Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

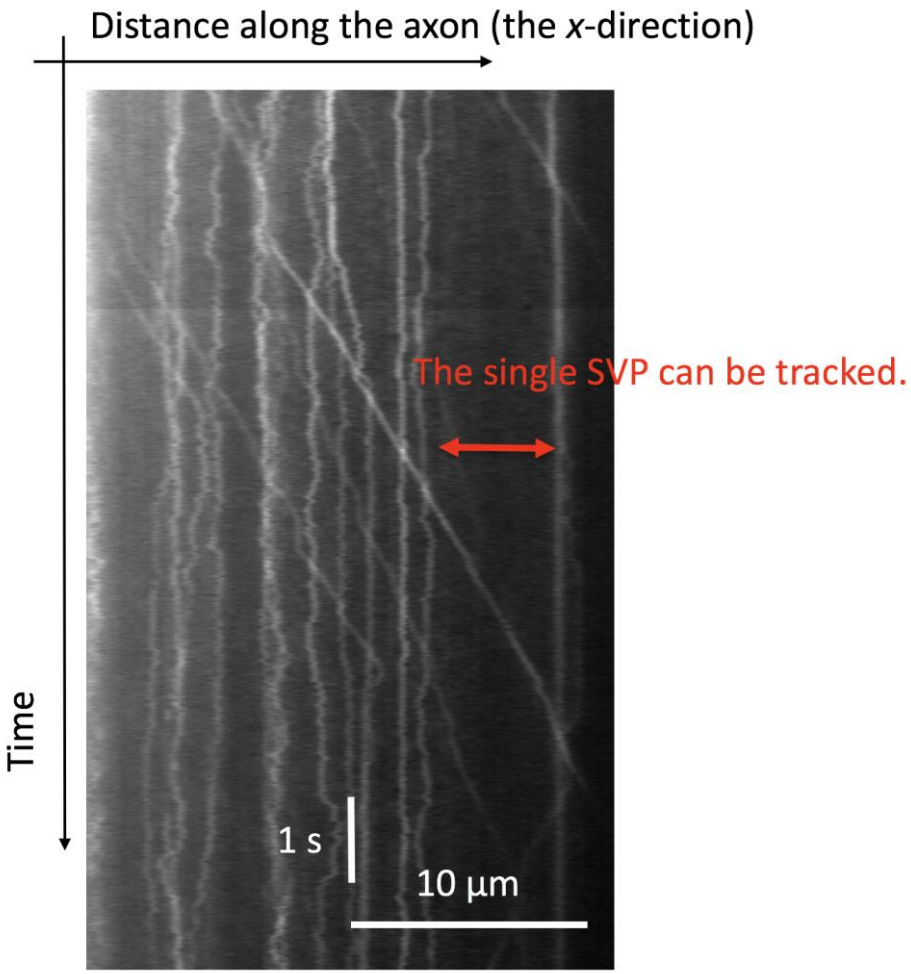

Fig. S1 Kymograph for SVPs. There were many SVPs in axons. The kymograph represents the motion of SVPs along the direction of the axon as a function of time. Each bright line represents the motion of a SVP. Several SVPs moved anterogradely. There were time intervals that the single SVP could be tracked (*e.g.*, the red arrows) even though the axon was clouded with many SVPs. We investigated such rare time intervals.

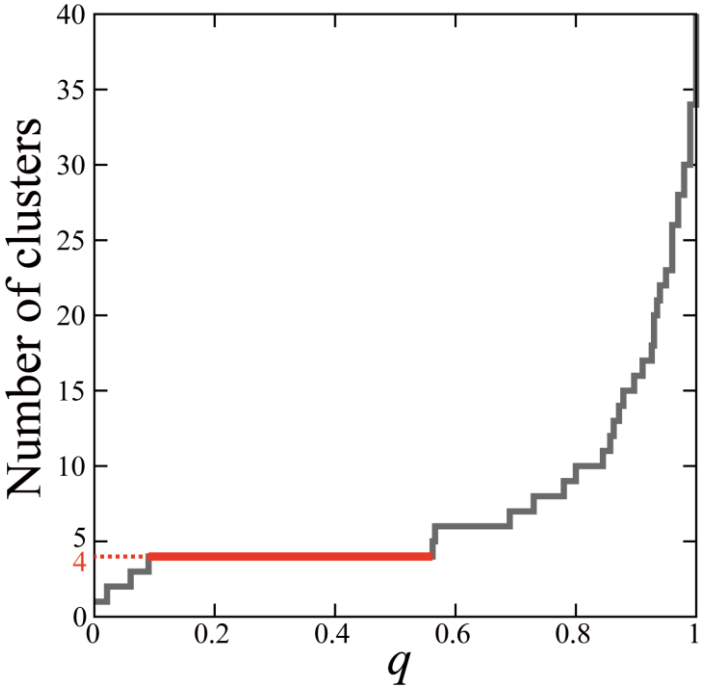

Fig. S2 Stability of the clustering analysis (Affinity propagation). The effect of the parameter q, which controls the input preference of the affinity propagation method[18], on the result (the number of clusters). It is known that the value q=0.5 results in a modulate number of clusters in general[18]. It was seen that the cluster number was stable for the wide range of q for our experimental data (Fig. 3).

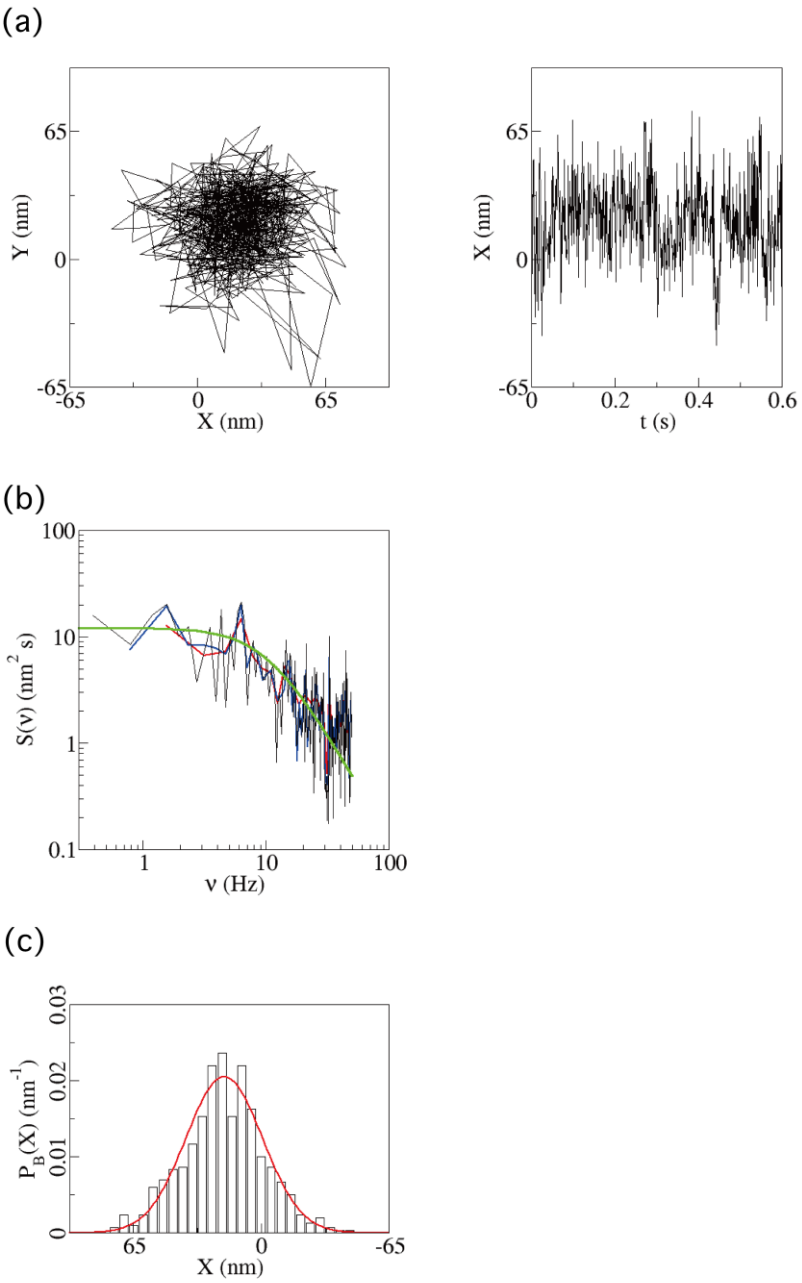

Fig. S3 Force calibration. (a) The position (*X, Y*) of a paused synaptic vesicle precursor (SVP) (left). The *x*-direction is the direction of motion of transported SVPs. *X*(*t*) as a function of time is plotted (right). (b) The power spectrum of the position *X*(t) in the cases N_w=64 (red), 128 (blue) and 256 (black), respectively (N_w is the window of the Fourier transform). It was fitted by the Lorenztian $c/(1+(\Gamma/k\cdot\nu)^2)$ (green), where *c* is a constant. (c) The probability distribution, $P_B(X)$, of *X*. It wa fitted by the Boltzmann distribution $P_B(X) = (k/2\pi k_B T)^{0.5}\exp(-k\,(X-X_a)^{\,2}/2k_B T)$.