High Throughput Evolution of Near Infrared Serotonin Nanosensors

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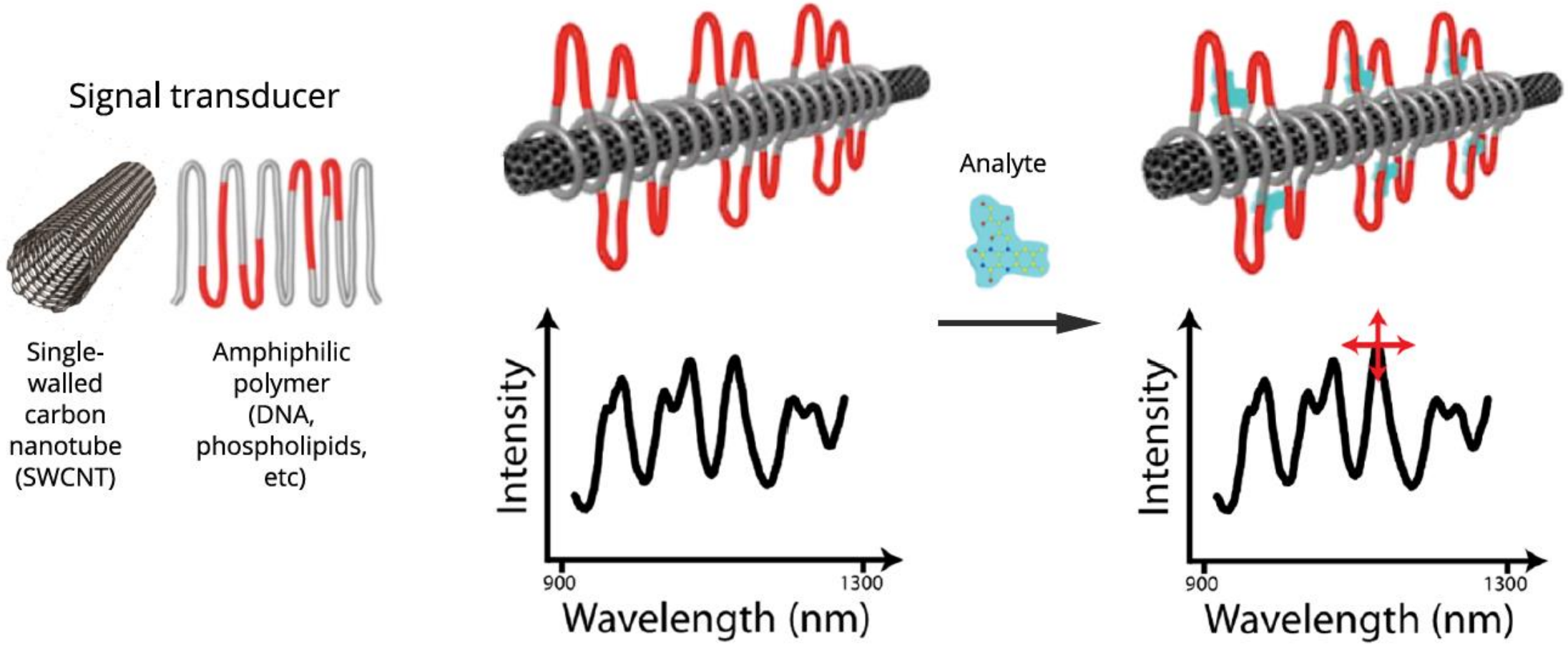
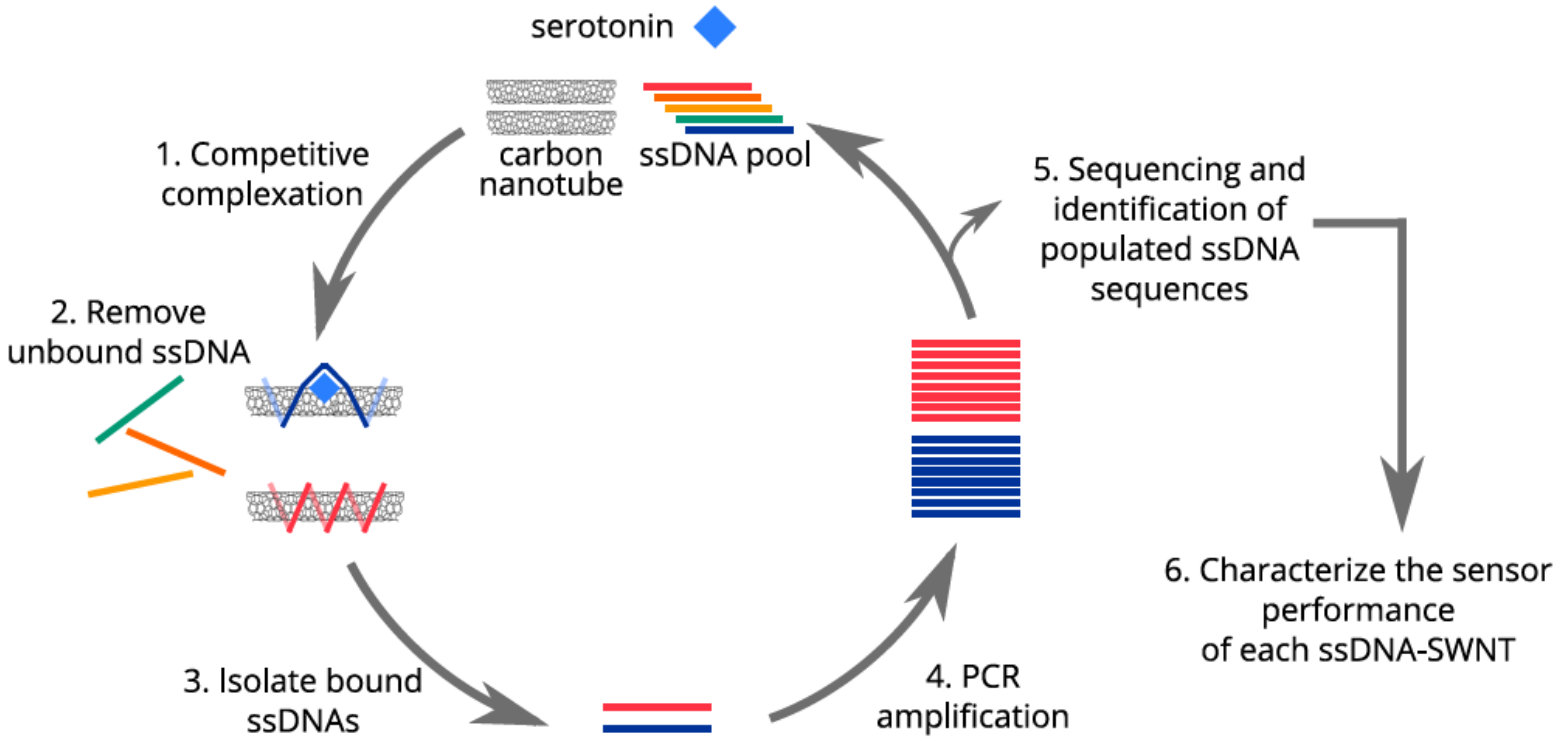
Synthetic molecular recognition



How we can efficiently screen the proper polymer-SWCNT constructs for specific analyte?

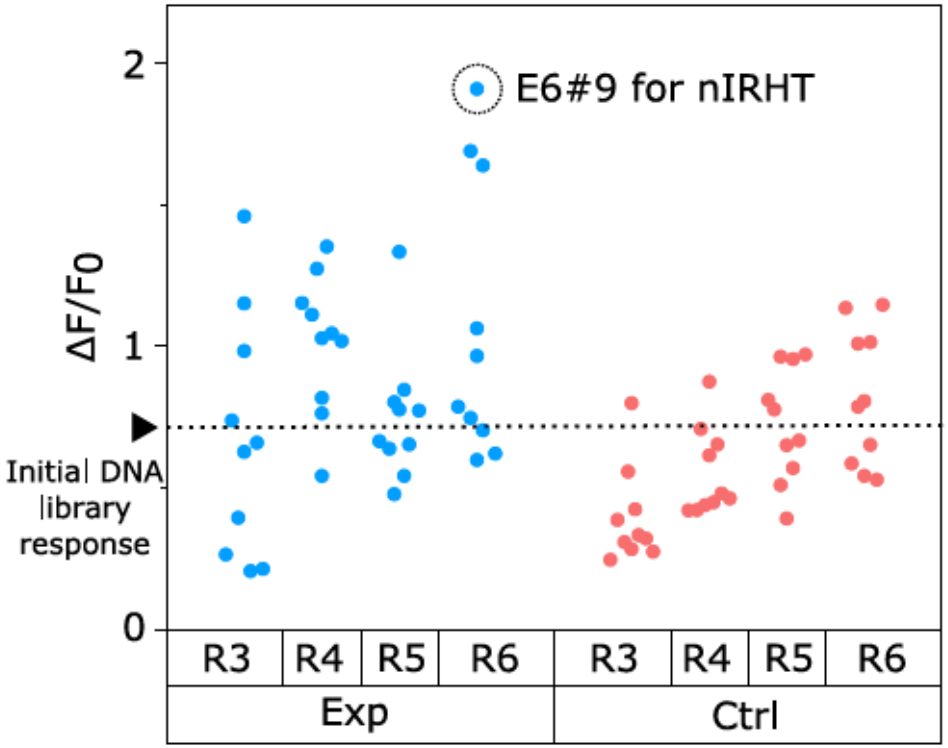
Selective evolution of serotonin-specific ssDNA-SWCNT constructs

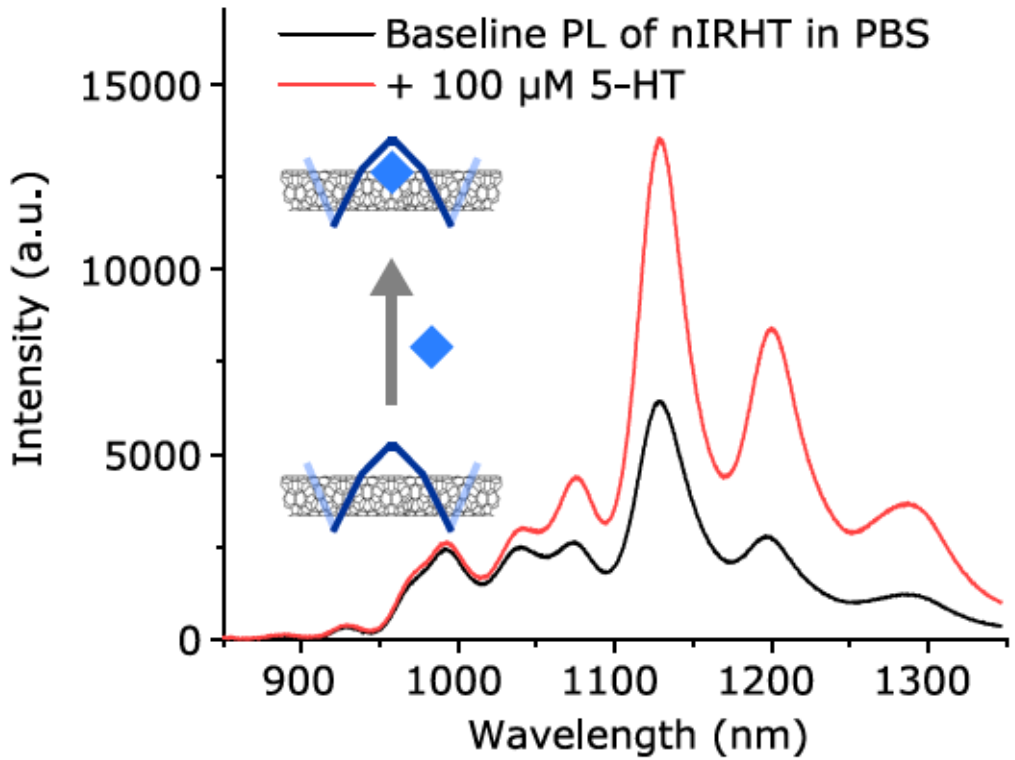
ssDNA library:
5'-AGCGTCGAATACCACTACCCCCC-N18-CCCCCCGACCACGAGCTCCATTAG-3'



Experimental DNA library = serotonin-binding sequences + non-specific sequences
Control DNA library = non-specific sequences

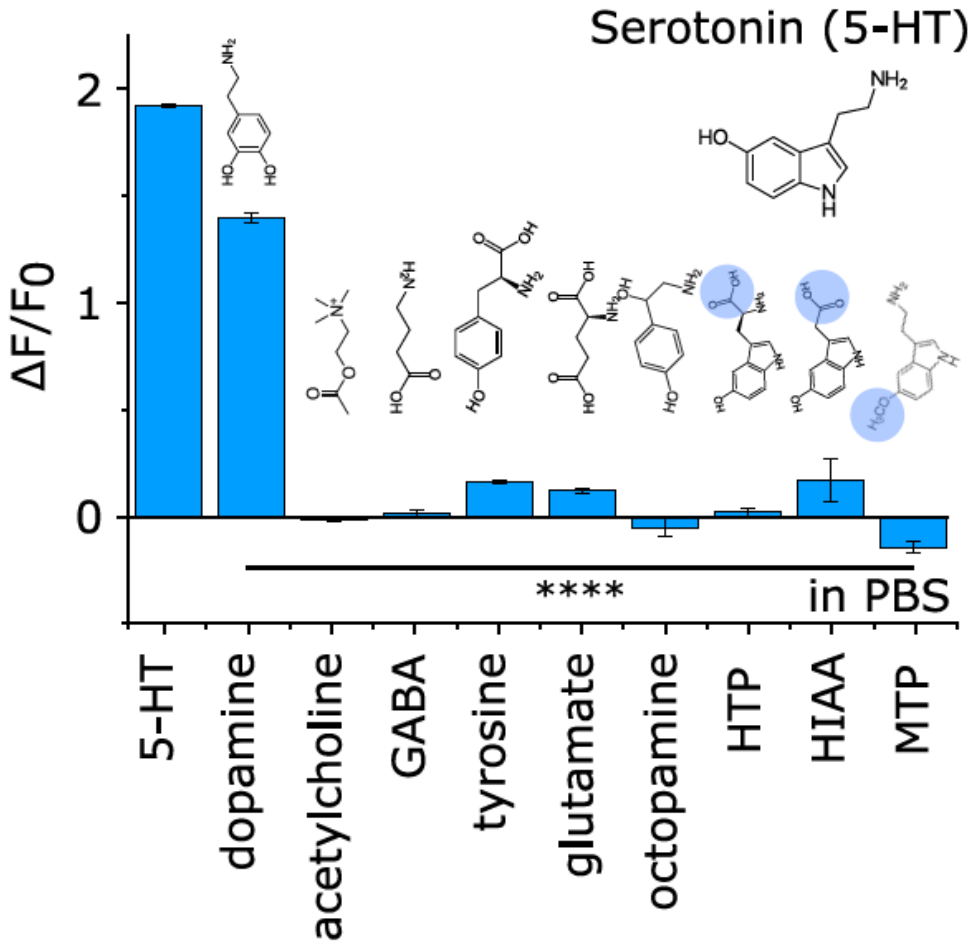
Fluorescence intensity response of sensor candidates upon serotonin (5-HT) addition

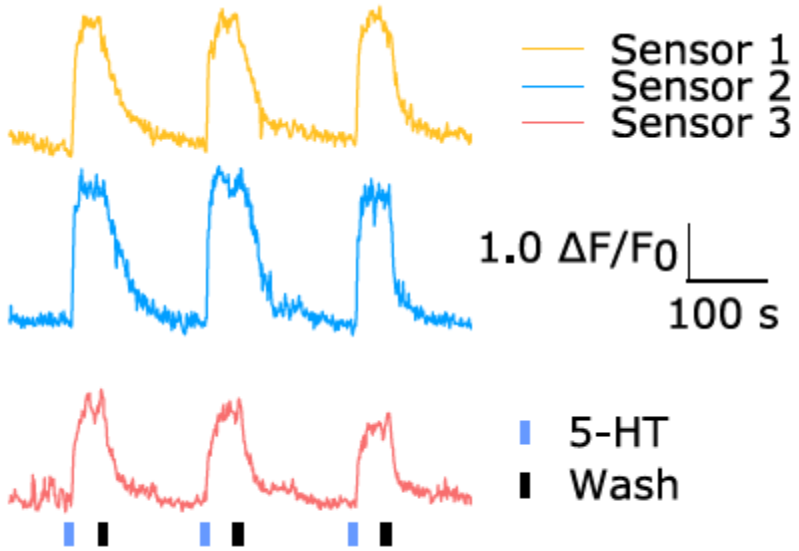




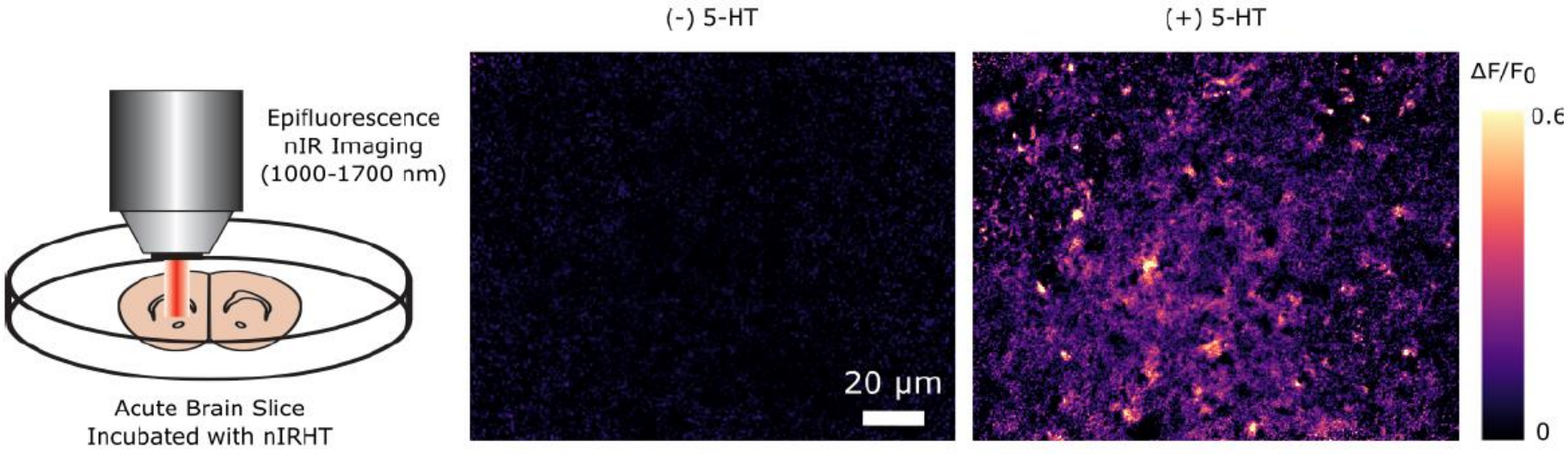
Best nIRHT nanosensor showed ΔF/F = 1.95

Selectivity of nIRHT nanosensors





nIRHT nanosensor showed reversibility and sub-second response (at least)



nIRHT nanosensor stably detects serotonin diffusion in acute brain slice