Papers and Reference Numbers

1. Bustamante, C., Chemla, Y. R., Forde, N. R., & Izhaky, D. (2004). Mechanical processes in biochemistry. *Annual review of biochemistry*, *73*, 705-48.
    1.1. not his data. This is a Review
2. Carter, N. J., & Cross, R. A. (2005). Mechanics of the kinesin step. *Nature*, *435*(May), 308-312.
3. Carter, N. J., & Cross, R. A. (2006). Kinesin's moonwalk. *Current Opinion in Cell Biology*, (Figure 1), 61-67.
4. Cross, R. A. (2004). What kinesin does at roadblocks: the coordination mechanism for molecular walking ´. *Molecular Biology*, *23*(1), 23-32.
    4.1. Note: Binding to microtubule with ADP 10-20M (dissociation constant) for ADP value
    4.2. ATP dissociation from kinesin-microtubule complex 75 M (approximates Michaelis Menten constant) for Phosphate release bound value
5. Fan, D., Zheng, W., Hou, R., Li, F., & Wang, Z. (2008). Modeling Motility of the Kinesin Dimer from Molecular Properties of Individual Monomers †. *Society*, (11), 4733-4742.
    5.1. Note, most of these come from Carter/Cross Kinetic mechanisms of kinesin. In this paper other data is published:
    5.2. Hancock and Howard
    5.3. Ishiwata et al
    5.4. Guydosh and Block
    5.5. Auerback and Johnson
    5.6. Cross
    5.7. Fan, Zheng et al
6. Gilbert, S., Webb, M., Brune, M., & Johnson, K. (1995). Pathway of processive ATP hydrolysis by kinesin. *Nature*, *373*(6516), 671–676.
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9. Hancock, W. O., & Howard, J. (1999). Kinesin's processivity results from mechanical and chemical coordination between the ATP hydrolysis cycles of the two motor domains.
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11. Imafuku, Y., Thomas, N., & Tawada, K. (2009). Hopping and stalling of processive molecular motors. *Journal of Theoretical Biology*, (2002). Elsevier.
12. Kaseda, K., Higuchi, H., & Hirose, K. (2003). Alternate fast and slow stepping of a heterodimeric kinesin molecule. *Group*, *5*(12), 10-15.
13. Liu, M., Todd, B., & Sadus, R. (2005). Cooperativity in the motor activities of the ATP-fueled molecular motors. *BBA-Proteins and Proteomics*, *1752*(2), 111–123. Elsevier.
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15. Rosenfeld, S., Xing, J., Jefferson, G., Cheung, H., & King, P. (2002). Measuring kinesin's first step. *Journal of Biological Chemistry*, *277*(39), 36731–36739. ASBMB.
16. Schnitzer, M.J. et al. Force production by single kinesin motors. *Nature Cell Biology* **2**, (2000).

17. Thorn, Kurt S, Jeffrey A Ubersax, and Ronald D Vale. 2000. "Engineering the Processive Run Length of the Kinesin Motor." *Cell* 151(5): 1093-1100.
18. Shao, Q., & Gao, Y. Q. (2007). Asymmetry in Kinesin Walking †. *Society*, (9), 9098-9106.
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20. Ma, Y., & Taylor, E. W. (1997). Interacting Head Mechanism of Microtubule-Kinesin ATPase*. *Biochemistry*, *272*(2), 724 -730.
21. Gilbert, S. P., Moyer, M. L., & Johnson, K. A. (1998). Alternating Site Mechanism of the Kinesin ATPase †. *System*, *341*(97), 792-799.
22. Farrell, C. M., Mackey, A. T., Klumpp, L. M., & Gilbert, S. P. (2002). The Role of ATP Hydrolysis for Kinesin Processivity*. *Biochemistry*, *277*(19), 17079 -17087

Reference (#)	Stepping Speed	Stepping Speed	Stall Force	Force for Backwards Stepping
Units	nm/sec	steps/sec	pN	pN
Bustamante (1)	840	-	7	-
Carter (2)	-	-	7	7 to 14
Carter (3)	-	-	7.2	-
Cross (4)	-	50-200	-	-
Fan (5)	-	-	7 -8	-
Hyeon (10)	-	-	5 -7	-
Kaseda (12)	636	-	5.4	-

Reference (#)	ADP Release Unbound	ADP Release Bound	ADP Release Bound	ADP Binding Rate Bound
Units	s^{-1}	s^{-1}	$M^{-1} s^{-1}$	s^{-1}
Cross (4)	0.002	300	1.5	~300
Fan (5)	-	300	-	-
Gilbert (6)	~0.1	300	-	-
Hancock (9)	0.01	50-300	-	-
Liu (13)	-	200	-	-
Rosenfeld (14)	-	170	-	-
Shao (18)	0.002	20	-	-
Ma (20)	-	150	-	-
Gilbert (21)	-	306	-	-
Farrell (22)	-	>200	-	-

Reference (#)	ATP Binding Rate Bound	ATP Release Unbound	ATP Release Bound	ATPase cycle rate per head
Units	$\mu M^{-1} s^{-1}$	$M^{-1} s^{-1}$	s^{-1}	s^{-1}
Cross (4)	2	4	150	50
Fan (5)	3.2	-	-	-
Gilbert (6)	2	-	200	-
Imafuku (11)	2-3.8	-	79.3-827	-
Kaseda (12)	-	-	-	27.6
Liu (13)	1.1	-	200	-
Rosenfeld (14)	1	-	-	-
Shao (18)	4 (b or unb?)	-	150	-
Ma (20)	-	-	50	-
Gilbert (21)	2	-	-	-
Farrell (22)	1.1	-	200	-

Reference (#)	ATP Hydrolysis Bound	ATP Hydrolysis Unbound	ATP Synthesis	Reverse Dissociation Rate for ATP
Units	s^{-1}	s^{-1}	s^{-1}	s^{-1}
Cross (4)	100-300	~7	~25	-
Fan (5)	180	-	18	150
Gilbert (6)	100	-	-	-
Hackney (7)	-	0.009	-	-
Hackney (8)	-	6 -10	-	-
Hyeon (10)	>100	-	-	-
Imafuku (11)	217 (unbind too)	-	-	-
Liu (13)	100	-	-	-
Rosenfeld (14)	100	-	-	-

Reference (#)	ATP Hydrolysis Bound	ATP Hydrolysis Unbound	ATP Synthesis	Reverse Dissociation Rate for ATP
Shao (18)	100-300	6	-	-
Ma (20)	200	-	-	-
Gilbert (21)	100	-	-	-

Reference (#)	Pi Release Unbound	Pi Release Bound	Pi Recapture	Empty Unbinding
Units	s^{-1}	s^{-1}	$M^{-1} s^{-1}$	n/a
Cross (4)	~250	100	~25	-
Fan (5)	250	-	-	-
Gilbert (6)	20	-	-	-
Liu (13)	-	40	-	-
Shao (18)	-	>100	-	-
Gilbert (21)	-	50	-	-
Farrell (22)	-	13	-	-

Reference (#)	Foot Unbinding Empty	Foot Unbinding ATP	Foot Unbinding ADP	Back Binding Rate
Units	s^{-1}	s^{-1}	s^{-1}	s^{-1}
Fan (5)	-	-	-	~1
Hancock (5.2)	0.2	0.1	4	-
Ishiwata (5.3)	0.0067	0.0067	1	-
Guydosh (5.4)	-	0.9	-	-
Auerback (5.5)	-	-	9	-
Fan (5.6)	0.05	0.5	25	-
Hancock (9)	0.0009	48	1.01	-

Reference (#)	ADP-P Unbinding from MT	ADP unbound binding to MT	ADP release with other head empty	ADP release with other head ATP
Units	s^{-1}	$M^{-1} s^{-1}$	s^{-1}	s^{-1}
Gilbert (6)	20	20 2	-	-
Hancock (9)	1.67	-	0.01-5	110-300
Hyeon (10)	-	-	-	$*2x10^{-3}$

Reference (#)	Stepping Time	Entire Cycle Reaction Time	ADP Release (Front Head Only)	ADP Release (Back Head Only)
Units	S	mS	s^{-1}	s^{-1}
Hyeon (10)	≤100	at least 10	75-100	1
Shao (19)	-	-	260	2.6

Reference (#)	Vmax for Michaelis Menton	Michealis Menton Constant	Unbound Head Stepping	Unbound Head Stepping Back
Units	nm/ms	M	s^{-1}	s^{-1}
Hyeon (10)	0.8	≥50	-	-
Imafuku (11)	-	-	630	10
Kaseda (12)	-	3.5	-	-
Rosenfeld (14)	703	23	-	-
Schnitzer (15)	-	62	-	-
Thorn (17)	-	0.44	-	-

Reference (#)	Binding to MT	Unbinding from MT	Forward Stepping Rate	ATP Hydrolyzed over whole run
Units	s^{-1}	s^{-1}	s^{-1}	-
Imafuku (11)	166-305	1.74	-	-
Rosenfeld (14)	-	-	800	-
Rosenfeld (15)	-	-	-	~100

Reference (#)	Run Length	Total K cat	Stepping Rate	Velocity
Units	steps	nm/s	$M^{-1} s^{-1}$	m/s
Schnitzer (16)	~100	680	1.4	-
Thorn (17)	1.1m	45 ATPs/head	-	0.37

Reference (#)	ATP Disassociation Constant	ADP in Head Binding to MT Disassociation Constant	ADP release with one head ATP
Units	µM	µM	s^{-1}
Shao (18)	75	10 -20	30-600

Reference (#)	ATP Binding Front Head	ATP Binding Back Head	ATP Hydrolysis Front Head	ATP Hydrolysis Back Head
Units	$\mu M^{-1} s^{-1}$	$\mu M^{-1} s^{-1}$	s^{-1}	s^{-1}
Shao (19)	3	0.3	8	800

Reference (#)	ATP Binding	Kinesin Binding to MT		
Units	s^{-1}	$\mu M^{-1} s^{-1}$		
Ma (20)	250			
Gilbert (21)		19.5		