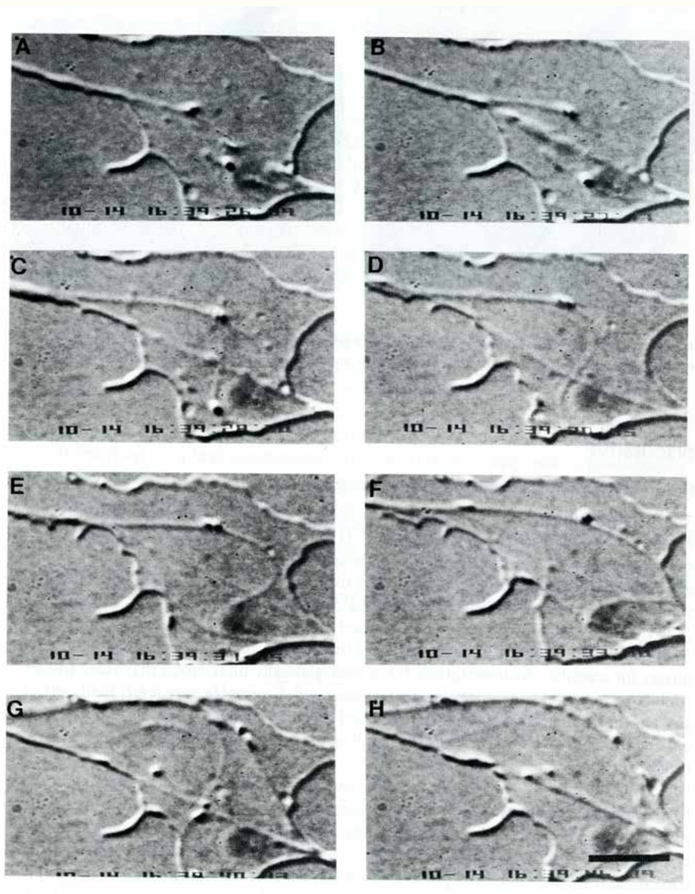
SEEING HOW CELL PARTS MOVE

By the 1970s, electron microscopy and live cell imaging showed that cells are filled with different types of very fine filaments, like microtubules, that form a cytoskeleton.

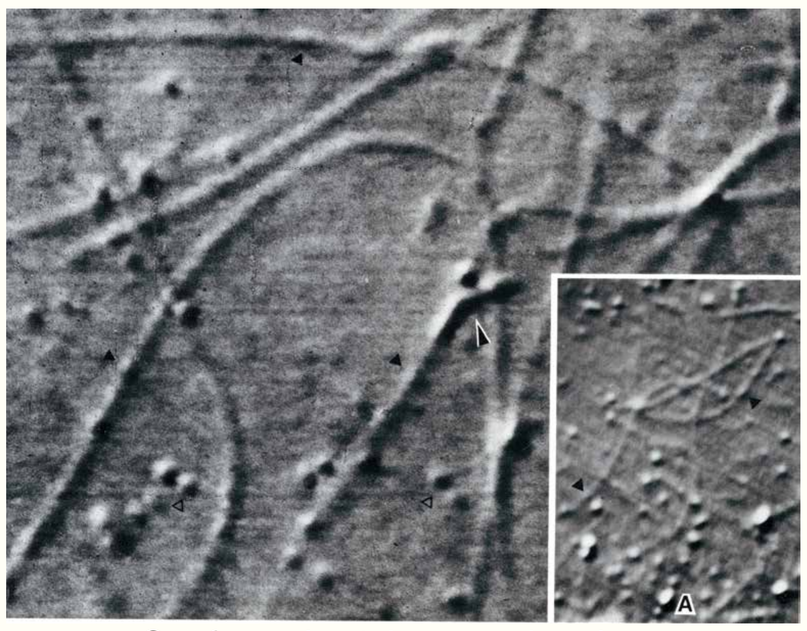
Microtubules were too small to see with ordinary light microscopy. But while developing a video microscope at the MBL, Nina and Robert Allen accidentally discovered that they could detect cellular structures below the resolution of light microscopy by artificially increasing the contrast of their live cell images. Shinya Inoué, also at the MBL, almost simultaneously designed a similar video microscope.



Microtubules and vesicles in the axon
Allen, Allen, and Travis 1981

Together with Scott Brady and Ray Lasek, who worked summers at the MBL on a nerve cell process from squid called the giant axon, Robert Allen visualized tiny vesicles moving along microtubules within the axon.

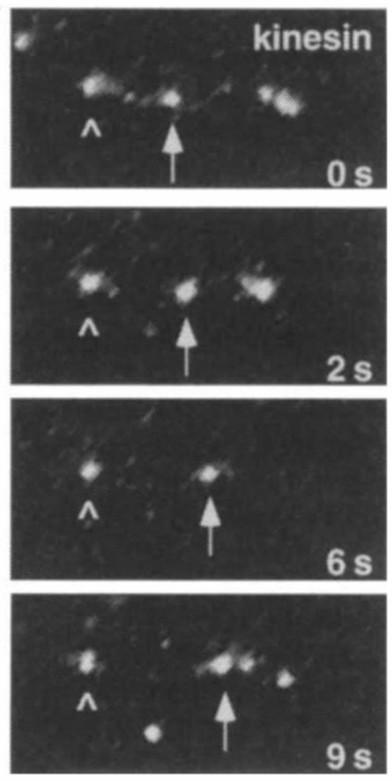
Brady and Ron Vale were soon using the same video setup to view vesicles moving on microtubules isolated from the axon.



Cell free microtubules and vesicles *Vale et. al. 1985*

Biochemical analysis of the cell-free preparation led Vale to discover a new molecular motor which he called kinesin.

Kinesin moving *Vale et. al. 1996*



By learning about how cell parts work, scientists can piece together how cells as individual units achieve certain functions. But how do cells come together, and what could be learned from the fact of cell aggregation?