Supporting Information
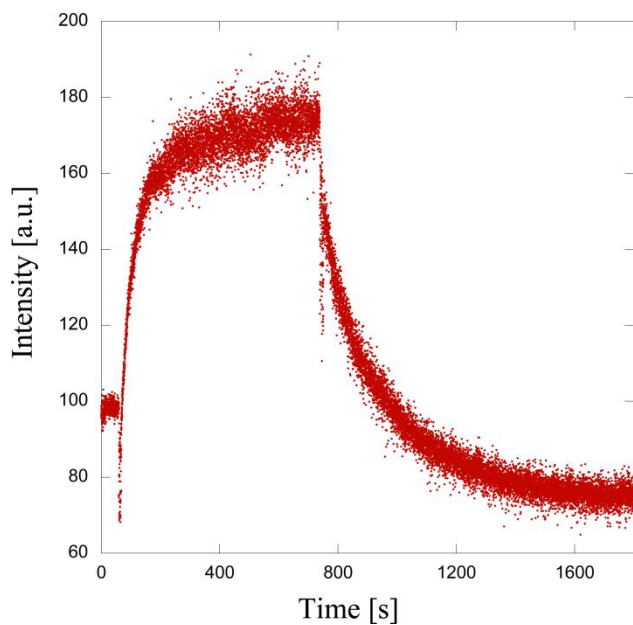
(a)
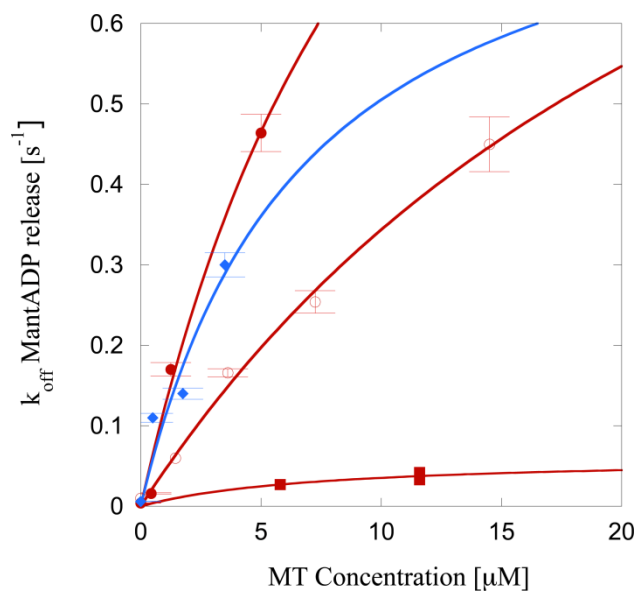
(b)

Supporting Figure S1 Transient state ATPase activity of of Kif15$_{19-375}$ and Kif15$_{1-375}$. **a)** Transient state ATP turnover. Addition of Kif15$_{19-375}$ to a solution of MantATP at t = ~50 s initiates a fluorescence enhancement as the MantATP binds. Addition of chasing Mg^{2+}ATP on the plateau of enhanced fluorescence at t = ~750 s initiates a decay corresponding to the release of MantADP. Exponential fits to the rising and decay phases yield rate constants k_{on} = 0.017 s^{-1} for basal Mg^{2+}ADP release and k_{off} = 0.005 s^{-1} for Mg^{2+}MantADP release. **b)** Stopped flow data for MT activation of Kif15$_{19-375}$ MantADP release in BRB20 (o) and BRB80 for Kif15$_{19-375}$ (•) and Kif15$_{1-375}$ (♦). Data for both Kif15$_{1-375}$ and Kif15$_{19-375}$ are fitted

to rectangular hyperbolae to yield estimates for the maximum rate of MT-activated MantADP release and for $K_{0.5, MT,}$ the apparent Michaelis constant for MT activation. For Kif15$_{19-375}$, the fitted k_{off} for MantADP release is 1.3 s^{-1} in BRB20 and 1.5 s^{-1} in BRB80, with $K_{0.5,MT}$ = 29 µM and 11 µM, respectively. For Kif15$_{1-375}$, the k_{off} is 0.8 s^{-1} in BRB20, with $K_{0.5,MT}$ = 7µM. The control was carried out with unpolymerised tubulin (■) in the presence of Kif15$_{19-375}$.