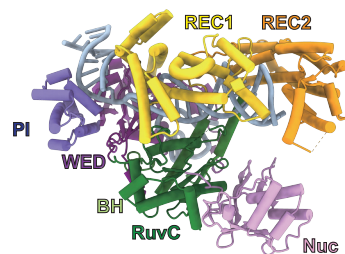
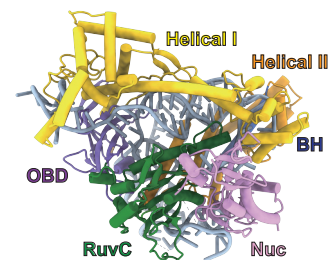


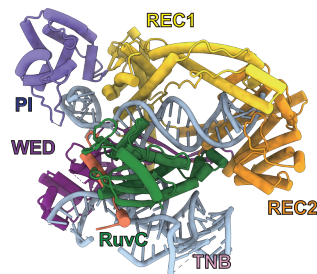
Cas12a (PDB 5XUZ)



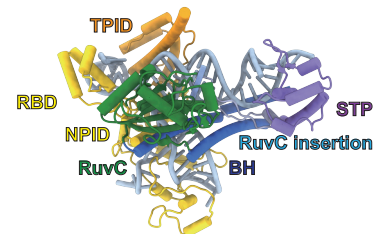
Cas12b (PDB 5U30)



Cas12c2 (PDB 7V94)



CasΦ (PDB 7ODF)



**Fig. S7 Overall structural comparison among representative type V effectors.**

- (a) The overall structural similarity between Cas $\pi$ -1 and reported structures. The 10 structures with top Z-scores of similarities to Cas $\pi$ -1 are listed.
- (b) Structural similarity of protein domains within Cas $\pi$ -1 to all reported structures. The reported structure with the highest Z-score of similarity to each Cas $\pi$ -1 domain was shown.
- (c) The structural similarity between each Cas $\pi$ -1 domain and DpbCasX.
- (d) The structural similarity between each Cas $\pi$ -1 domain and LbCas12a.
- (e) The structures of representative type V effectors. All models were shown from the top view with the same size scale. For Cas $\pi$  and CasX, the domain organization within the primary sequence were shown. The protein domains within each structure are colored and labeled accordingly.