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The force of molecular motor movement on filaments

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Molecular motors are proteins that bind to filaments in a cell and can move along a filament. Their natural stepping movement along a filament can exert force on another object if the motor is bound to that object. Examples of such objects include vesicles or another filament. In cells, there are many motors and their collective motion can result in interesting behaviour. For example, motors often work together in teams and this increases the total force they can exert. Sometimes teams of motors work in opposite directions like in a "tug of war"game. When there are multiple parallel filaments these can be thought of as multiple lanes on a motorway with the analogy of molecular motors as motor cars. We can then consider the effect of motors changing lanes.

In this talk we will consider models of multiple motors and multiple filaments. We will discuss particular cellular examples and present some analytical results and simulations. We suggest the force of molecular motor movement on filaments can result in a varied cell processes from cargo transport to nuclear deformation and even parasite invasion.

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