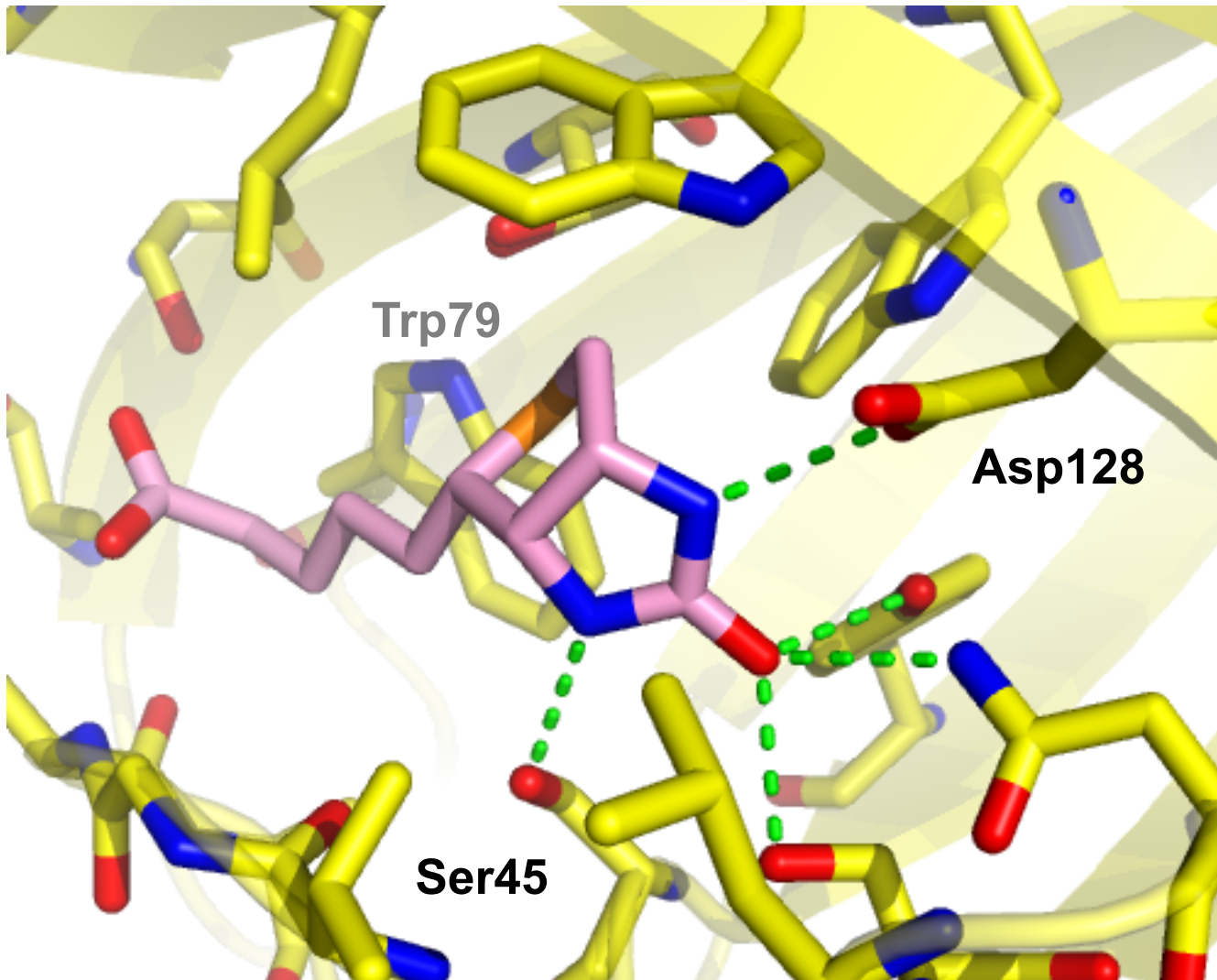
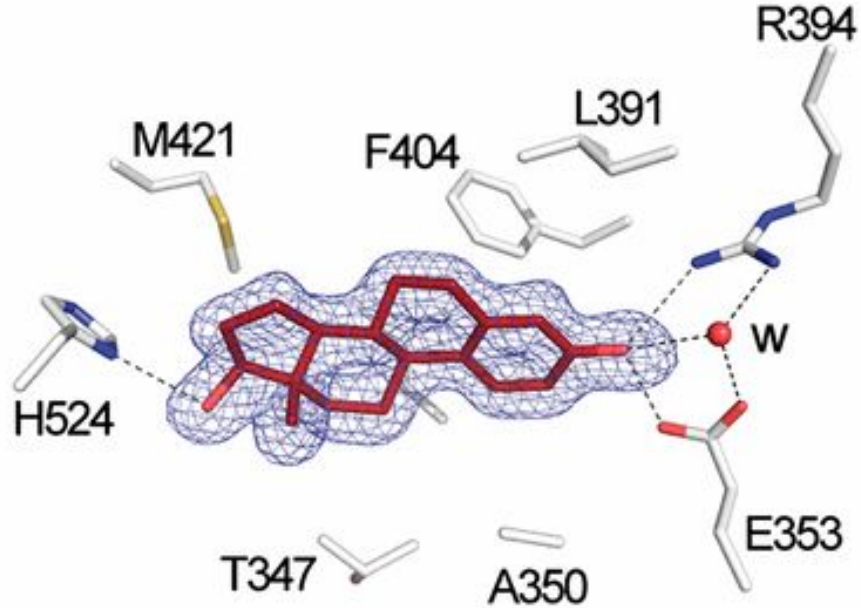


# Biotin•Streptavidin



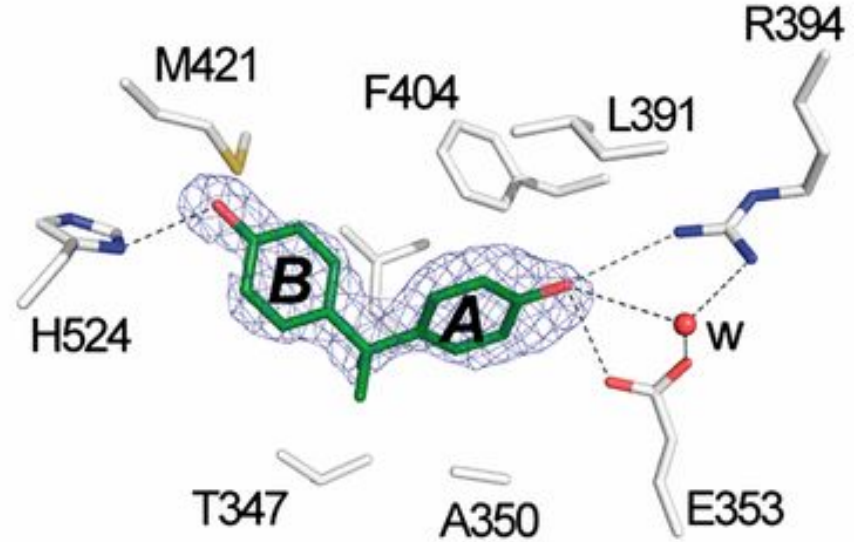
# Estrogen Receptor

B



**Estradiol**

C



**Bisphenol A**

# Conserved RNA Sequence:

**AUACCA** + **CCUUGG<sup>A</sup><sub>C</sub>AG**

## CLASS I

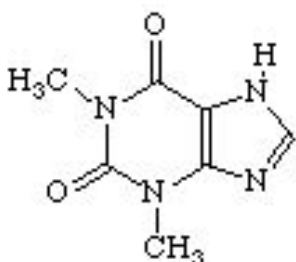
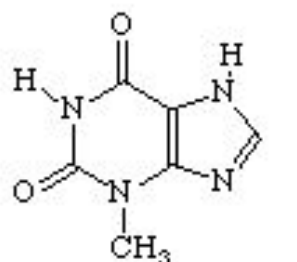
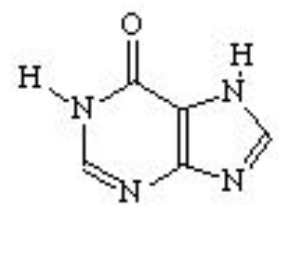
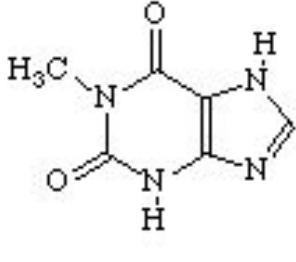
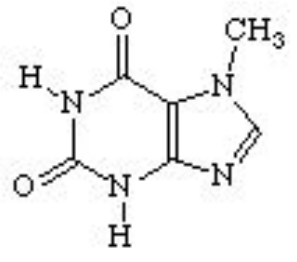
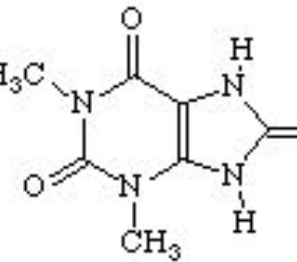
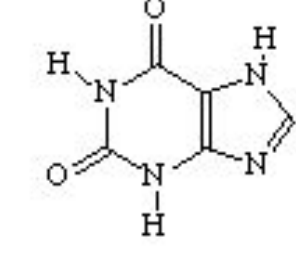
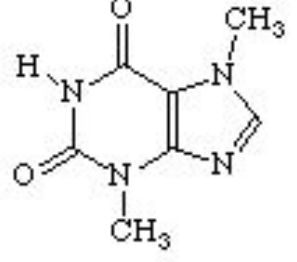
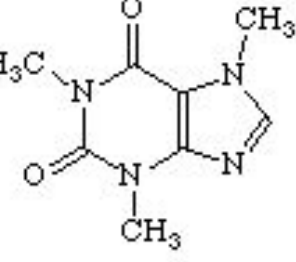
		region 1		region 2 *	
TCT8-6,9	5' gagaa	AUACCA	gugacaacucucgagauca	CCUUGGAAG	3'
TCT8-5		AUACCA	ucguguaagcaagagcacga	CCUUGGCAG	ugugug
TCT8-1,10		AUACCA	acagcauau----uugcugu	CCUUGGAAG	caacgaga
TCT8-4,8		AUACCA	gcaucguc-----uugaugc	CCUUGGCAG	cacuuca
TCT8-7	uugucgaaucgg	AUACCA	gcau-----gcagc	CCUUGGAAG	cag
TR8-14		AUACCA	acggcauau----uugcugu	CCUUGGAAG	caacuaua
TR8-8	cucucgaa	AUACCA	acuacucucaca---auagu	CCUUGGAAG	
TR8-5	uucaugucgcuug	AUACCA	ucaaca-----auga	CCUUGGAAG	ca

## CLASS II

		region 2 *		region 1	
TCT8-3	5' ugacucgaa	CCUUGGAAG	accugagu-----acaggu	AUACCAg	3'
TCT8-11		CCUUGGAAG	ccg-----uacgg	AUACCA	uuugaguggccaauaug
TR8-28	uaucgagugg	CCUUGGCAG	accaggc-----ccggu	AUACCA	cca
TR8-29	cgagauca	CCUUGGAAG	ucau-----cguga	AUACCA	uuguu
TR8-9	ucagaa	CCUUGGAAG	cacugaauaagaucaguug	AUACCA	

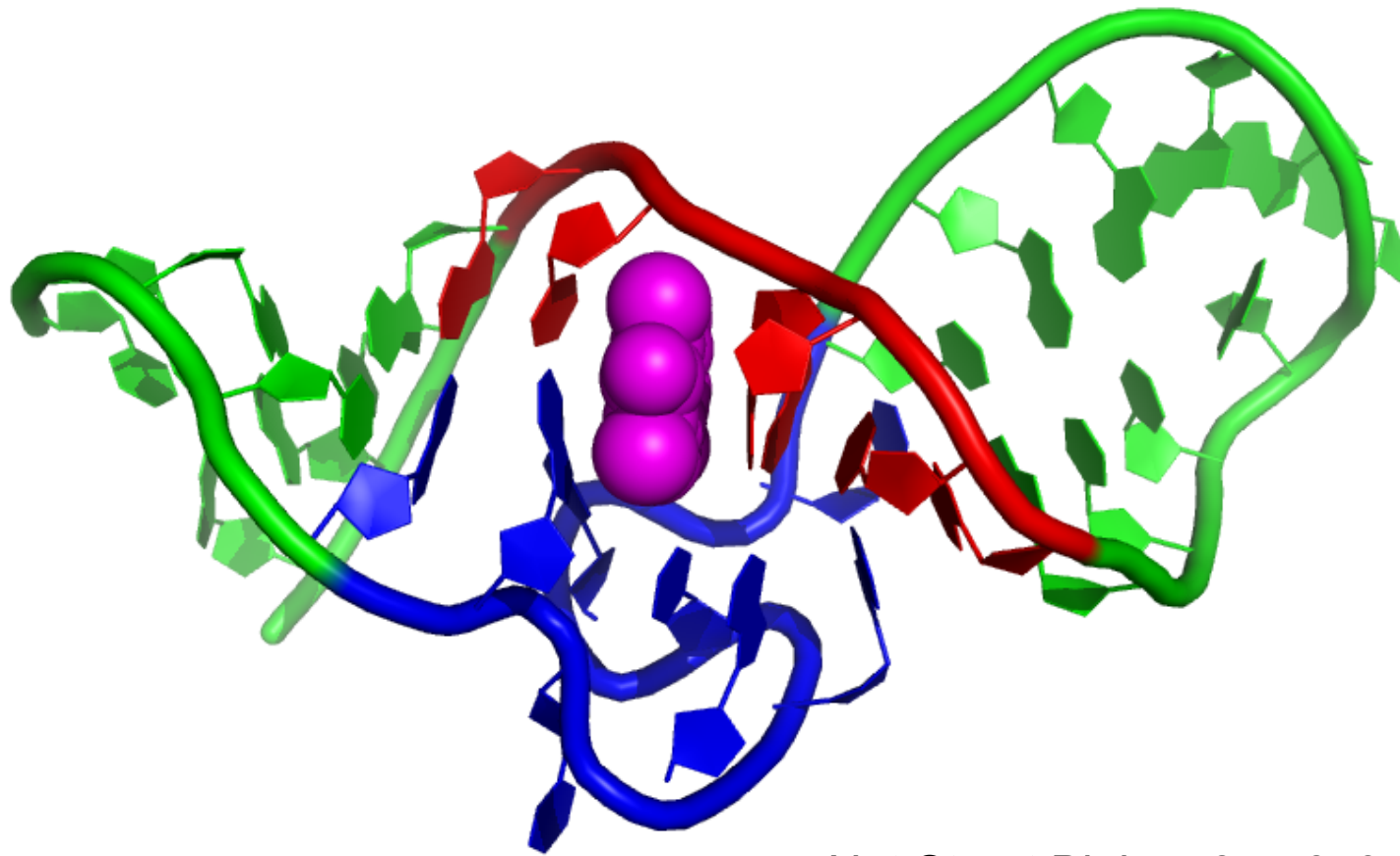
Properties of a Theophylline-Binding RNA Aptamer  
 (Jenison et al. (1994) *Science* **263**, 1425)

**Theophylline**

	$K_d$ ( $\mu\text{M}$ )		$K_d$ ( $\mu\text{M}$ )		$K_d$ ( $\mu\text{M}$ )
	0.32		2.0		49.0
	9.0		>500		>1000
	8.5		>500		3500

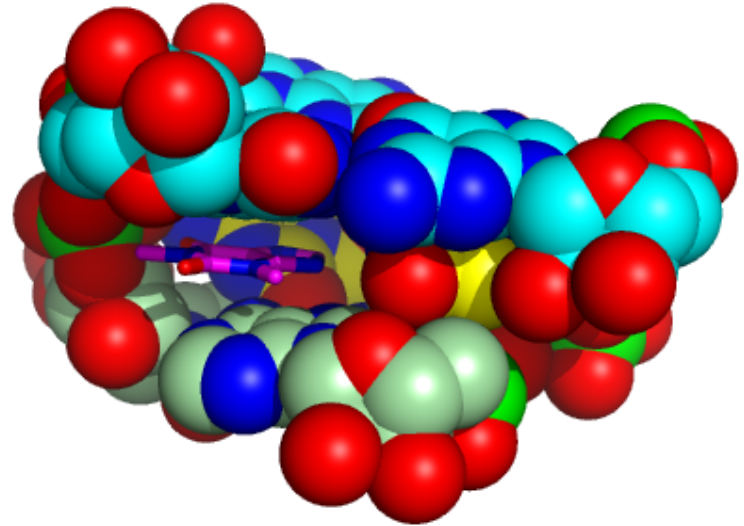
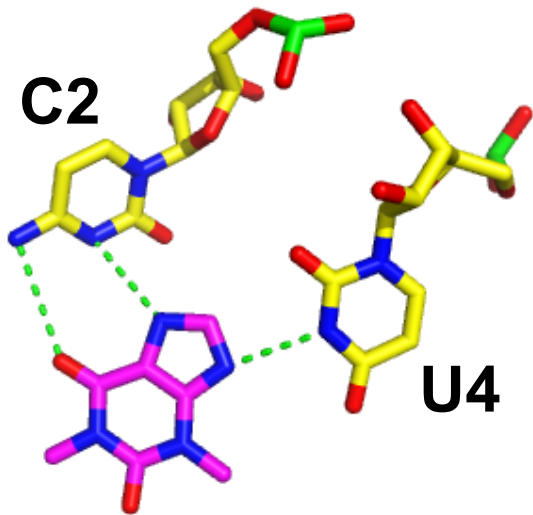
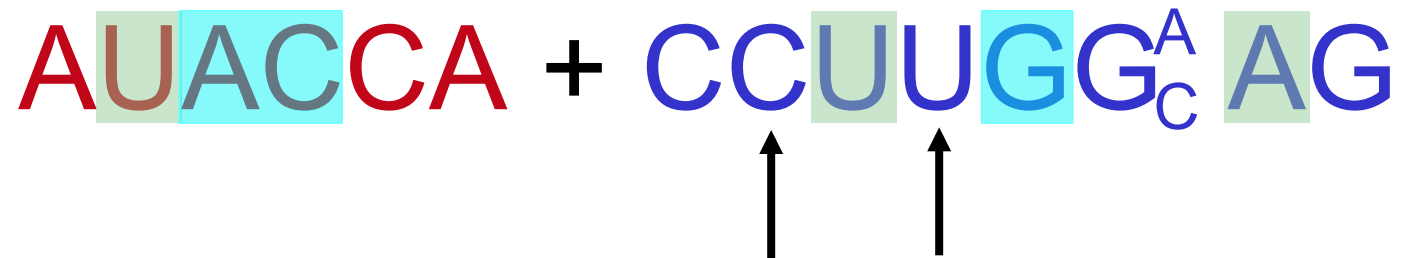
**Caffeine**

Conserved RNA Sequence:  
**AUACCA** + **CCUUGG<sup>A</sup><sub>C</sub>AG**



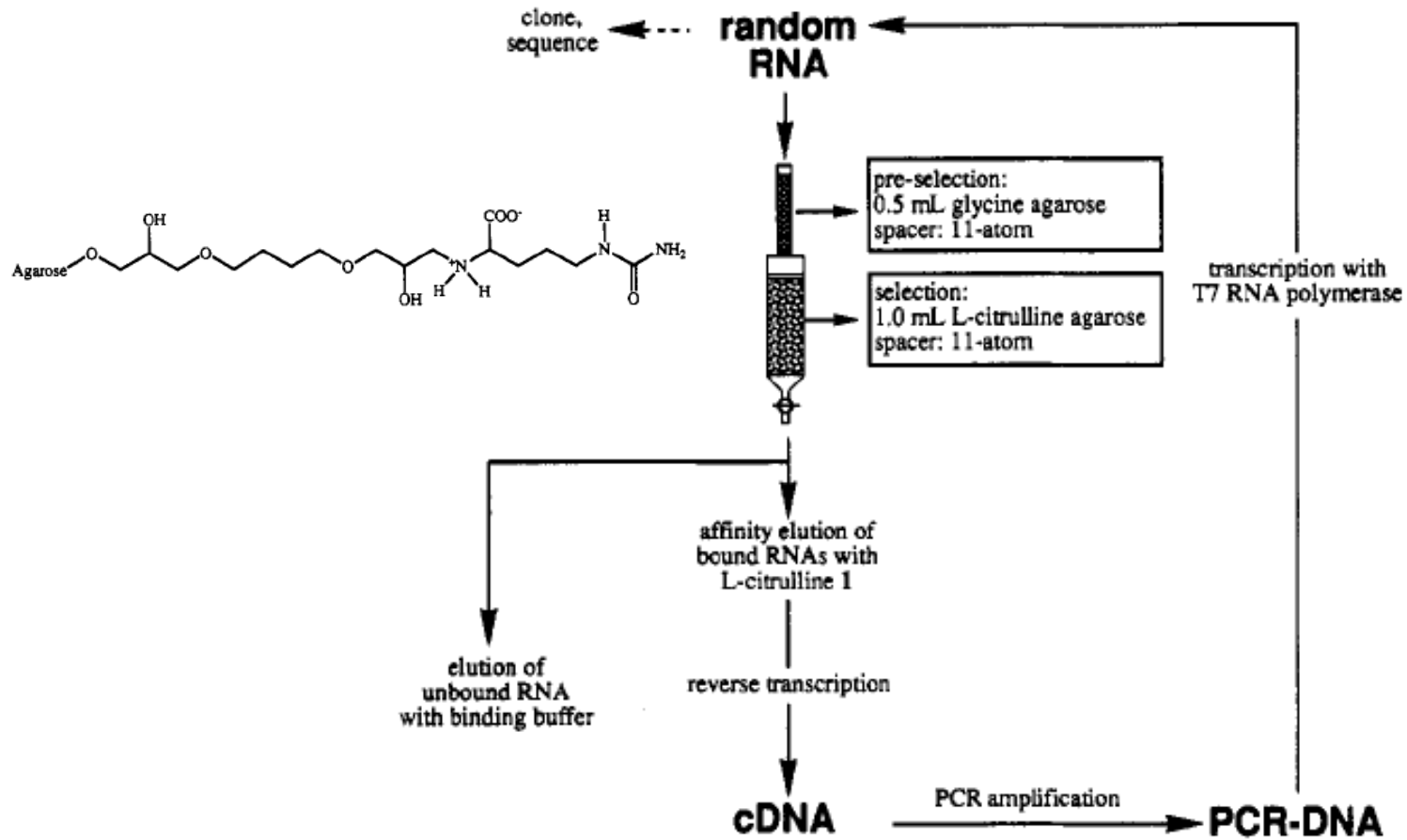
Nat.Struct.Biol. 4: 644-649 (1997)

# Conserved RNA Sequence:



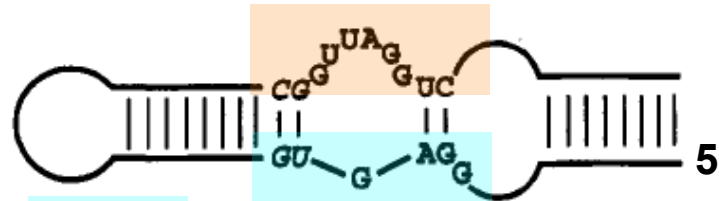
# SELEX and a Citrulline Aptamer

**Scheme 2.** Schematic for the In Vitro Selection Cycle<sup>a</sup>



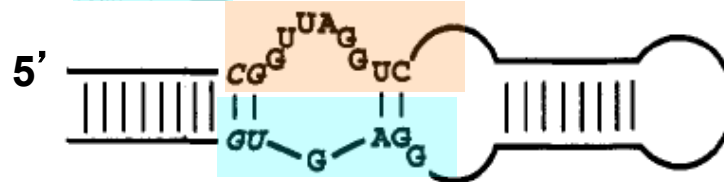


# From a $10^{15}$ RNA Library



Clone

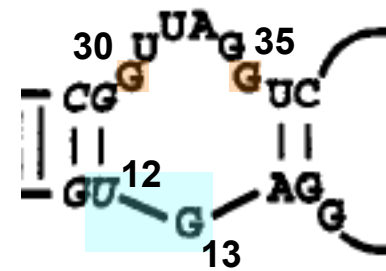
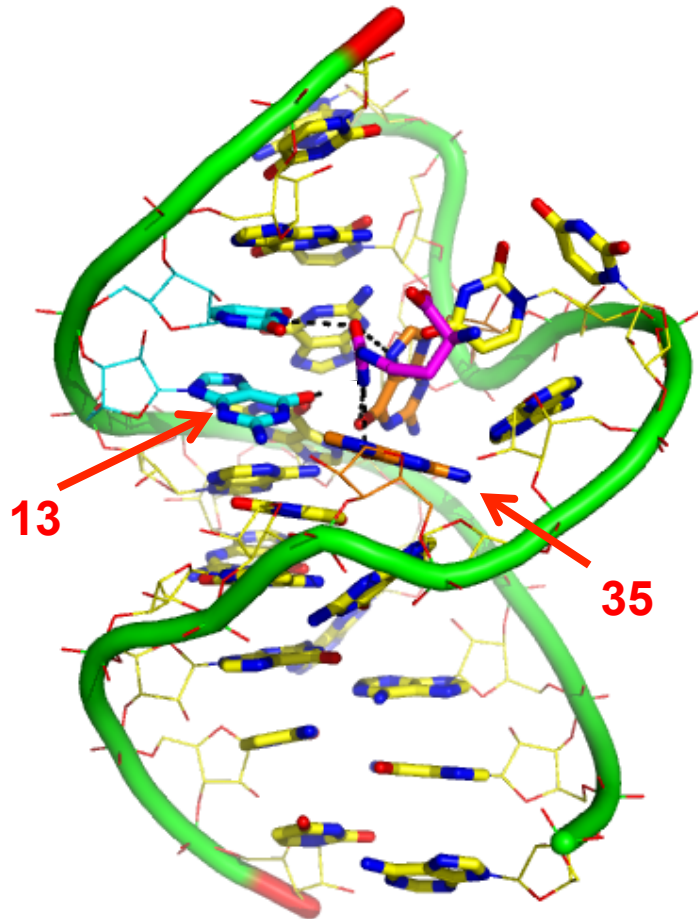
02	N <sub>17</sub> -GAGUCA	<b>GGAGUG</b>	UCCAUAAGGU-N <sub>03</sub> -AUCUUAUGGGU	<b>CGGUUAGGUC</b>	AGCUC-N <sub>04</sub>
03	N <sub>02</sub> -AUUGUCGAA	<b>GGAGUG</b>	CUCUAG-----N <sub>27</sub> -----UUAGAG	<b>CGGUUAGGUC</b>	GCGACGAU
04	N <sub>05</sub> -CCGUACG	<b>GGAGUG</b>	GAGCGUCCGUG-N <sub>19</sub> -UGUGGGCGCCU	<b>CGGUUAGGUC</b>	AAUACaa
05	cugccg	<b>GGAGUG</b>	GGAUG-----N <sub>03</sub> -----UAUCU	<b>CGGUUAGGUC</b>	AGCAG-N <sub>40</sub>
07	N <sub>20</sub> -GAGUGGACGCA	<b>GGAGUG</b>	CUU-----N <sub>03</sub> -----AAG	<b>CGGUUAGGUC</b>	ACGUCACACUC-N <sub>07</sub>
08	ccuucacugCAA	<b>GGAGUG</b>	AUGUAAG-----N <sub>33</sub> -----CUUAUGU	<b>CGGUUAGGUC</b>	GCCGGUGGaa
10	N <sub>12</sub> -GAGACGGGAA	<b>GGAGUG</b>	CAGU-----N <sub>09</sub> -----GUUG	<b>CGGUUAGGUC</b>	GCUCGUCUC-N <sub>10</sub>
11	N <sub>04</sub> -GGUUUACCGAGAA	<b>GGAGUG</b>	CUGGU-----N <sub>03</sub> -----ACUAG	<b>CGGUUAGGUC</b>	ACUCAUAAACCU-N <sub>15</sub>
12	ugcAUCG	<b>GGAGUG</b>	GCC-----N <sub>04</sub> -----GGU	<b>CGGUUAGGUC</b>	AAGUGCA-N <sub>37</sub>
13	acugcGUU	<b>GGAGUG</b>	GCAA-----N <sub>10</sub> -----UUGU	<b>CGGUUAGGUC</b>	GCGCAGU-N <sub>27</sub>
22	N <sub>07</sub> -UUUUUAACG	<b>GGAGUG</b>	AUGU-----N <sub>04</sub> -----ACAUU	<b>CGGUUAGGUC</b>	AAUUAAGGG-N <sub>16</sub>



15	N <sub>08</sub> -UAG	<b>CGGUUAGGUC</b>	GCUG-----N <sub>05</sub> -----CGGAA	<b>GGAGUG</b>	CUA-N <sub>29</sub>
16	N <sub>07</sub> -AC	<b>CGGUUAGGUC</b>	GCUGGAC--N <sub>14</sub> --GUCCGGAA	<b>GGAGUG</b>	GU-N <sub>18</sub>
17	acugc	<b>CGGUUAGGUC</b>	GCCC-----N <sub>23</sub> -----GGGAA	<b>GGAGUG</b>	GCAGU-N <sub>21</sub>
19	N <sub>07</sub> -UGGACUUU	<b>CGGUUAGGUC</b>	GGAACC---N <sub>18</sub> ---GGUICAG	<b>GGAGUG</b>	GGAGUUCA-N <sub>04</sub>
14	ucacug	<b>CGGUUAGGUC</b>	GGACU-----N <sub>04</sub> -----AGUCA	<b>GGAGUG</b>	CAGUGA-N <sub>35</sub>
20	N <sub>32</sub> -CCGU	<b>CGGUUAGGUC</b>	GGUCU-----N <sub>04</sub> -----AGAAUA	<b>GGAGUG</b>	GCgg
21	N <sub>37</sub> -CCGU	<b>CGGUUAGGUC</b>	GGCUGU---N <sub>05</sub> -----AUA	<b>GGAGUG</b>	GCgg
23	N <sub>03</sub> -GCC	<b>CGGUUAGGUC</b>	GGGCG---N <sub>05</sub> -----CGCAA	<b>GGAGUG</b>	GGU-N <sub>34</sub>



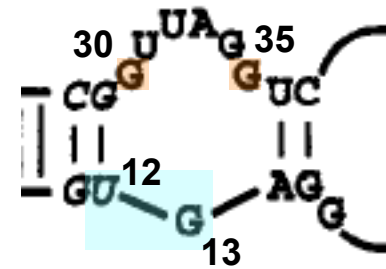
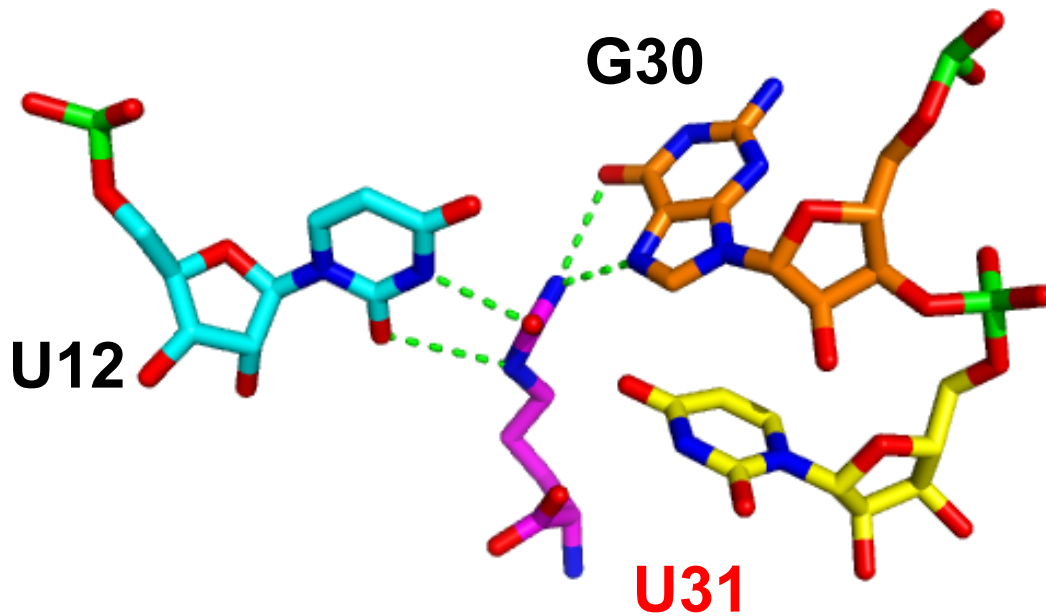
# Citrulline binding



**Structural Basis of Ligand Discrimination by Two Related RNA Aptamers Resolved by NMR Spectroscopy**

Yinshan Yang, Michel Kochoyan,\* Petra Burgstaller, Eric Westhof, Michael Famulok

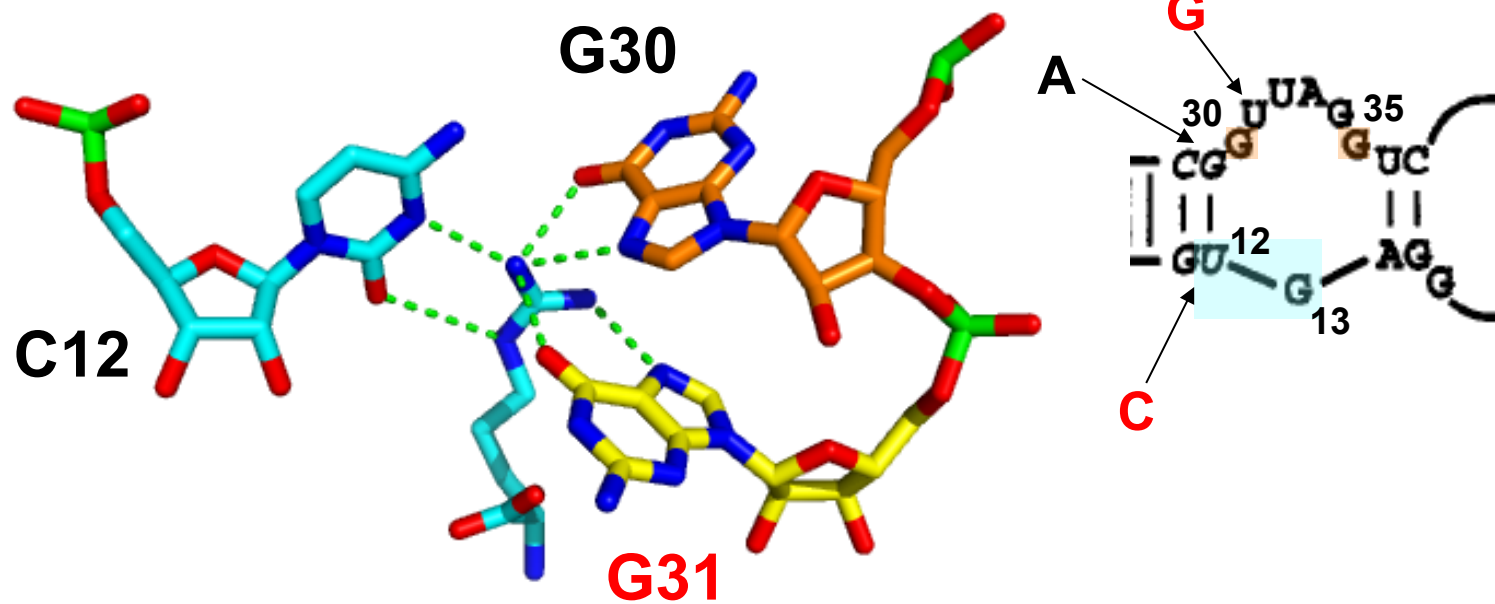
# Citrulline binding



**Structural Basis of Ligand Discrimination by Two Related RNA Aptamers Resolved by NMR Spectroscopy**

Yinshan Yang, Michel Kochoyan,\* Petra Burgstaller, Eric Westhof, Michael Famulok

# Arginine binding



**Structural Basis of Ligand Discrimination by Two Related RNA Aptamers Resolved by NMR Spectroscopy**

Yinshan Yang, Michel Kochoyan,\* Petra Burgstaller,  
Eric Westhof, Michael Famulok