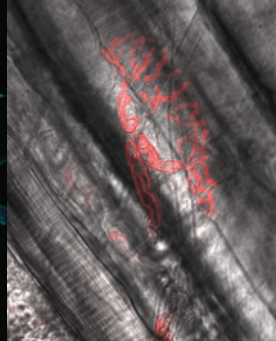
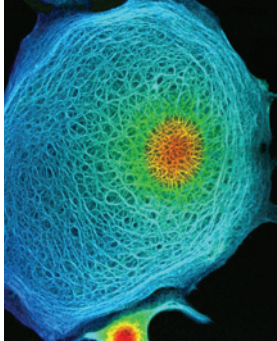
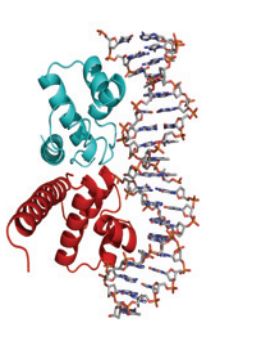


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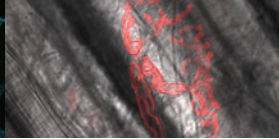
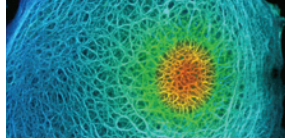
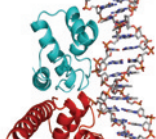


It is interesting to note that if one had a specific marker for GTP-tubulin it might not be easy to measure directly the length of the GTP cap. Nevertheless, one could measure how the GTP-tubulin density decreases as one moves away from the tip of the microtubule. Fitting that density to an exponential curve, one could be able to measure the characteristic length λ and compare to the prediction of our model shown in Fig. 11.

Fluctuations in the length of the microtubule cap at the + end are evident over time as shown in Fig. 12 for two free tubulin dimer concentrations, $d=2$ and $d=5$. The sharp decreases in length occur when a single GTP-tubulin dimer takes a long time to hydrolyse to GDP dimer. For example, between the arrows in Fig. 12 the hydrolysis time is 30 s compared to the average GTP hydrolysis time of 5 s. The decreased length depicts the new length of the cap which is from the next closest GTP-tubulin dimer to the base of the crown. Moreover we can evaluate the length of the cap and this averages approximately 60 dimers for $d=2$ and 300 dimers for $d=5$. Another way of evaluating the size of the cap is to count the number of GTP-tubulin dimers over the 13 protofilaments. These data are shown in Fig. 13 and fluctuations in the number of GTP-tubulin dimers is apparent further supporting the variations in cap length seen in Fig. 14. Performing a similar analysis and considering only the crown, variations in length occur from 1 to 7 GTP tubulin dimers which

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the GTP cap. Nevertheless, one could measure how the GTP-tubulin density decreases as one moves away from the tip of the microtubule. Fitting that density to an exponential curve, one could be able to measure the characteristic length λ and compare to the prediction of our model shown in Fig. 11. Fluctuations in the length of the microtubule cap at the + end evident over time as shown in Fig. 12 for two free tubulin dimer concentrations, $d=2$ and $d=5$. The sharp decreases in length occur when a single GTP-tubulin dimer takes a long time to leave the GTP cap. The smaller the time, the more frequent the decreases.

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