

Supporting Information

Tsay et al. 10.1073/pnas.0904364106

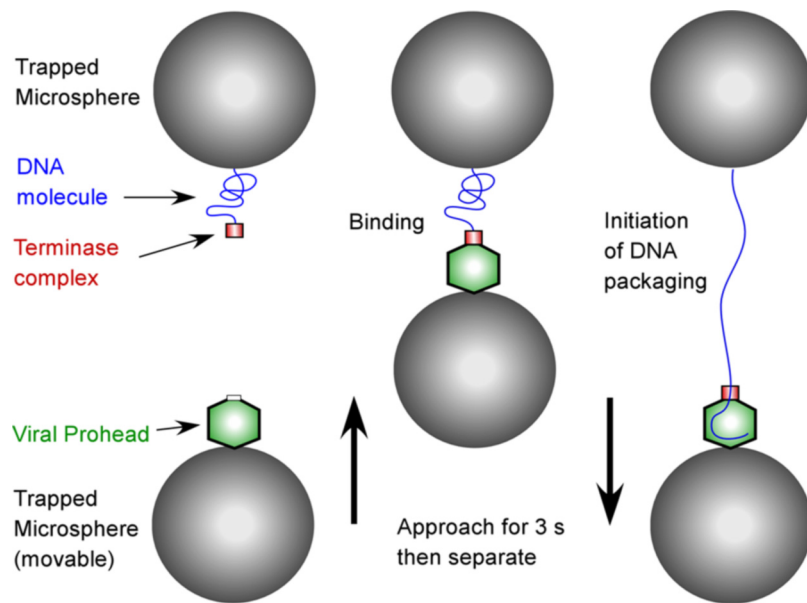


Fig. S1. Cartoon of optical tweezers assay tailored for bacteriophage λ .

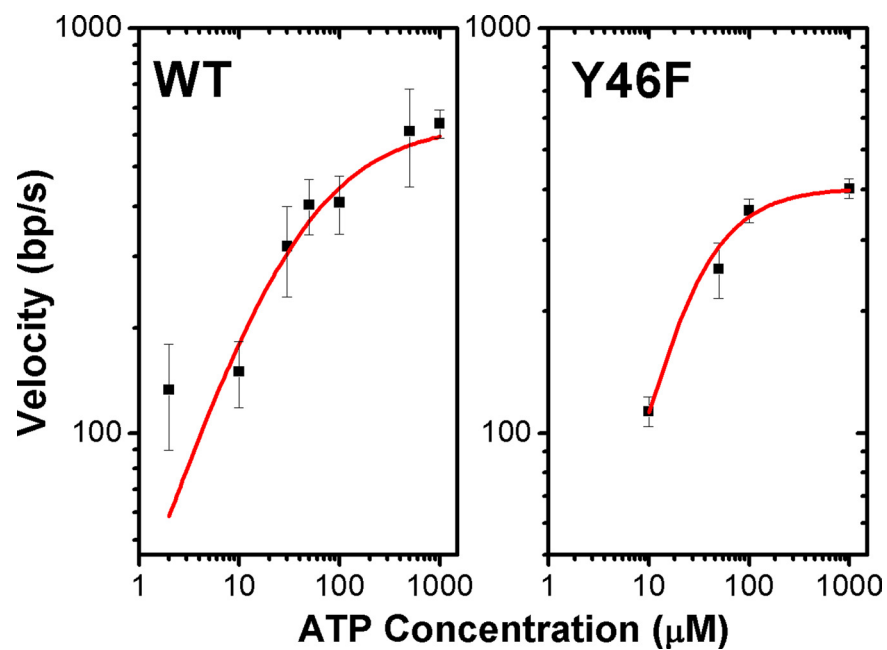


Fig. S2. ATP concentration (μM) vs. velocity of translocation (bp/s) in WT and Y46F. Measurements were taken with an optical tweezers assay using a force feedback ≈ 5 pN as described in the text. In red is the fit to the Hill equation with a constraint on V_{max} described in the text. Errors are SE.

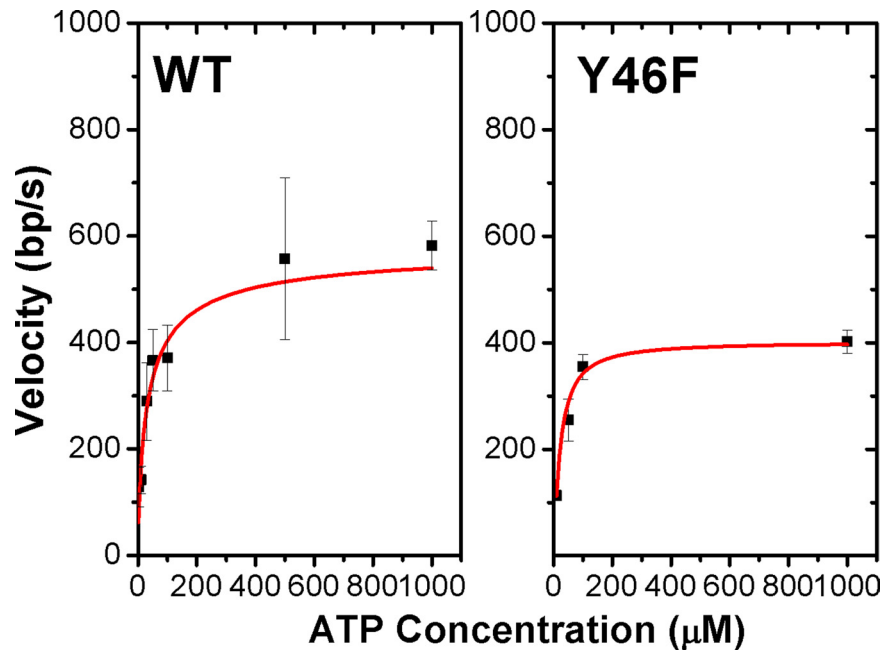


Fig. S3. Linear-linear plot version of Fig. S2: ATP concentration (μM) vs. velocity of translocation (bp/s) in WT and Y46F. In red is the fit to the Hill equation described in the text with a constraint on V_{max} . Discarding the 2- μM data point for the WT ATP concentration vs. velocity plot gives an $n = 0.91 \pm 0.11$ value when fit to the Hill equation.

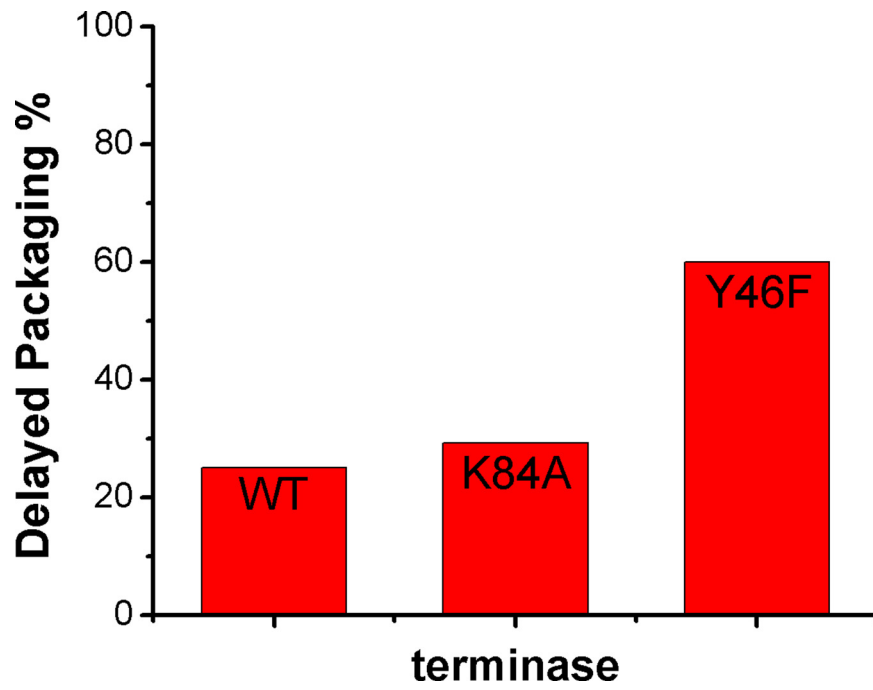


Fig. S4. Percentage of delayed initiation in packaging events ($t_{\text{start}} > 0$ s) in various terminases measured with an optical tweezers assay. Packaging events were initiated with an ≈ 5 -pN force clamp.

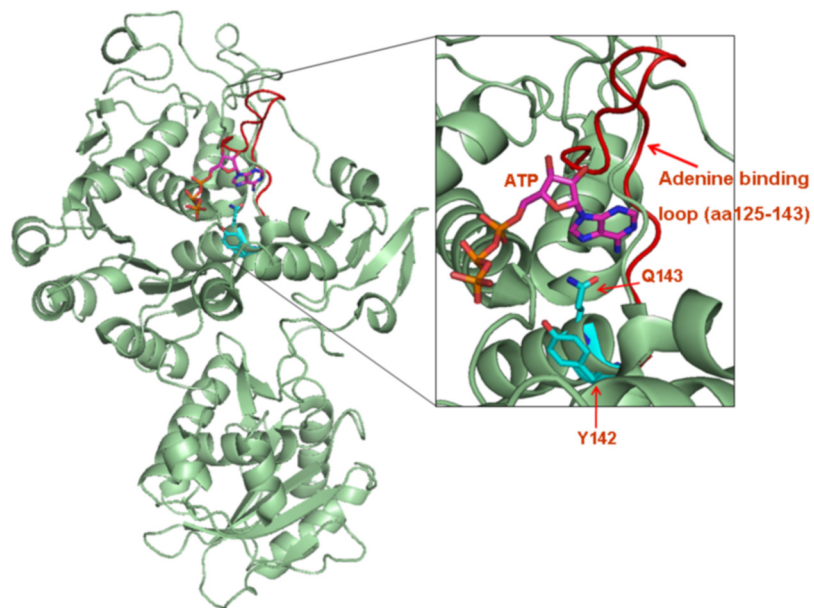


Fig. S5. The crystal structure of T4's gp17 with ATP modeled to be inserted in the catalytic pocket. The adenine-binding or Q motif is zoomed in. The analogous residues to λ gpA's Y46 and Q47 in T4 (Y142, Q143) are shown in cyan (courtesy of K. Kondabagil and V. Rao).

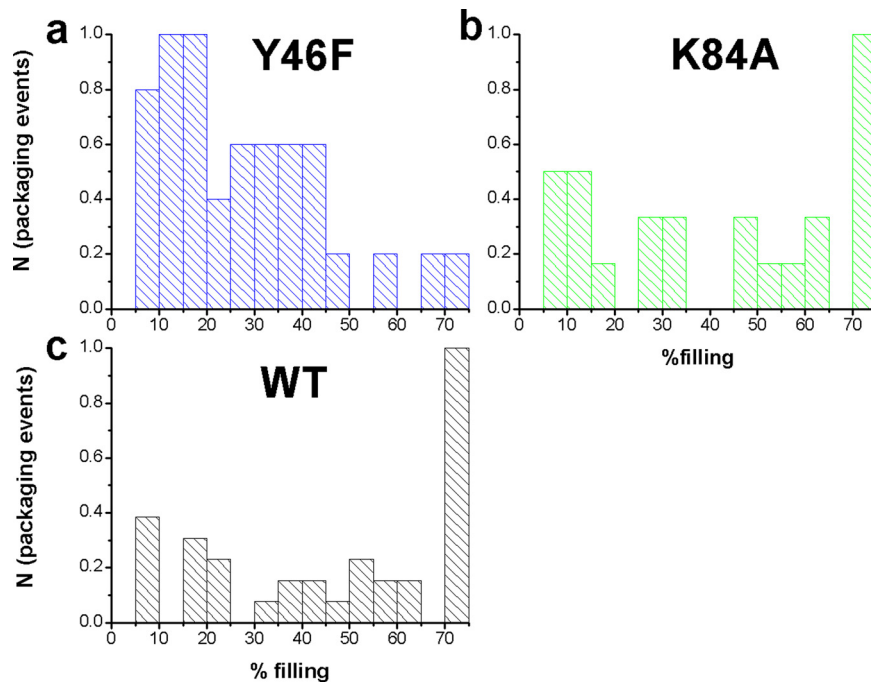


Fig. S6. Histograms of stalling dependence on filling in various terminases: The final lengths (converted to filling percentages) at which the translocating complexes stalled were measured and compiled in bins of 5% filling. Packaging events are normalized to the bin with the largest number of events.

Table S1. Velocities for DNA translocation of the λ packaging motor measured at various ATP concentrations used for Figs. S2 and S3

| ATP concentration, μ M | WT velocity, bp/s | SE | Y46F velocity, bp/s | SE |
|----------------------------|-------------------|------|---------------------|------|
| 2 | 128 | 37 | — | — |
| 10 | 141 | 26 | 113.3 | 9.56 |
| 30 | 289 | 72 | — | — |
| 50 | 366 | 57 | 254.7 | 39.8 |
| 100 | 370 | 61 | 354.6 | 23.7 |
| 500 | 557 | 151 | — | — |
| 1,000 | 582 | 46.2 | 402 | 22 |