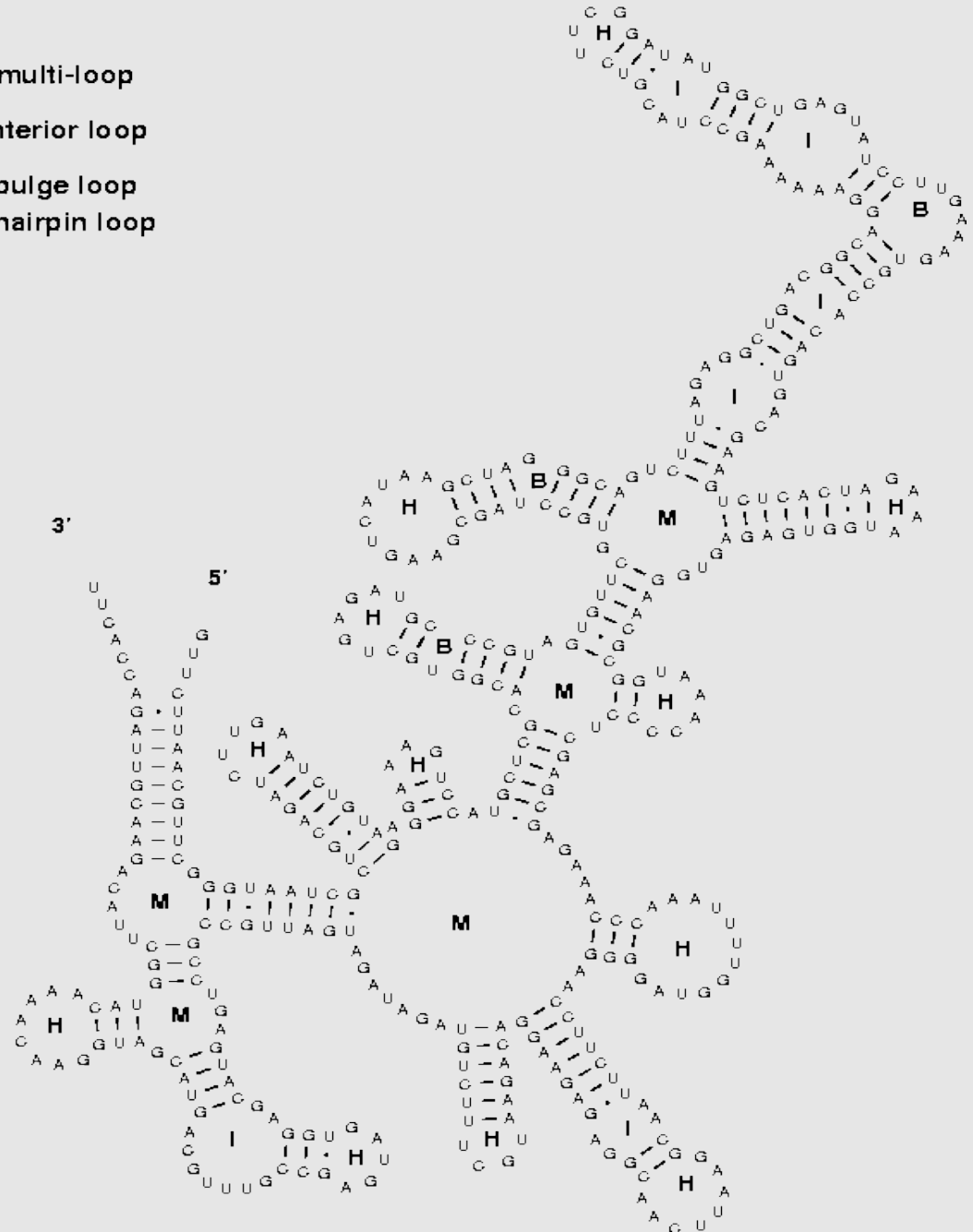


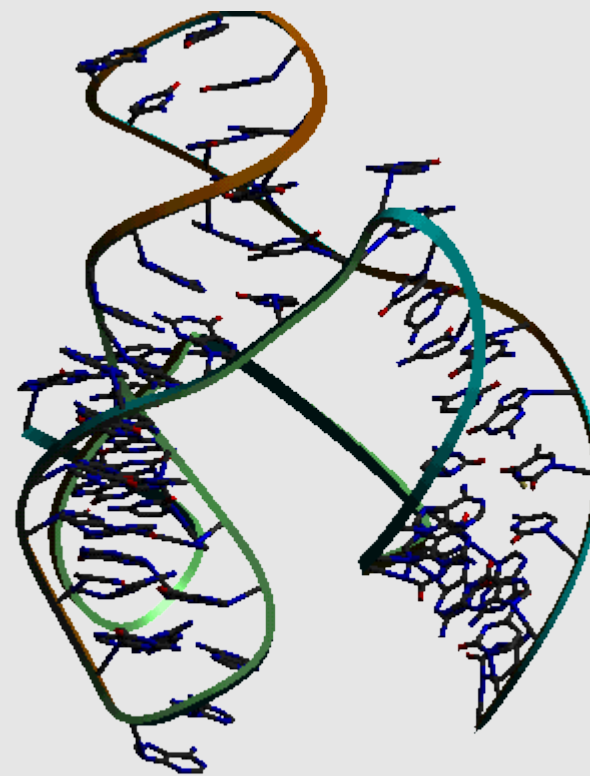
# Sekundární struktura RNA

## *Bacillus subtilis* RNase P RNA

- M** - multi-loop
- I** - interior loop
- B** - bulge loop
- H** - hairpin loop

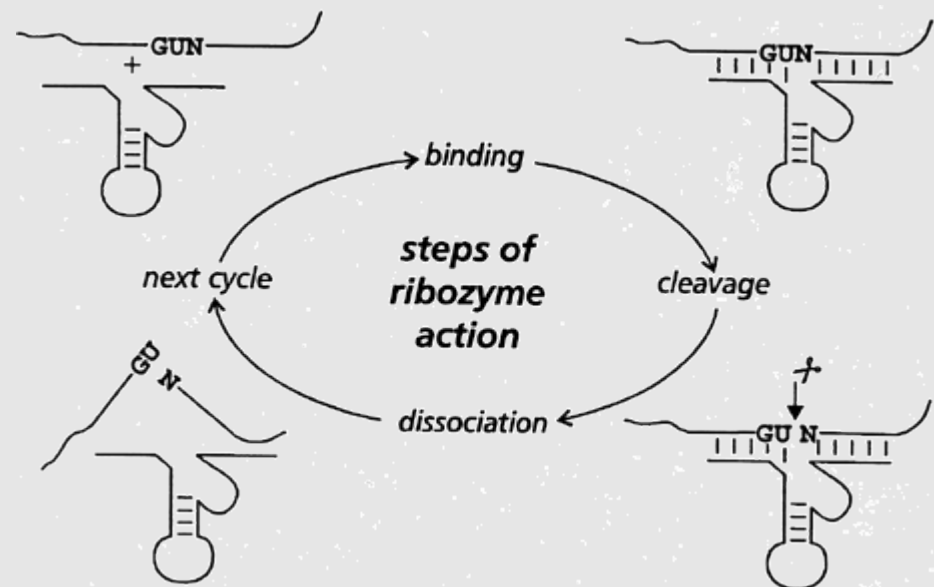
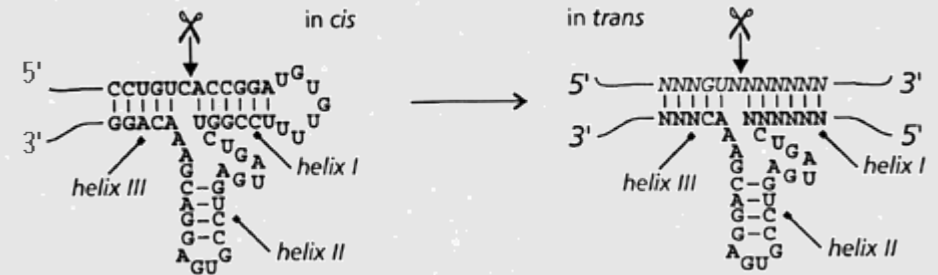


# Terciární struktura RNA

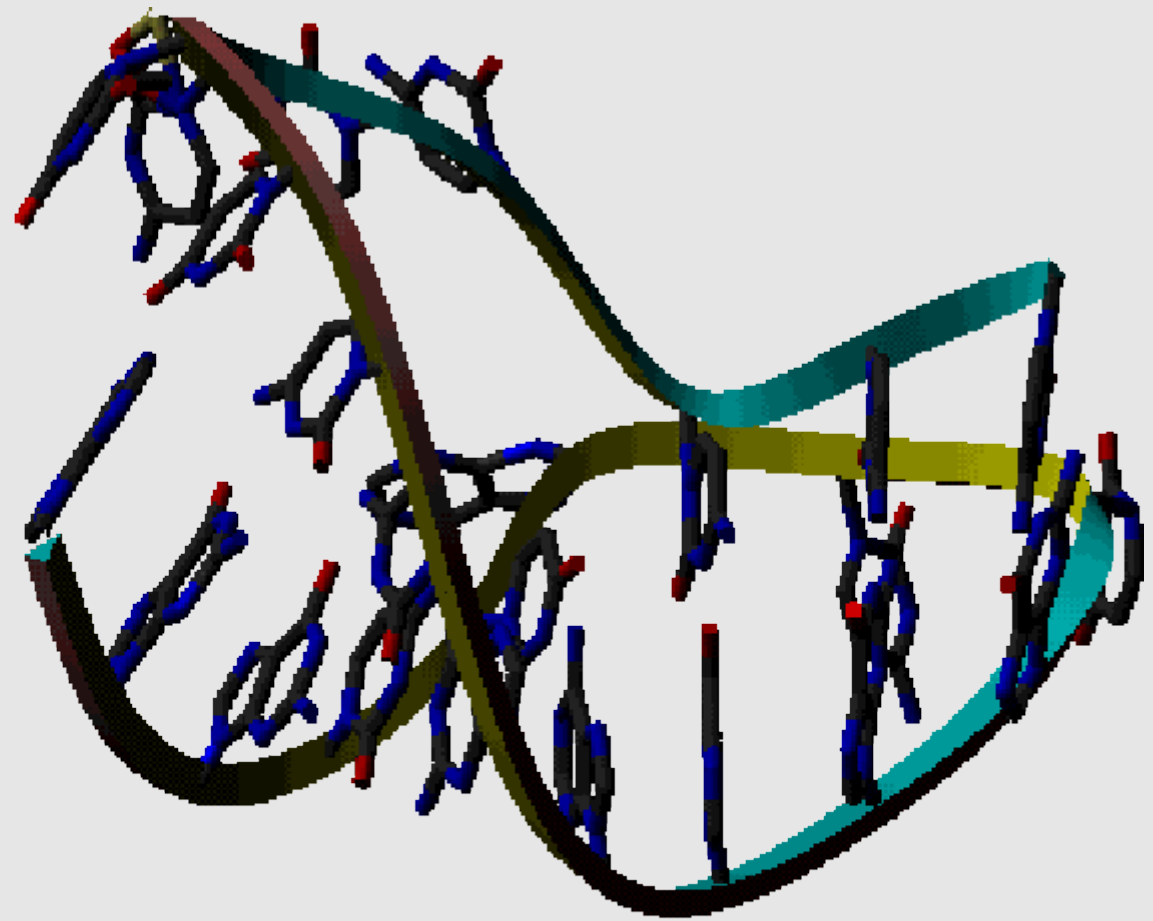


# RNA jako enzym

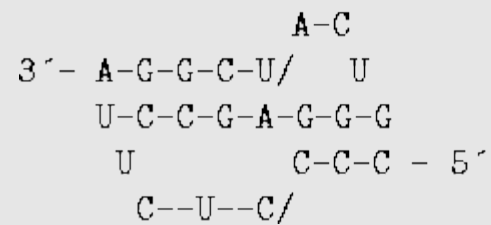
hammerhead ribozyme



# Pseudouzel (pseudoknot)



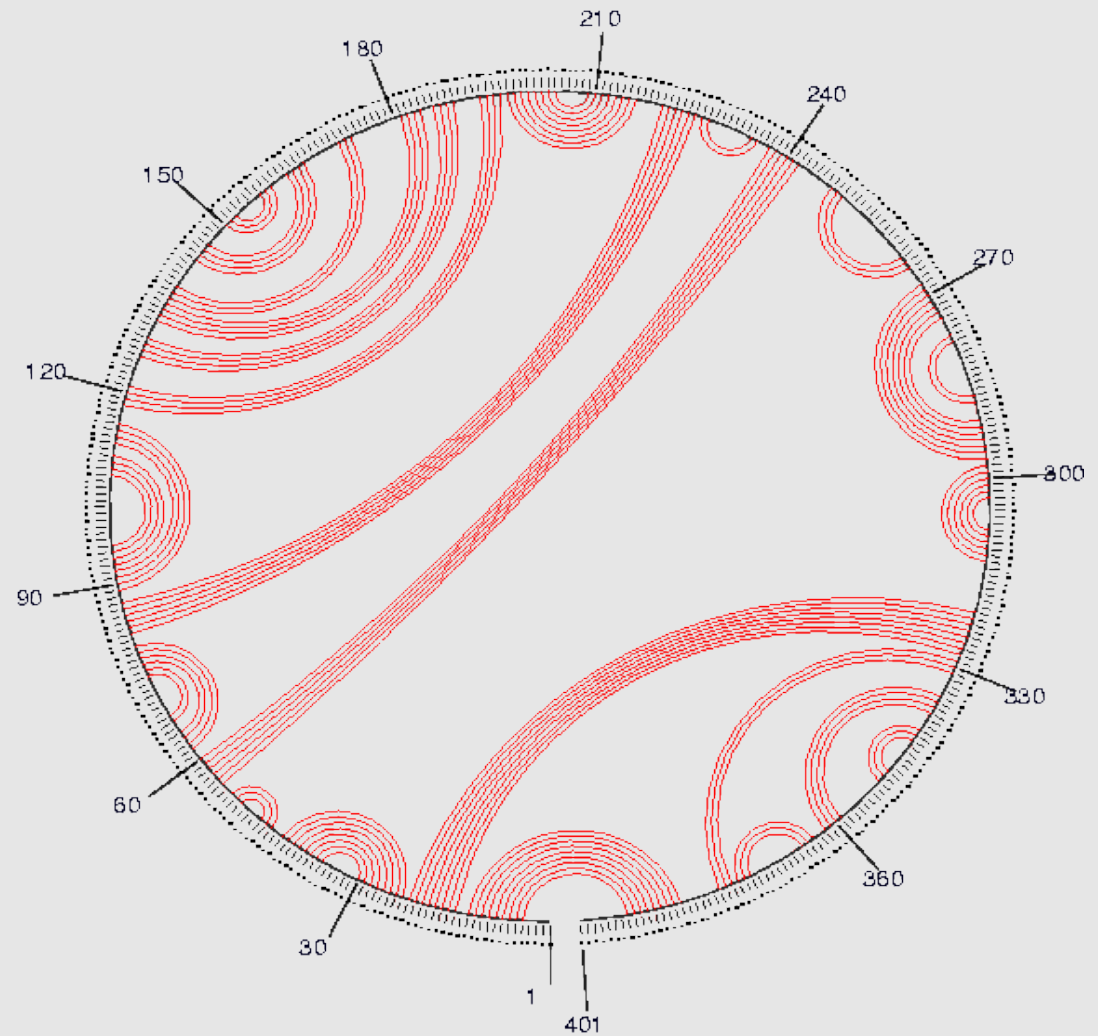
The corresponding secondary structure is:



# Sekundární struktura RNA

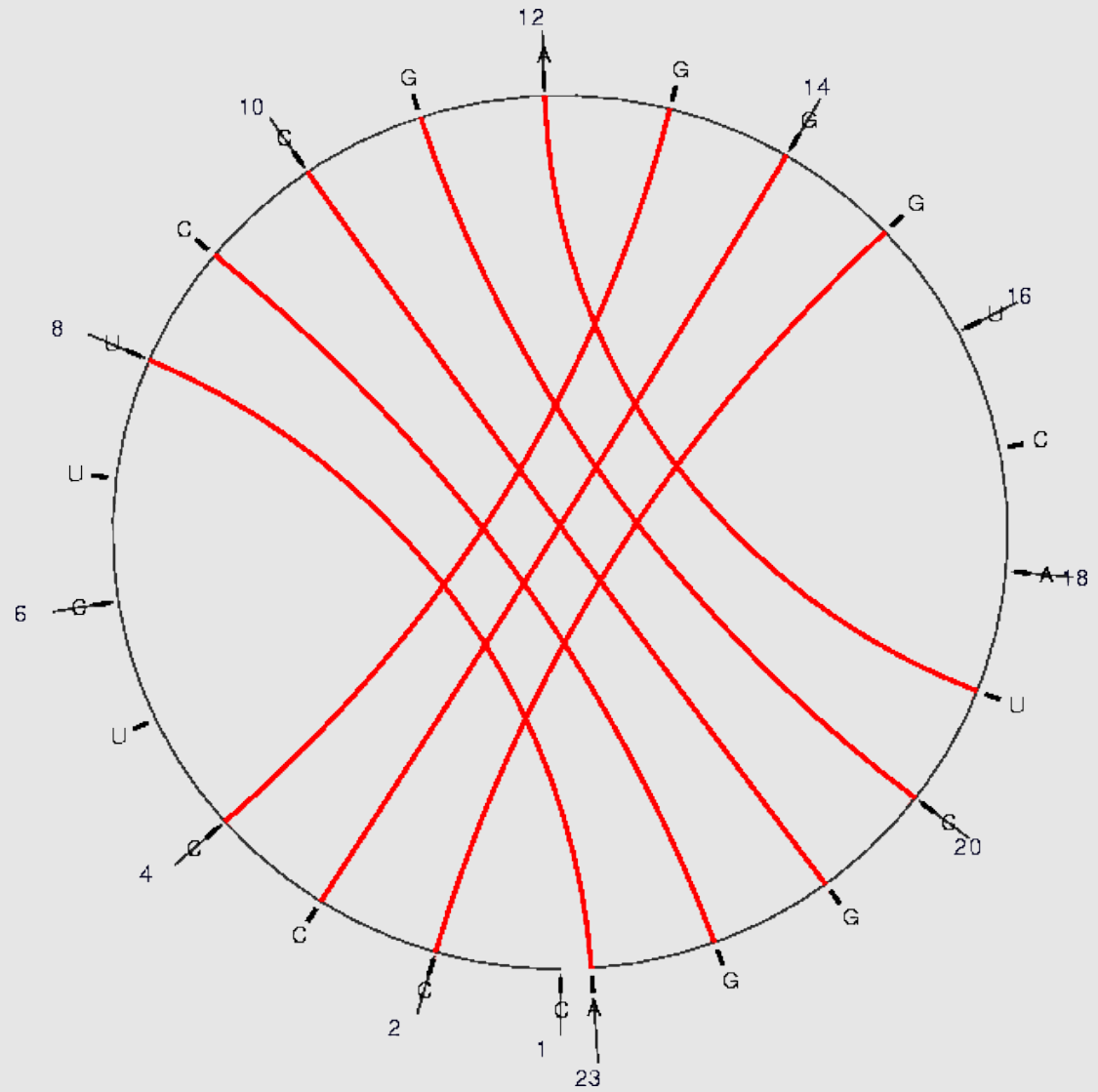
zobrazení

vir\_graph by D. Stewart and M. Zuker  
© 2001 Washington University



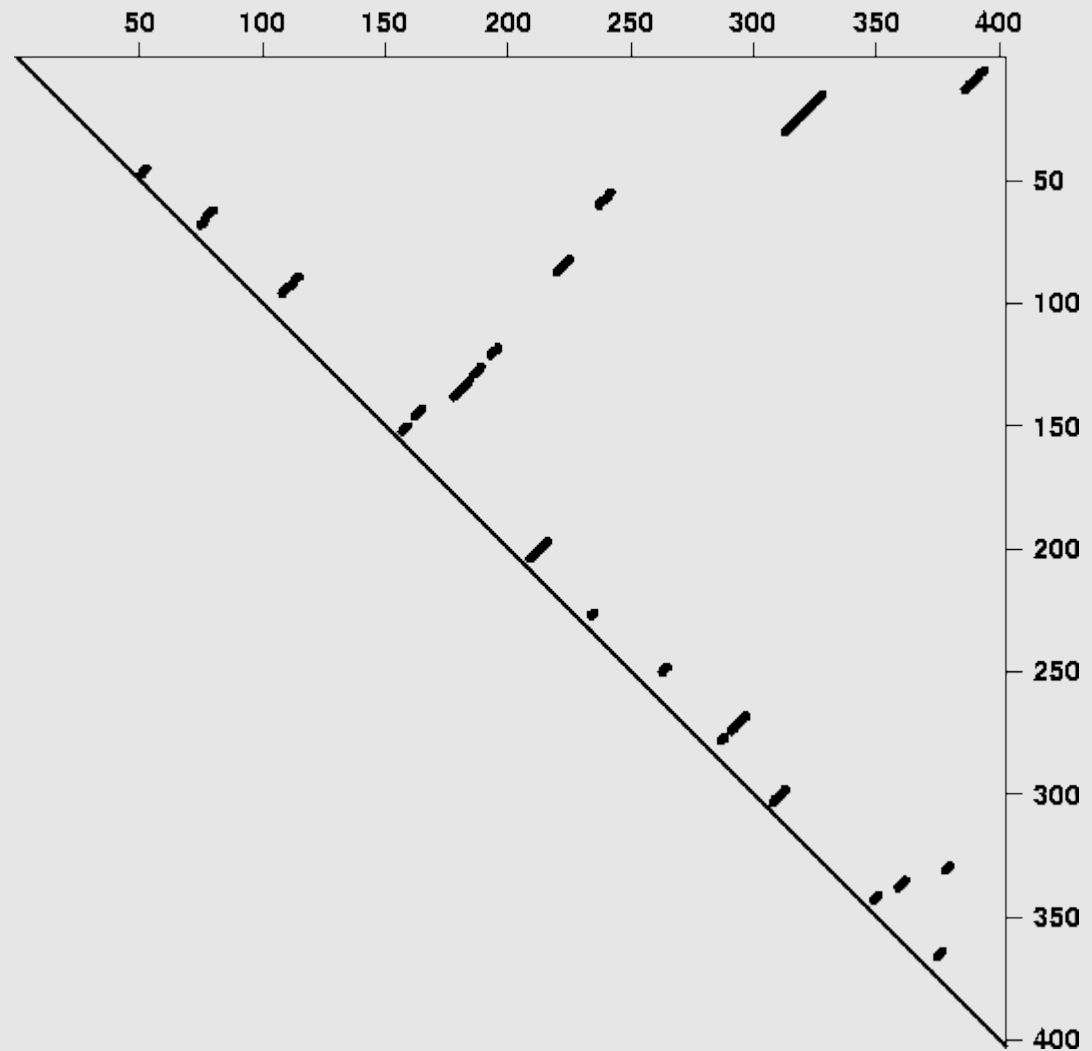
ENERGY = -85.7 Bacillus subtilis RNase P RNA

# Pseudouzel

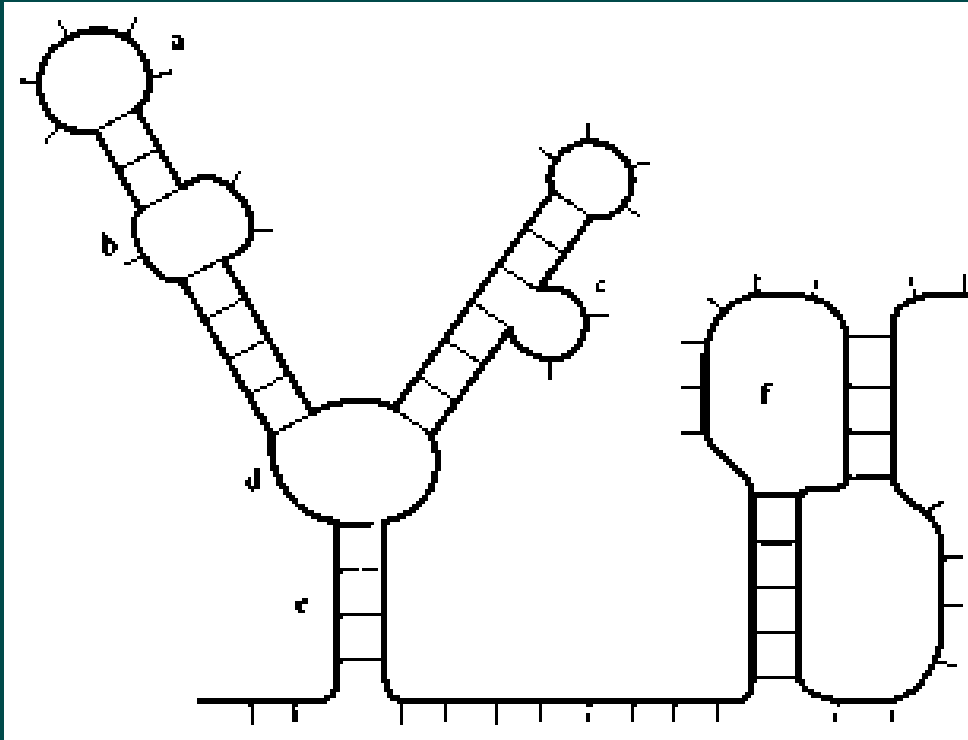


# Sekundární struktura RNA

zobrazení  
(dotplot)



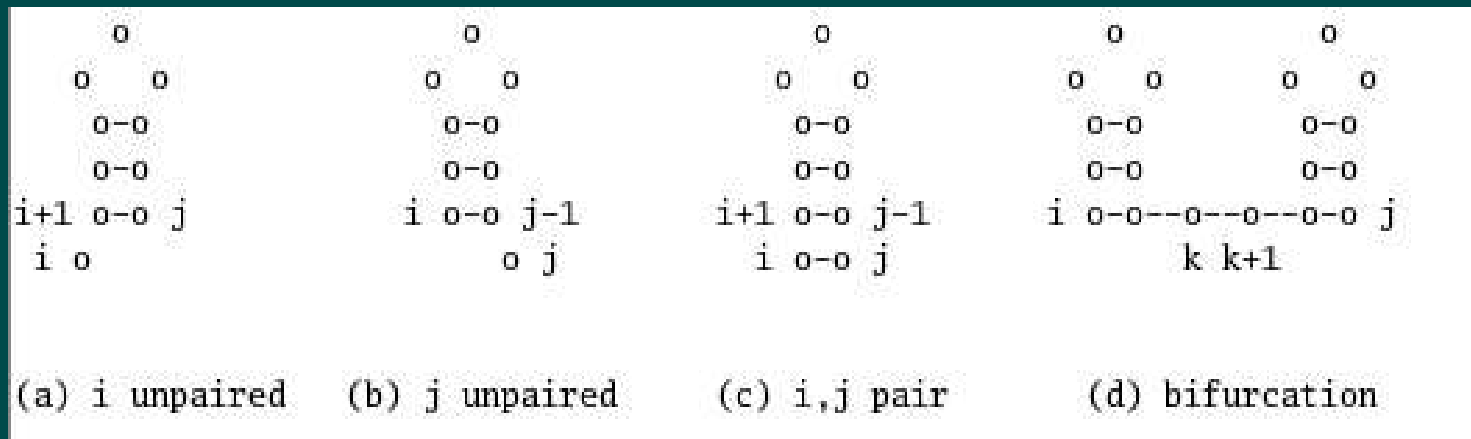
# Sekundární struktura RNA



- a – hairpin (1-loop)
- b – internal loop (2-loop)
- c – bulge (2-loop)
- d – multi-loop (3-loop)
- e – stem (2-loop)
- f – pseudoknots



# Nussinov 1978



$$\gamma(i, j) = \max \left\{ \begin{array}{l} \gamma(i+1, j) \\ \gamma(i, j-1) \\ \gamma(i+1, j-1) + \delta(i, j) \\ \max_{i < k < j} [\gamma(i, k) + \gamma(k+1, j)] \end{array} \right.$$

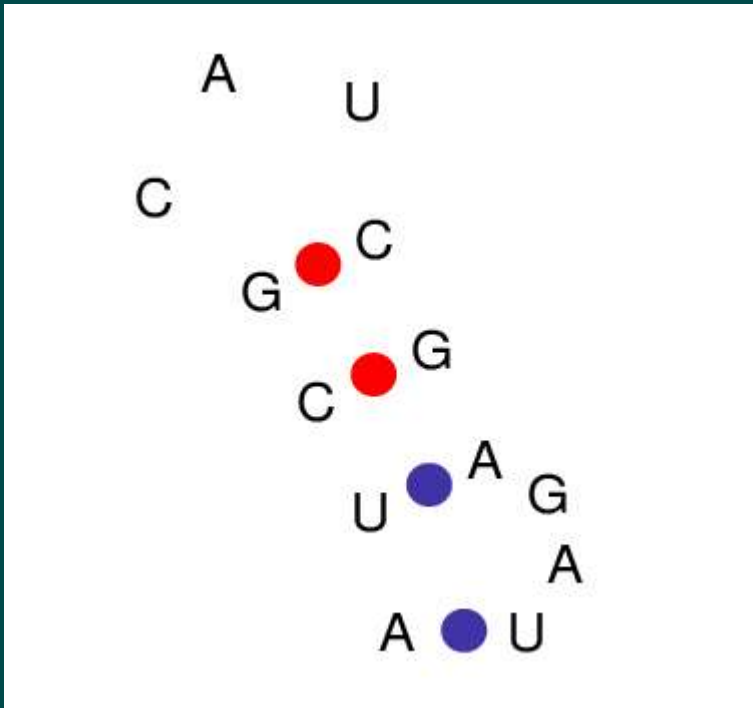
# Nussinov 1978

	A	U	C	G	C	A	U	C	G	A	G	A	U
A	0	0	0	0	0	1	2	2	2	3	3	3	4
U	0	0	0	0	0	1	1	1	2	3	3	3	3
C		0	0	0	0	0	0	1	2	2	2	2	3
G			0	0	0	0	0	1	1	1	2	2	3
C				0	0	0	0	0	1	1	2	2	3
A					0	0	0	0	0	1	1	2	3
U						0	0	0	0	1	1	2	2
C							0	0	0	0	1	1	1
G								0	0	0	0	0	1
A									0	0	0	0	1
G										0	0	0	0
A											0	0	0
U												0	0

Row	1	2	2	2	3	4	5	6	7
Column	13	12	11	10	9	8	7	7	7

1 2 3 4 5 6 7 8 9 0 1 2 3  
A U C G C A U C G A G A U

# Sekundární struktura - zobrazení



1 2 3 4 5 6 7 8 9 0 1 2 3  
A U C G C A U C G A G A U