Supplementary Information

Figure S1. Schematic of silane linker and aptamer attachment on a ZnO surface. (a) Surface condition and silane oligomer structure, (b) covalent attachment of silane oligomer to ZnO surface, (c) covalent attachment of aptamer to silane linker and complete functionalized structure.

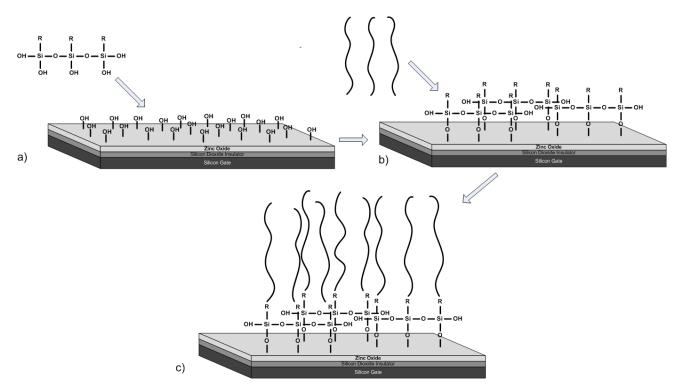


Figure S2. X-ray photoelectron spectroscopy data confirming attachment of silane linkage and aptamers to the ZnO semiconductor. ZnO FET shows on Nitrogen, ZnO FET w/Silane shows an increase in Si 2s and 2p, and AptaFET shows the presence of 0.64% Nitrogen associated with the large amount of Nitrogen present in DNA.

Sample	Si 2s	Si 2p	N 1s	C 1s	O 1s
ZnO FET	17.15%	16.42%	-	7.55%	30.83%
ZnO FET w/Silane	17.44%	17.34%	-	7.81%	31.44%
AptaFET	17.48%	17.10%	0.64%	6.98%	31.33%

Figure S3. Secondary structure of riboflavin aptamer as obtained by mfold³³.

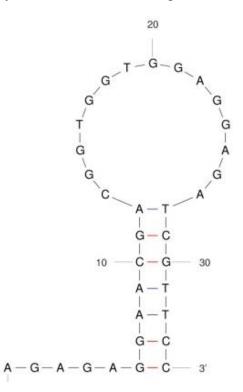


Figure S4. Device reproducibility via I_{SD} vs. V_G for three aptamer functionalized ZnO-FETs.

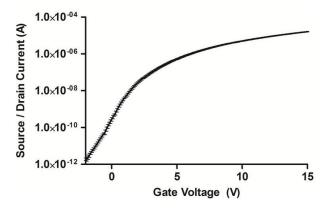


Figure S5. Gate voltage modulation response of ON state AptaFET to 10 μ M riboflavin immediately after exposure (0 min) and after 1 min. Response increases between 6–10 V with a maximum at 8 V.

