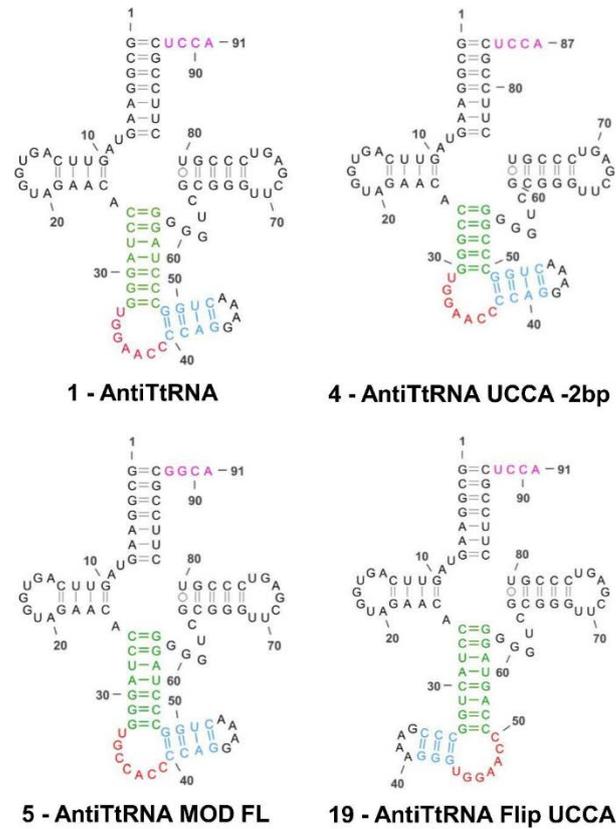
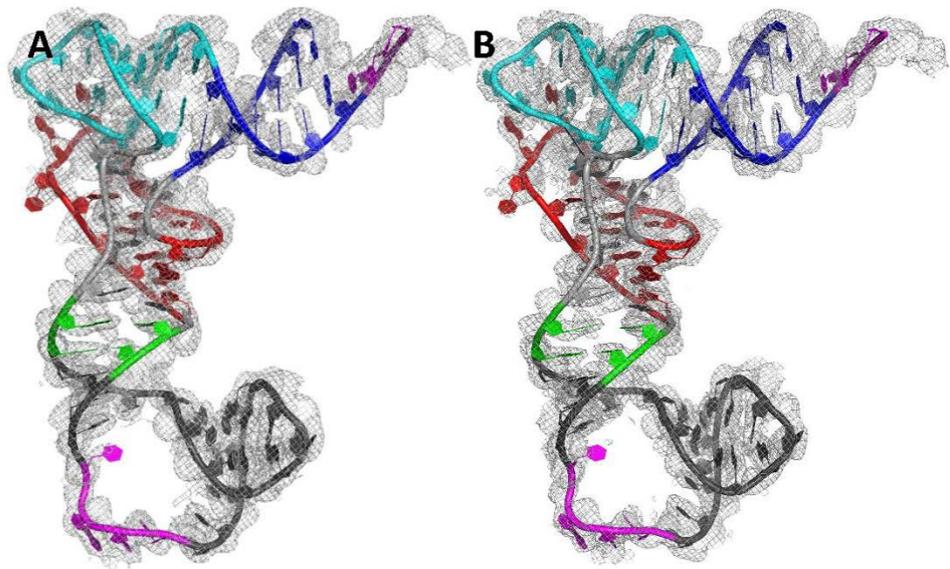


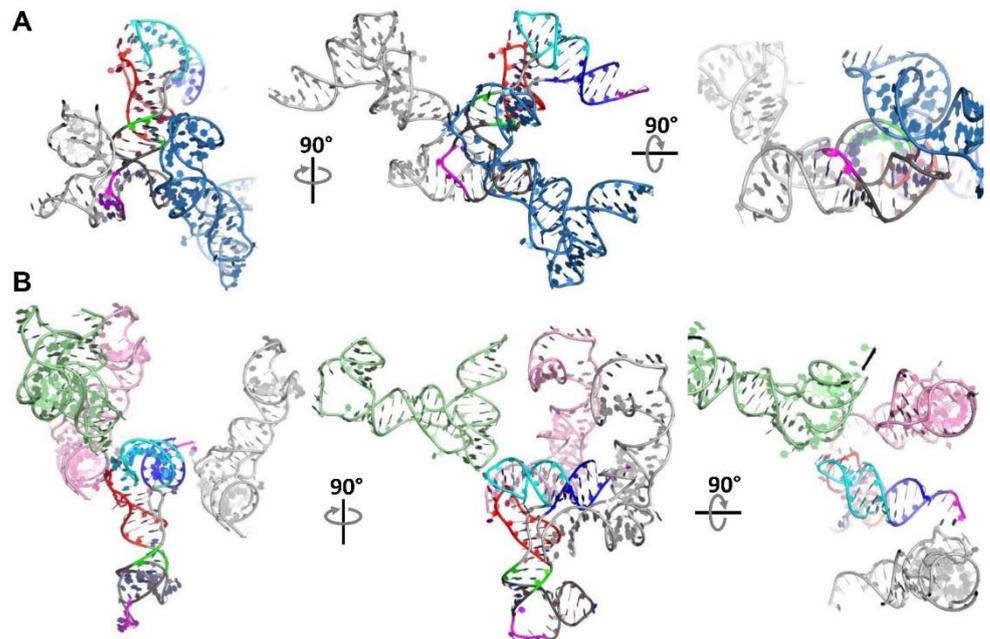
Supplementary Materials



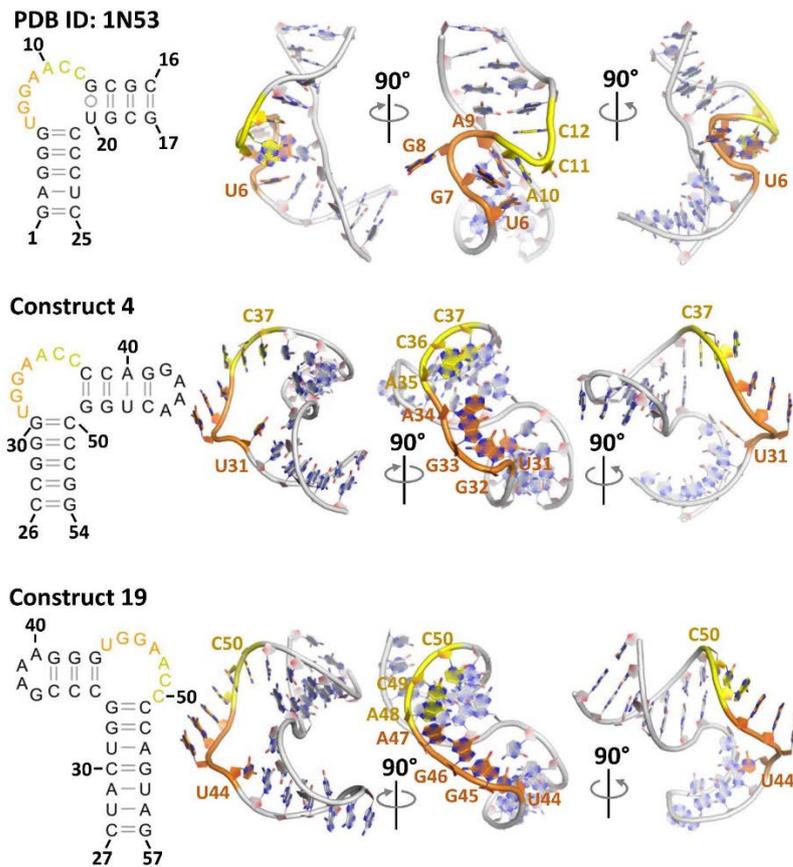
**Figure S1.** Secondary structure models for the starting AntiTtRNA construct and the three crystallized constructs with structures reported in the text. The consistent tRNA scaffold is shown in black font with the antiterminator colored as in Figure 2, the base of the antiterminator/tRNA anticodon stem is green, the bulge is red, the distal antiterminator stem is blue and the tRNA 3' acceptor is magenta.



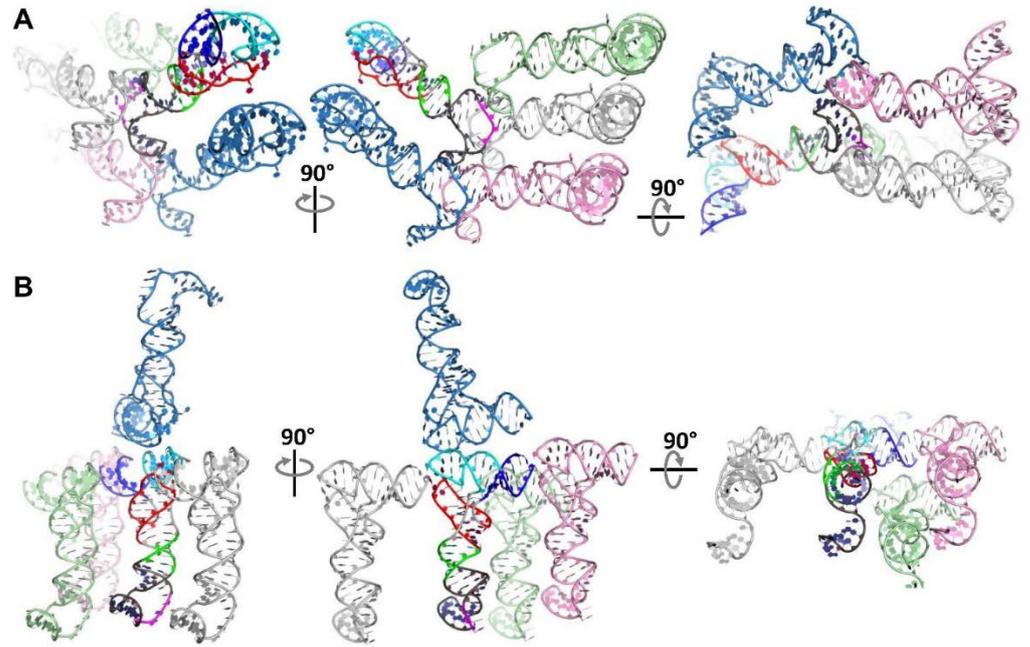
**Figure S2.** Electron density for tRNA-antiterminator Construct #4 structure. (A) Composite omit and (B) simulated annealing composite omit maps contoured at  $1.0 \sigma$ . Maps were generated using the Composite Omit Map tool in Phenix (Terwilliger et al. Acta Crystal. D64, 515-524 (2008)). Electron density is shown as grey mesh and the tRNA-antiterminator fusion is colored using the same scheme as the main text.



**Figure S3.** Crystal packing interactions observed for the structure of Construct #4. All structures are shown as cartoons with the contents of the focused asymmetric unit colored as in Figure 3 and all symmetry-related molecules colored with a different solid color. Packing interactions involving the (A) antiterminator portion of the structure and (B) the tRNA scaffold portion of the structure are shown separately to simplify the figure.



**Figure S4.** Comparison of antiterminator bulge conformations for the previously determined NMR structure (PDB ID:1N53) and Constructs #4 and #19. All structures are shown in secondary structure format with numbering corresponding to their numbering in their full structure. The tRNA 3' acceptor interacting UGGA motif is shown in orange with the conserved ACC shown in yellow. Structures are shown as cartoons in three consistent orientations and colored as in the secondary structure models.



**Figure S5.** Crystal packing interactions observed for the Construct #19 structure. All structures are shown as cartoons with the contents of the focused asymmetric unit colored as in Figure 3 and all symmetry-related molecules colored with a different solid color. Packing interactions involving the (A) antiterminator portion of the structure and (B) the tRNA scaffold portion of the structure are shown separately to simplify the figure.