Figure 3. PrP-induced fast axonal transport inhibition is mediated by Casein kinase 2 activity.

Data from **Fig. 3** (**A-D**) corresponding to plots that depict vesicle motility in extruded axoplasms, and graphs (**C** and **D**) showing quantitation of average rates of anterograde and retrograde fast axonal transport obtained 30-50 minutes after PrP perfusion from three independent experiments:

Data from plots that depict the vesicle velocity in extruded axoplasms measured in µm/sec:

Treatment	Anterograde	Retrograde
PrP 106-126 + DMAT	1,621	1,233
PrP 106-126 + DMAT	1,524	1,231
PrP 106-126 + DMAT	1,679	1,207
Prion-FL + DMAT	1,679	1,249
Prion-FL + DMAT	1,46	1,14
Prion-FL + DMAT	1,58	1,167

Data from graph (**E**) corresponding to CK2 activity evaluated *in vitro* by CK2 kinase assay. Phosphorylation kinase activity of CK2 is expressed as the incorporation of radioactive inorganic phosphate (P_i) into the synthetic $R_3A_2DSD_5$ peptide by the recombinant CK2. The data suggest that PrP activates CK2 directly. Values are expressed as C.P.M., which stands for counts per minute in arbitrary units. Scintillation counting-based quantitation from 3 independent experiments. *: p<0.0002; **: p<0.0001. Two-tailed P values:

CK2+Sub.	CK2+Sub+DMAT	PrP-FL	$PrP_{106-126}$
28545,9	13304,9	90155,5	64771,5
29077,9	15516,4	89876,1	64536,0
29030,7	11399,3	89638,8	62138,1

Data from figure 3 (**H** and **I**) corresponding to kymograms (**F** and **G**), which depict the mean mitochondria traveled distance in the anterograde or retrograde direction (**H**) and the percentage of moving mitochondria **(I)** upon PrP or PrP plus the specific CK2 inhibitor DMAT treatment. Quantitative analysis confirmed that average distances traveled by individual mitochondria in either anterograde (6.56±2.09µm) or retrograde (11.05±2.74µm) direction were significantly higher in neurons co-treated with DMAT compared to average distances of individual mitochondria from $PrP_{106-126}$ treated neurons (anterograde: 1.21±0.38µm; retrograde 3.97±1.44µm) (**H).** Additionally**,** the percentage of moving mitochondria (**I)** was significantly higher in DMAT-treated neurons (45.51±7.29µm) than in $PrP_{106-126}$ treated neurons (14.72±8.17µm). Collectively, results from these experiments indicated that the inhibitory effects of PrP-FL and $PrP_{106-126}$ on FAT are mediated by CK2 endogenous activity. Results were obtained from 3 independent experiments. One-way ANOVA with post-hoc Tukey.

Treatment	Direction	Experiment	# Neurons	# Mitochondria	Moving Distance (µM)
PrP106-126	Anterograde	1	5	3	0.56
PrP106-126	Anterograde	2	3	2	1.48
PrP106-126	Anterograde	3	4	2	1.62
PrP106-126	Retrograde	1	3	10	1.13
PrP106-126	Retrograde	2	2	4	5.86
PrP106-126	Retrograde	3	2	7	4.91
PrP106-126+DMAT	Anterograde	1	4	6	10.49
PrP106-126+DMAT	Anterograde	2	3	3	3.29
PrP106-126+DMAT	Anterograde	3	4	4	5.89
PrP106-126+DMAT	Retrograde	1	4	11	6.03
PrP106-126+DMAT	Retrograde	2	3	5	11.61
PrP106-126+DMAT	Retrograde	3	4	9	15.50