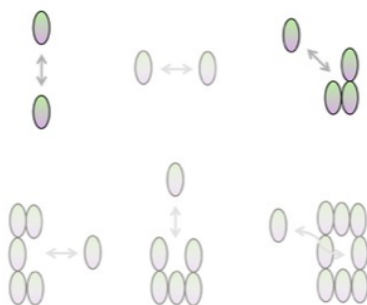
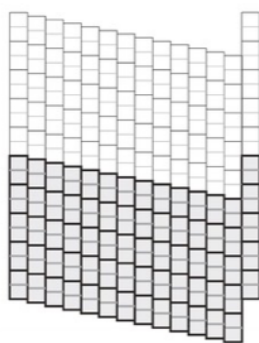


Figure 2 – Figure Supplement 1

A



B



Initial conditions:

- + template 'seed'
- + 13 possible association events

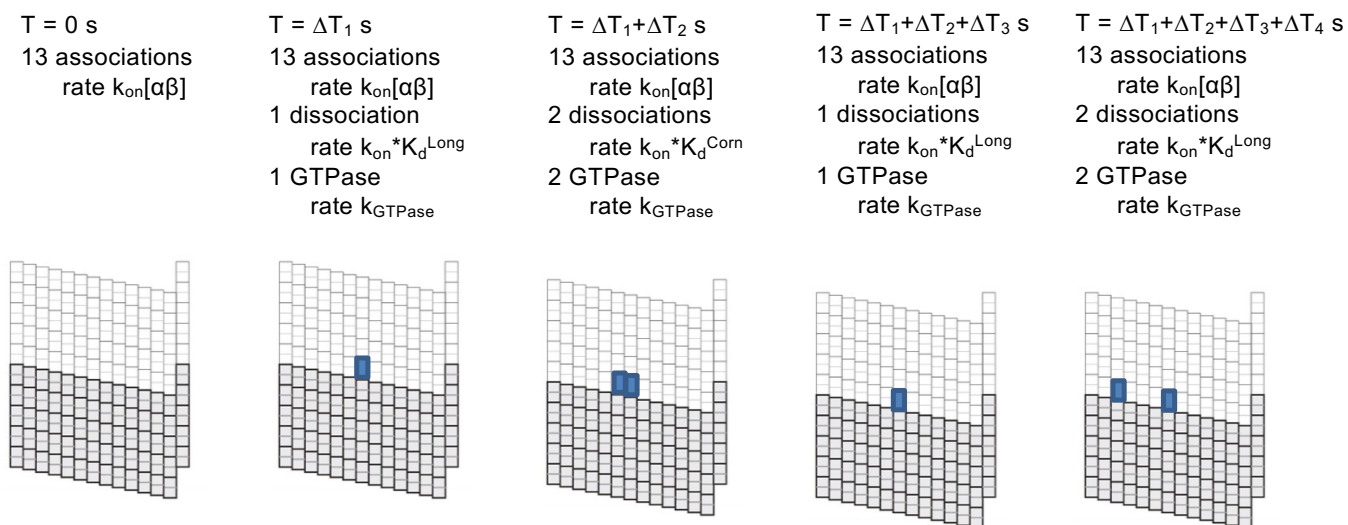
Then simulate MT dynamics one biochemical event at a time. The relative probability of different events are determined from the characteristic rates or rate constants

C

Simulation algorithm:

0. Start at time $T = 0$ s
1. determine 'execution time' for possible events.
2. Implement the event with the shortest execution time $\Delta T_{\text{fastest}}$
 - = Advance simulation time: $T \rightarrow T + \Delta T_{\text{fastest}}$
 - = Add new events and remove old events in response to the event that just occurred
3. GOTO 1

D



E

Results of the simulation:

- + $N_{\alpha\beta}$ (number of tubulins in the microtubule) as a function of time
- + biochemical state (GTP/GDP) and environment (neighbors) for every tubulin

Comparing to experimental data:

- + Convert to length units to obtain growth rate
- + Analyze simulated growth rates and fluctuations as for experiments
- + Adjust model parameters to obtain best agreement between simulation and experiment