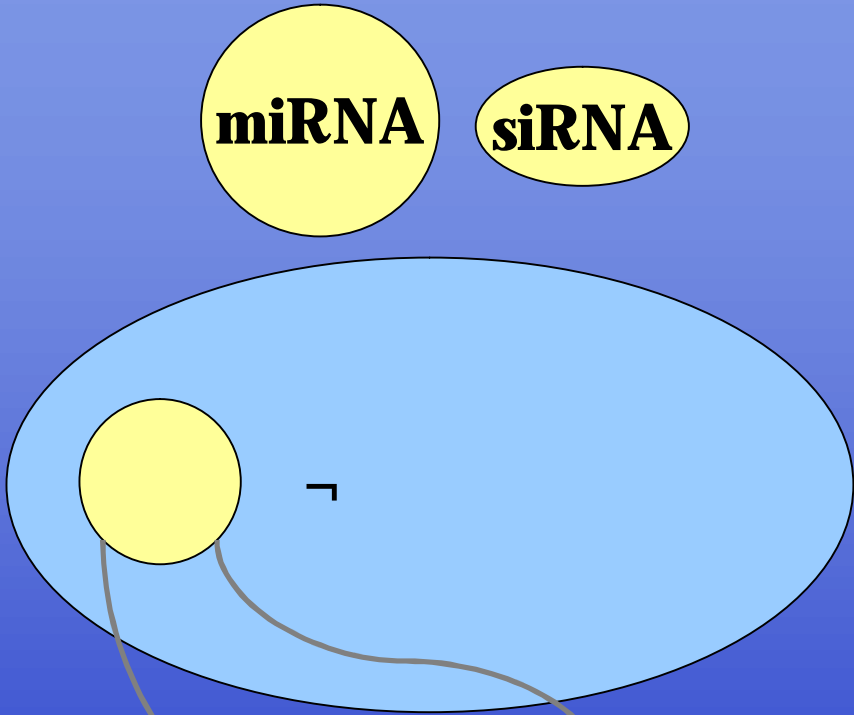
« / 7 »

miRNA

siRNA

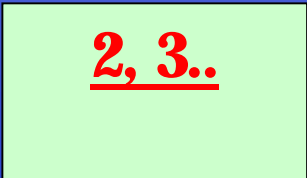
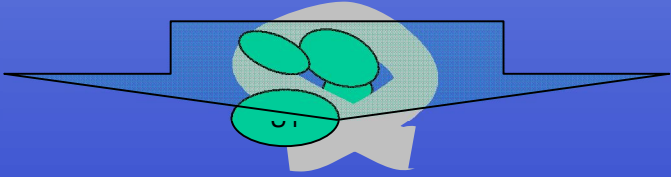
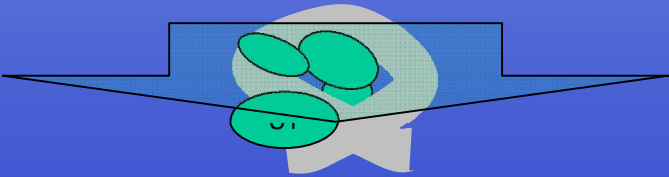
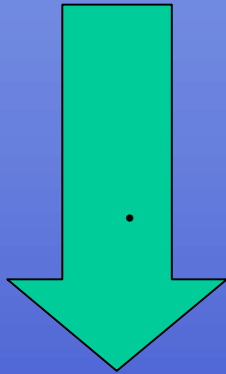
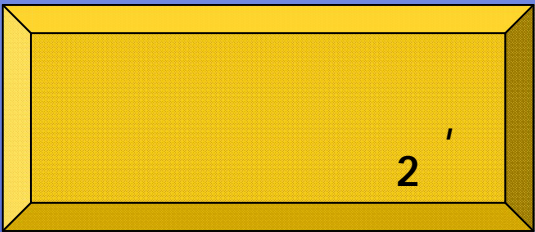
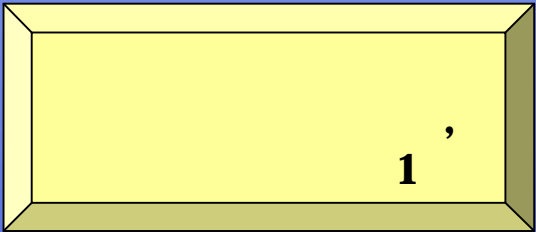
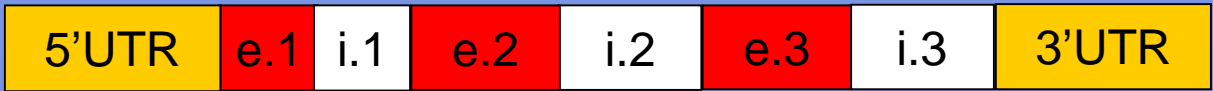
3' UTR

- - ,
- - 1000 ,
60% (!)
- 40% -



<i>Program</i>	<i>URL</i>	<i>Species</i>
" <i>In silico</i> " cloning MiRscan	http://genes.mit.edu/mirscan	<i>C. elegans</i> , Human
Target identification		
TargetScan	http://genes.mit.edu/targetscan	Vertebrates
Diana MicroT	http://www.diana.pcbi.upenn.edu/cgi-bin/micro_t.cgi	Human/Mouse
miRNA–target prediction	http://www.russell.embl.de/miRNAs/	<i>Drosophila</i>
miRanda	http://www.microrna.org/miranda.html	<i>Drosophila</i> /Human
RNAhybrid	http://bibiserv.techfak.uni-bielefeld.de/rnahybrid/	<i>Drosophila</i>
RNAcalibrate		
RNA effective		
mirnaviewer	http://cbio.mskcc.org/mirnaviewer/	Human
Pictar	http://pictar.bio.nyu.edu/	Human
MicroRNAs database		
The MicroRNAs Registry	http://www.sanger.ac.uk/Software/Rfam/mirna/index.shtml	All

(Sevignani, 2006)



80%

(Matlin, 2005).

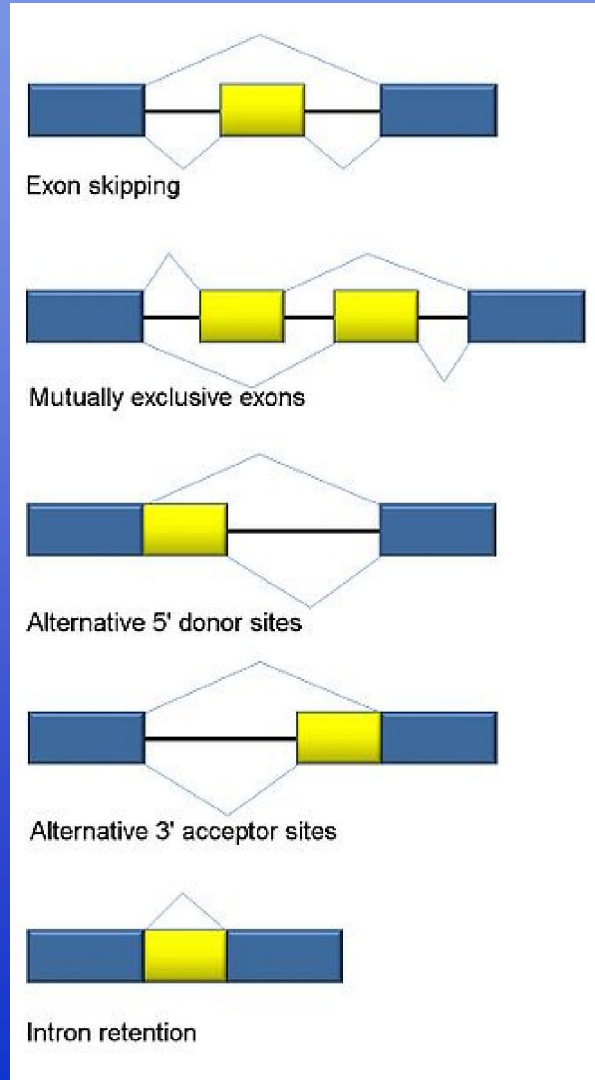
•

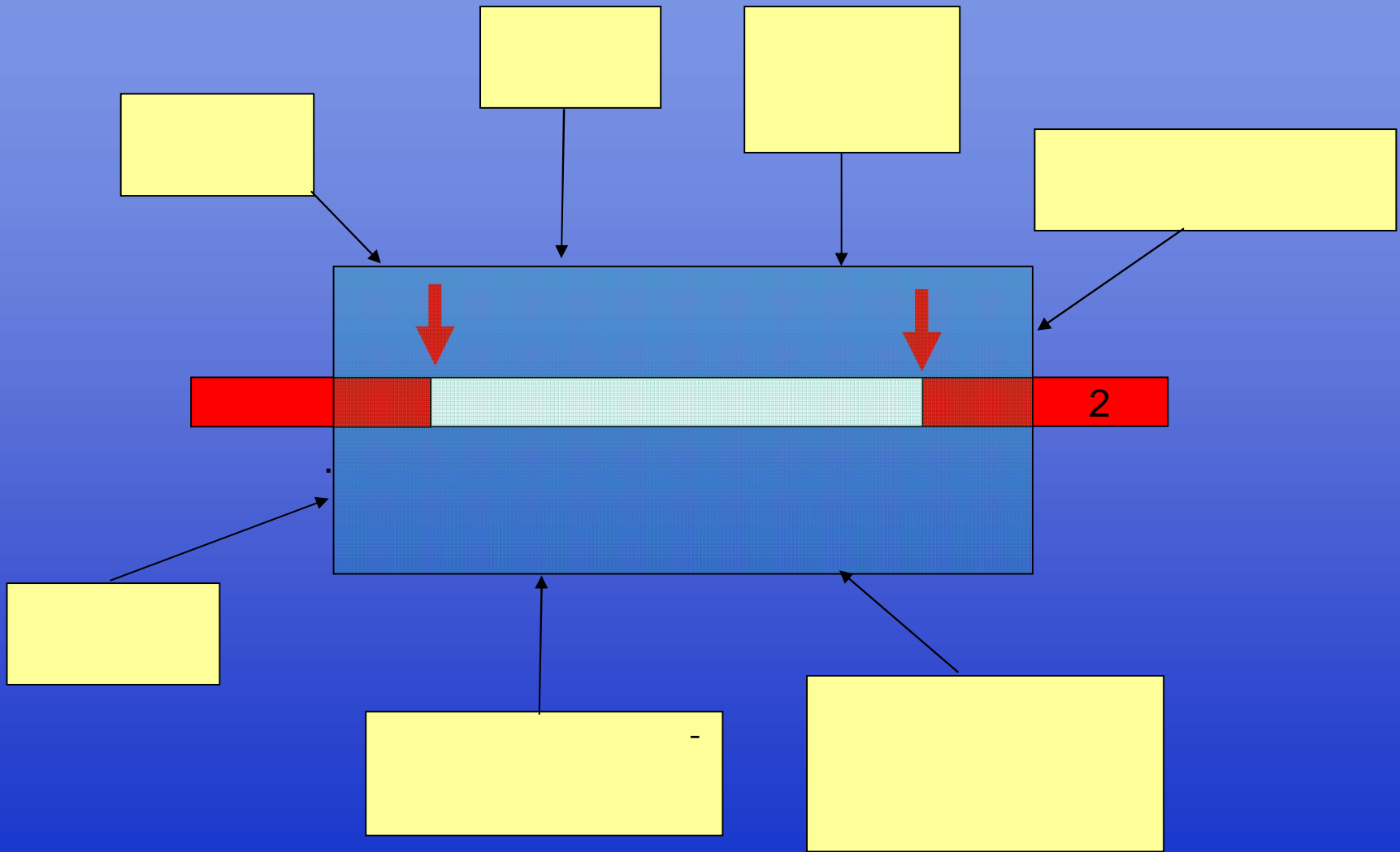
•

•

•

()

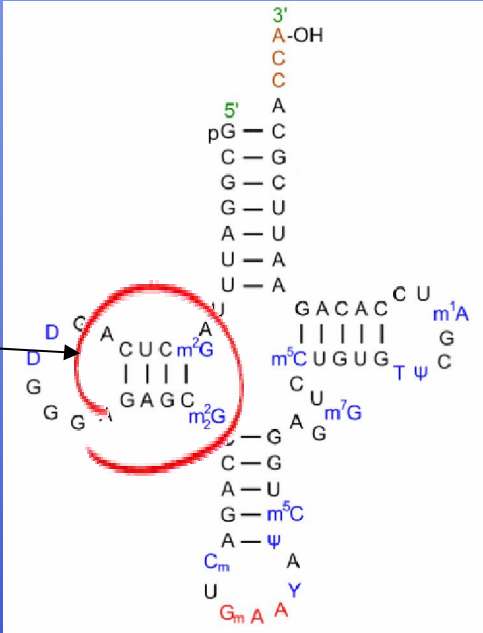




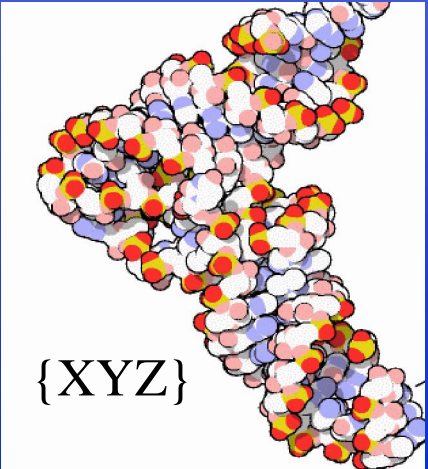
(Stamm, 2002)

1D

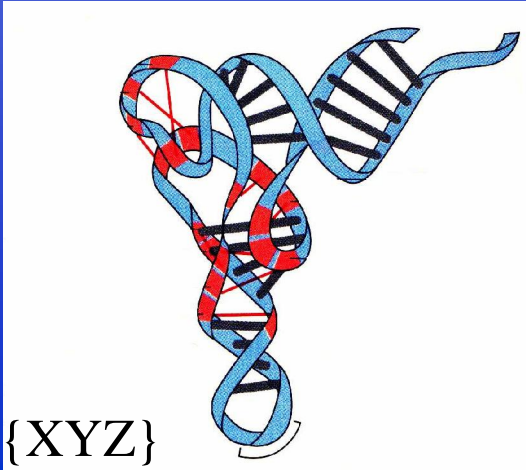
GCGGAUUUAGCUCAGDDGGGAGAGCGCCAGAGACUGAAYAPCUGGAGGUCCUGUGTPCGAUCCACAGAAUUCGCACCA



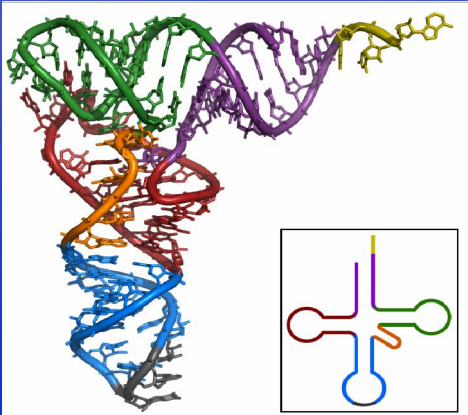
2D



{XYZ}



{XYZ}



3D

• « - » ()

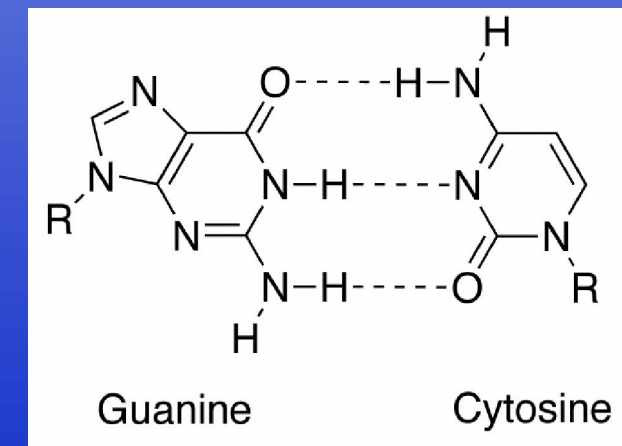
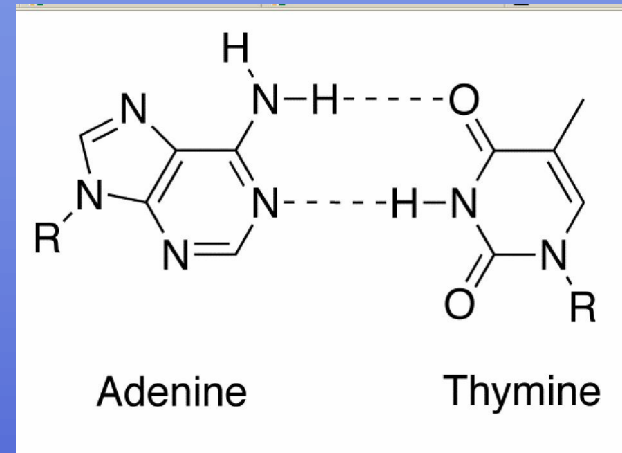
- A - T

- G - C

•

- A - U

- G - C



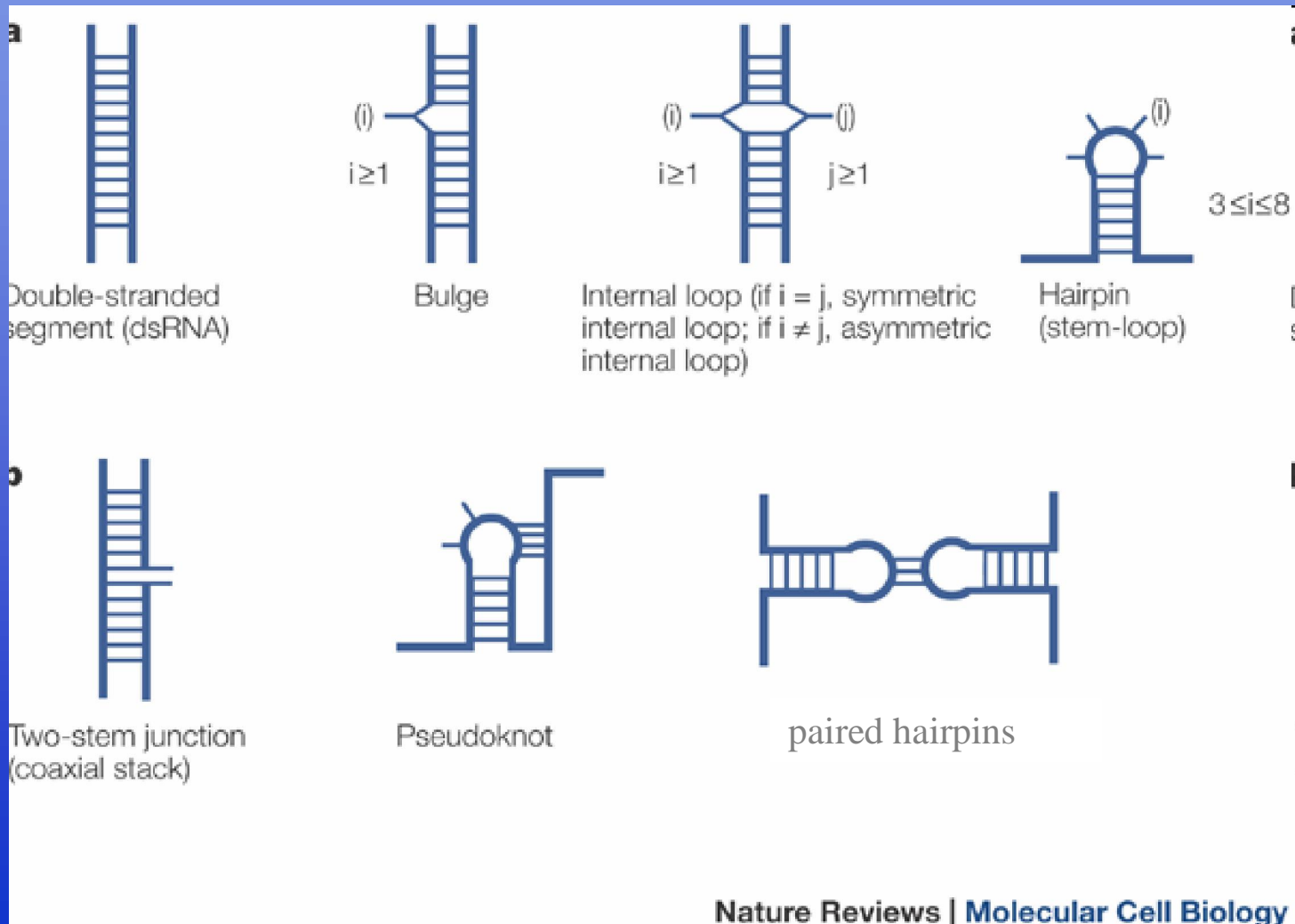
(

)

-

A	U
C	G
G	C <i>U</i>
U	A <i>G</i>
I	<i>A</i> <i>C</i> <i>U</i>

2D



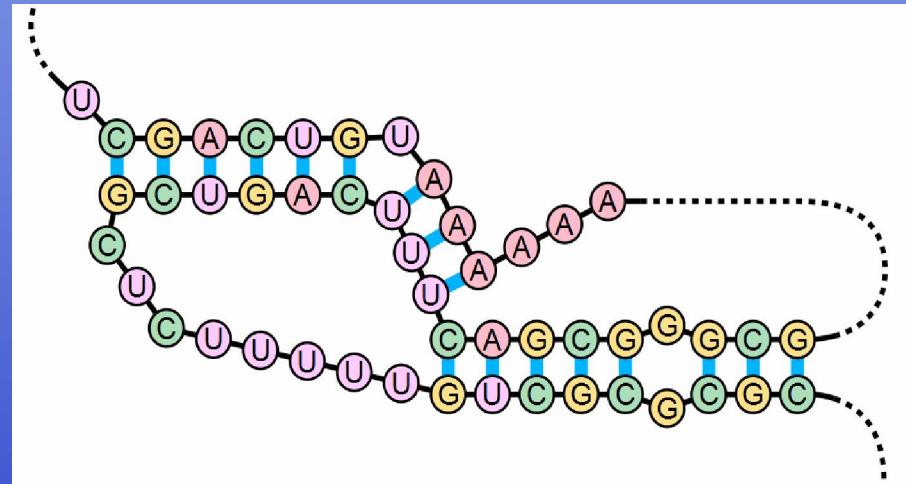
(pseudoknot)

- « « - »

- (. . .)
3 4

- “RNA structure prediction”

- (:)



3D > 2D

•

« 2D »



3D > 2D

•

2D 3D
2D

...

•

2D

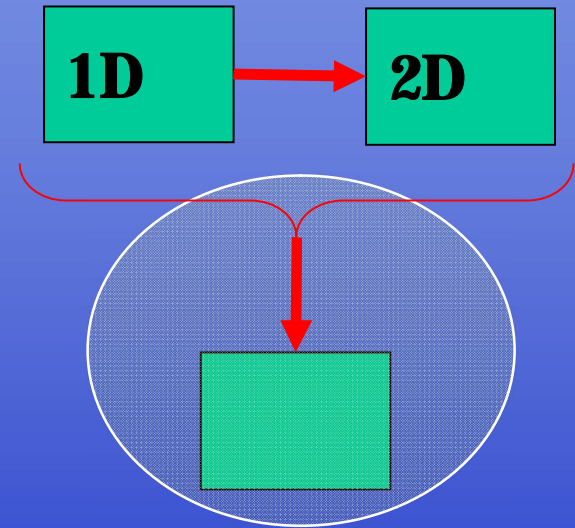
3D

« » : 1D > 3D

• 1- : 2D

• 2- :
- - 2D

• 3- :



•

.

•

(Mg, K,

)

•

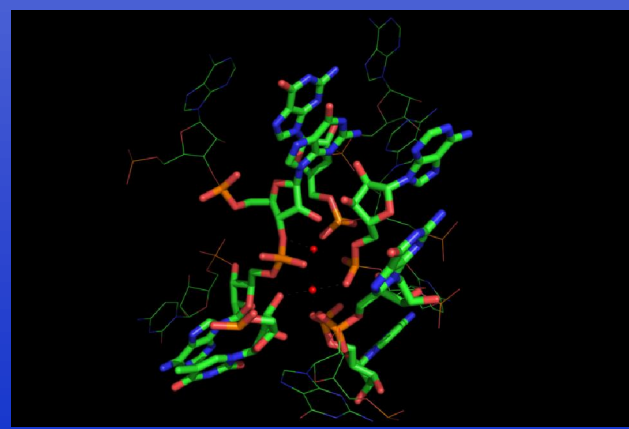
,

«-»

,

•

Mg, K



	IUPAC
A	A
C	C
G	G
T	T/U
(AC)	M
(AG)	R
(AT)	W
(CG)	S
(CT)	Y
(GT)	K
(AGC)	V
(CGT)	D
(AGTC)	X/N