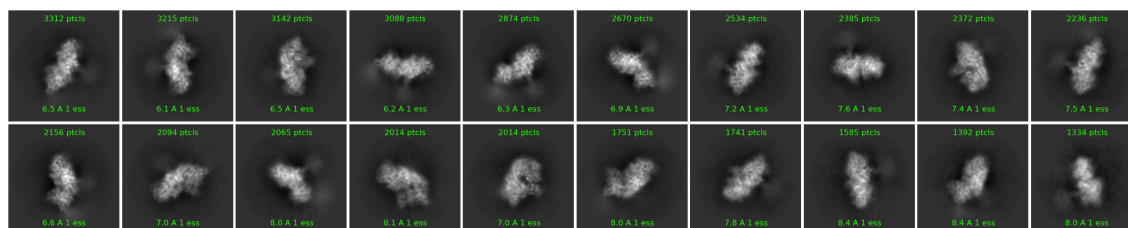# Supplementary Information

A. References cited:

1.   Malik, R. et al. Nat Struct Mol Biol, 2020. **27**(10): p. 913-924.
2.   Malik, R. *et al.* Nat Commun, 2022. **13**(1): p. 1050.
3.   Malik, R. et al. Nature Structural and Molecular Biology (accepted in principle), 2024.
4.   Acharya, N. et al. J Biol Chem, 2023. **299**(1): p. 102727.
5.   Anton, B.P. and R.J. Roberts. Annu Rev Microbiol, 2021. **75**: p. 129-149.
6.   Vandenbussche, I. *et al.* mSphere, 2020. **5**(4).
7.   Koopal, B. et al. Cell, 2022. **185**(9): p. 1471-1486 e19.
8.   Kottur, J., R. Malik, and A.K. Aggarwal. Nature Communication (under review), 2024.
9.   Jain, R. et al. Nat Struct Mol Biol, 2019. **26**(10): p. 955-962.
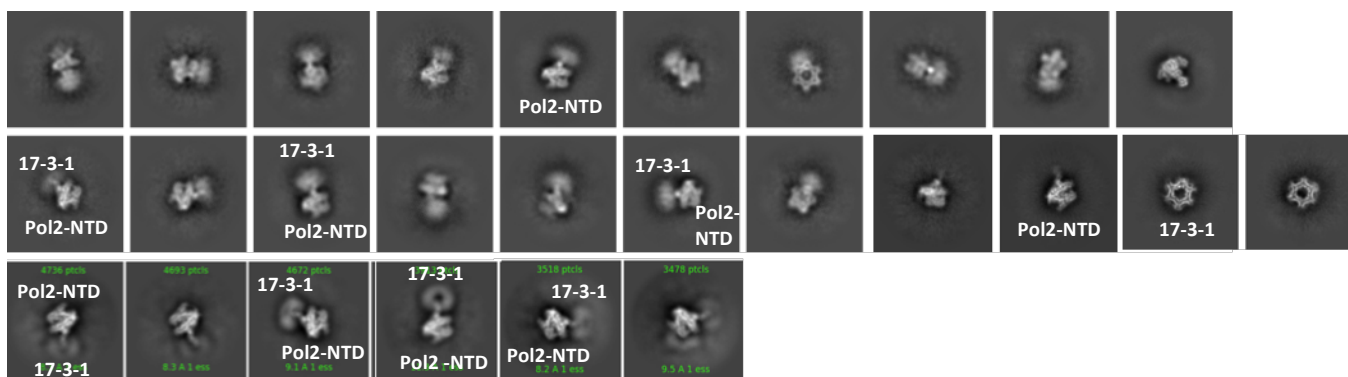10.   Rechkoblit, O et al. Nat Struct Mol Biol, 2024
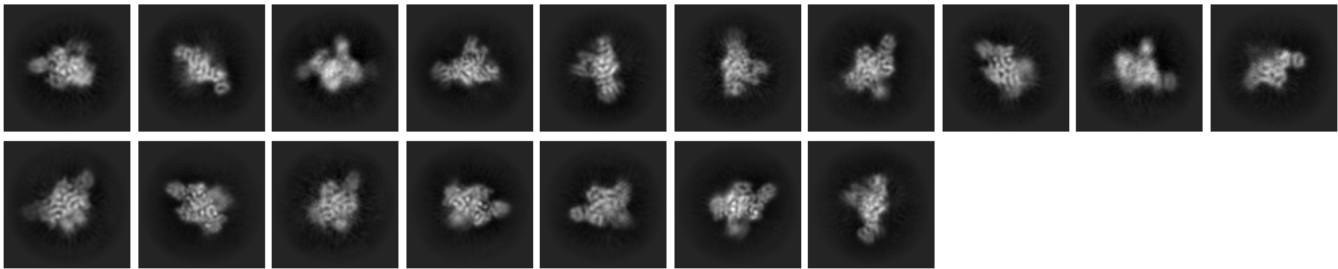
B. Supporting Figures:

Figure 1-

2-D classification of the Rev1-Polζ holocomplex with Thymine glycol DNA lesion. The 2D classes of the sample shows majority of the classes belonging to the Rev1-Polζ holocomplex. Individual components show high resolution features.
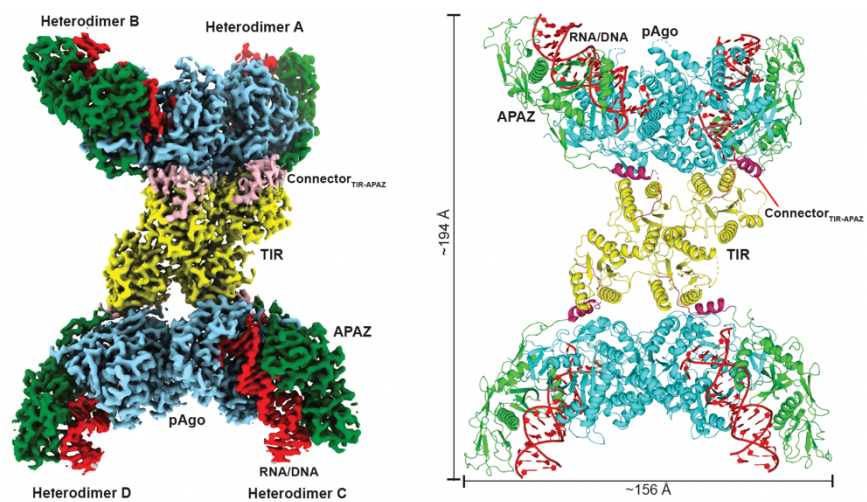
Figure 2-

2-D classification of the Polε-17-3-1-DNA sample. The 2D classes of the sample shows most of the classes belonging to the Pol2 NTD/17-3-1/DNA complex (as exampled in the figure). A fraction of the data also contains individual classes for Pol2 NTD, 17-3-1, and Pol2 CTD/Dpb2. Individual components show high resolution features. The complex of Pol2 NTD/17-3-1/DNA shows some blurring of 17-3-1 due to its motion with respect to Pol2 NTD.

Figure 3-

2-D classification of the MTase complex. The 2D classes of the sample shows that the classes belonging to the MTase dimer. Individual components show high resolution features.

Figure 4-

Architecture of the SPARTA oligomer. (Left) The cryo-EM map shows the domain organization of the "butterfly" shaped SPARTA oligomer with gRNA/tDNA. **(Right)** Structural arrangement of the SPARTA oligomer.