Supporting Information

Stabilizing Structure-Switching Signalling RNA Aptamers by Entrapment in Sol-Gel Derived Materials for Solid-Phase Assays

Carmen Carrasquilla[1], Pui Sai Lau[2], Yingfu Li[1,2] and John D. Brennan[1]*

[1]Department of Chemistry and Chemical Biology, McMaster University, Hamilton, Ontario, Canada, L8S 4M1

[2]Department of Biochemistry and Biomedical Sciences, McMaster University, Hamilton, Ontario, Canada, L8N 3Z5

* Author to whom correspondence should be addressed.

Tel: +1-905-525-9140 ext 27033

Fax: +1-905-527-9950

E-mail: brennanj@mcmaster.ca

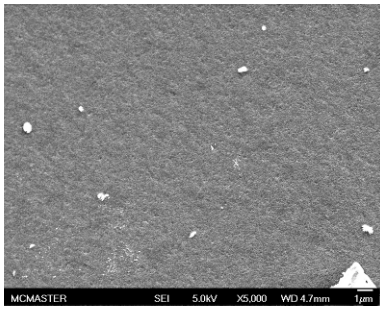
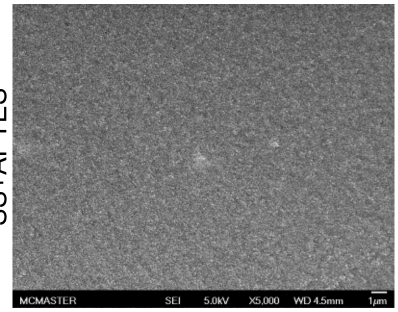
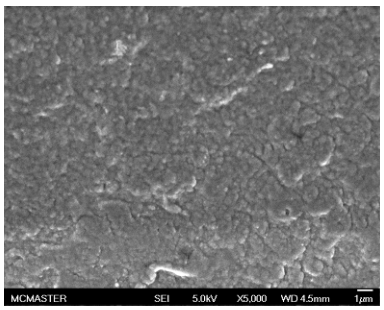
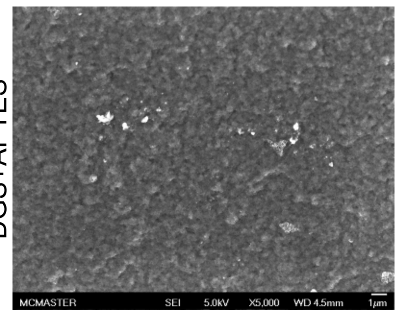
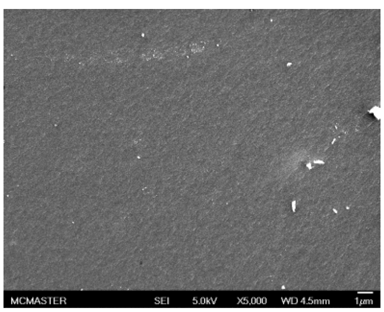
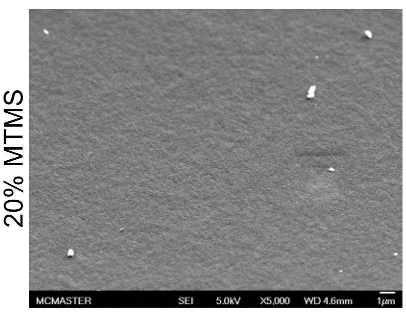
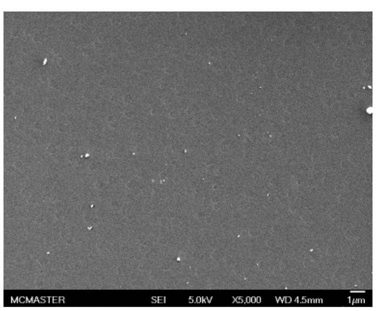
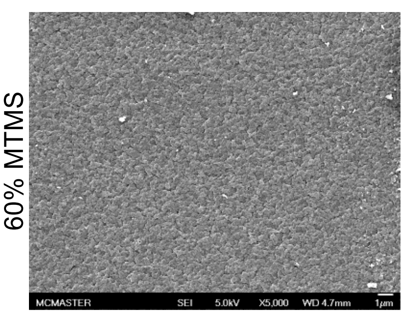
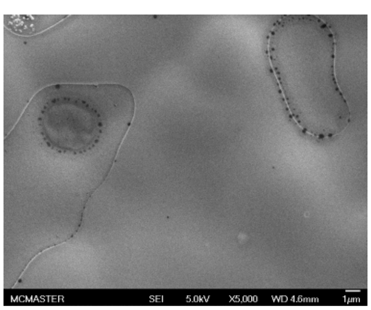
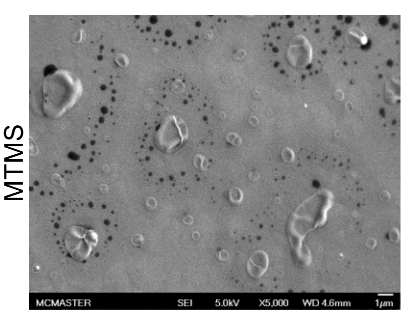
Internet: http://www.chemistry.mcmaster.ca/faculty/brennan

Supporting Information

Table S1. Contact angle (θ) and morphology of the sol-gel derived materials used for entrapment of RNA aptamer reporters.

Sample	Mean θ, °	BET surface area, $m^2 g^{-1}$	Median pore diameter, nm	Total intruded volume, $cm^3 g^{-1}$	Bulk particle density, $g cm^{-3}$	Porosity, %
Glass	25.51 ± 0.03	N/A	N/A	N/A	N/A	N/A
SS	16.3 ± 0.2	209.79	23.6	0.525	0.9755	51.22
SS+APTES	22 ± 1	206.97	8.1	0.229	1.2693	36.54
DGS	23.7 ± 0.2	508.20	16.0	0.245	1.4340	28.30
DGS+APTES	25 ± 2	506.85	6.5	0.185	1.4608	26.96
TMOS	28.7 ± 0.2	540.31	19.8	0.332	1.3826	30.87
20% MTMS	35.9 ± 0.1	600.03	7.7	0.185	1.1965	40.18
40% MTMS	49 ± 5	601.13	18.3	0.403	1.0839	45.80
60% MTMS	91 ± 1	499.46	15.0	0.320	1.0214	48.92
80% MTMS	105 ± 9	39.87	96.8	0.284	1.2749	36.26
MTMS	120 ± 13	36.95	172.8	0.407	1.3395	54.55

Table S2. Scanning electron microscopy (SEM) images of the various sol-gel derived materials used for RNA aptamer entrapment, 5000 x (bar = 1 µm).

SS		SS+APTES	
DGS		DGS+APTES	
TMOS		20% MTMS	
40% MTMS		60% MTMS	
80% MTMS		MTMS	

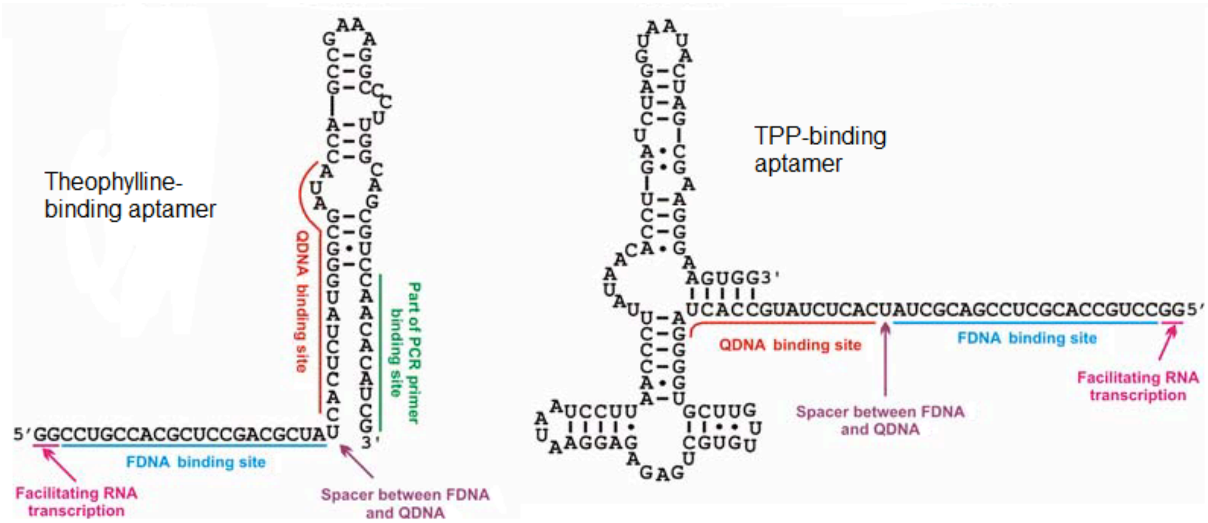


Figure S1. Secondary structure of the theophylline-binding and the TPP-binding RNA aptamer reporters. Sequence modifications for the indicated purposes, including FDNA and QDNA hybridization sites are shown. Adapted from Lau and Li, 2010.[1]

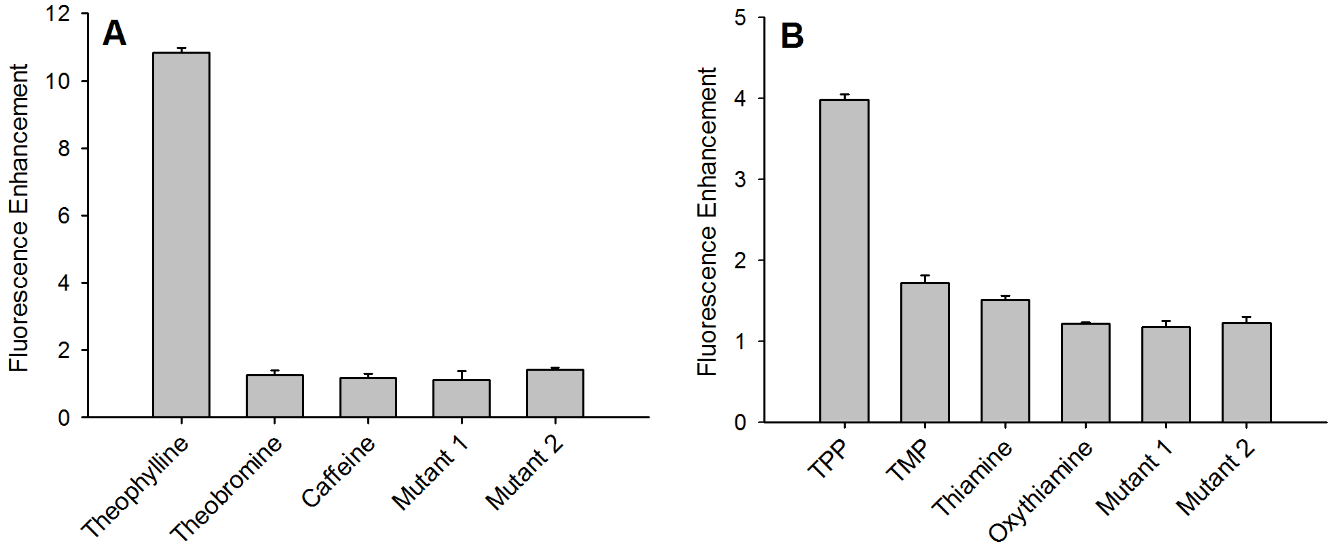


Figure S2. Selectivity of the sol-gel entrapped RNA aptamer reporters. Final signal enhancements of the (A) theophylline-binding aptamer and (B) TPP-binding aptamer to structurally similar molecules or using mutant aptamer constructs with the appropriate target.

Table S3. Fluorescence intensity values in relative fluorescence units (RFU) of RNA aptamer reporters used in storage stability studies (1 day versus 1 month).

		Before Target	After Target	Before Target	After Target
		1 day (RFU)		1 month (RFU)	
Theophylline-binding aptamer	Solution	820 ± 20	5260 ± 200	1230 ± 40	3010 ± 70
	Entrapped	460 ± 10	4900 ± 180	350 ± 30	2930 ± 50
TPP-binding aptamer	Solution	3410 ± 90	12720 ± 180	5180± 120	7580 ± 220
	Entrapped	2040 ± 60	7620 ± 80	1390 ± 40	3720 ± 80

References

(1) Lau, P. S.; Coombes, B. K.; Li, Y. *Angew. Chem. Int. Ed.* **2010**, *49*, 7938-7942.