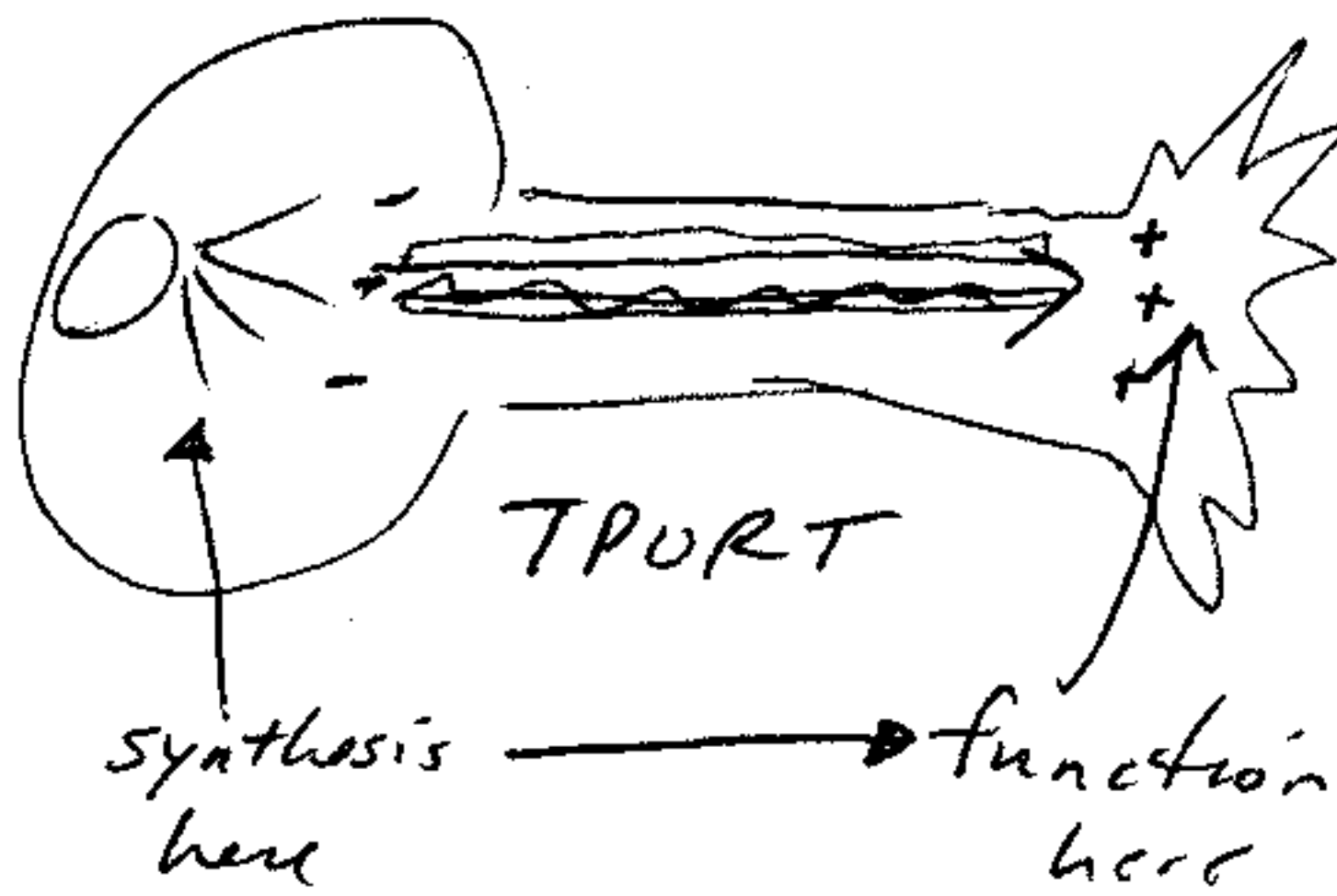
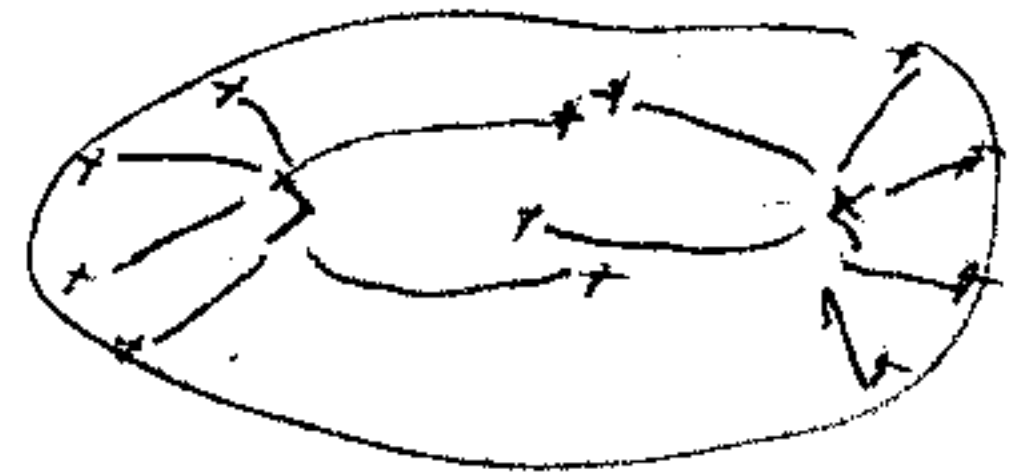
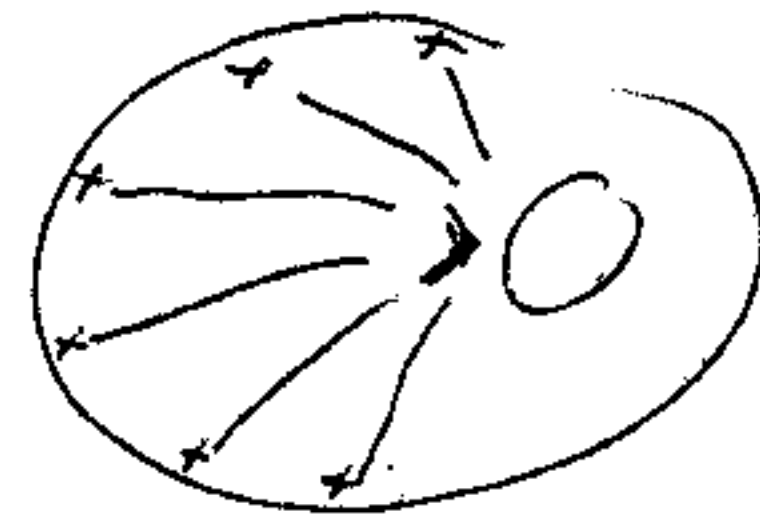


How do euk. cells move intracellular substances?

eg neuron



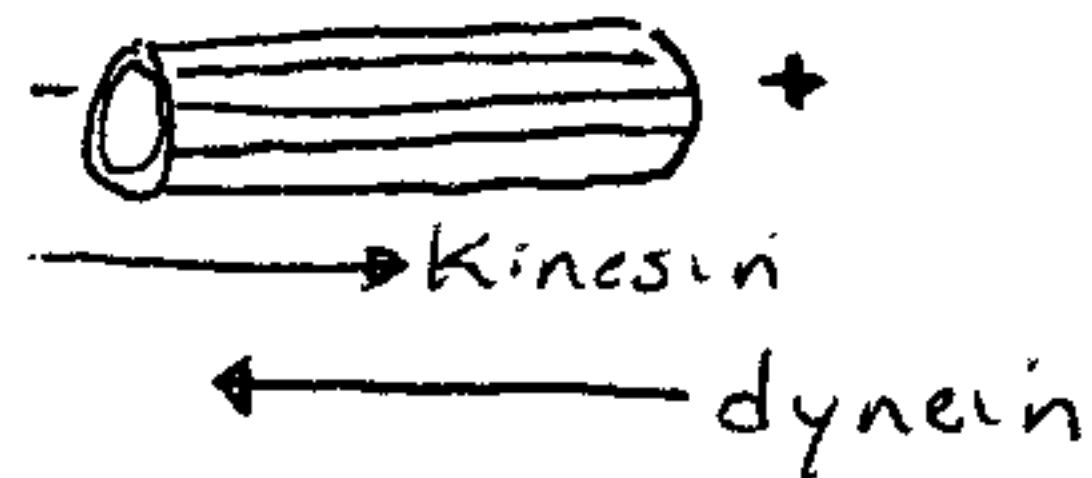
- but not just motors moving



3 types

actin } motors
dynein }
kinesin }

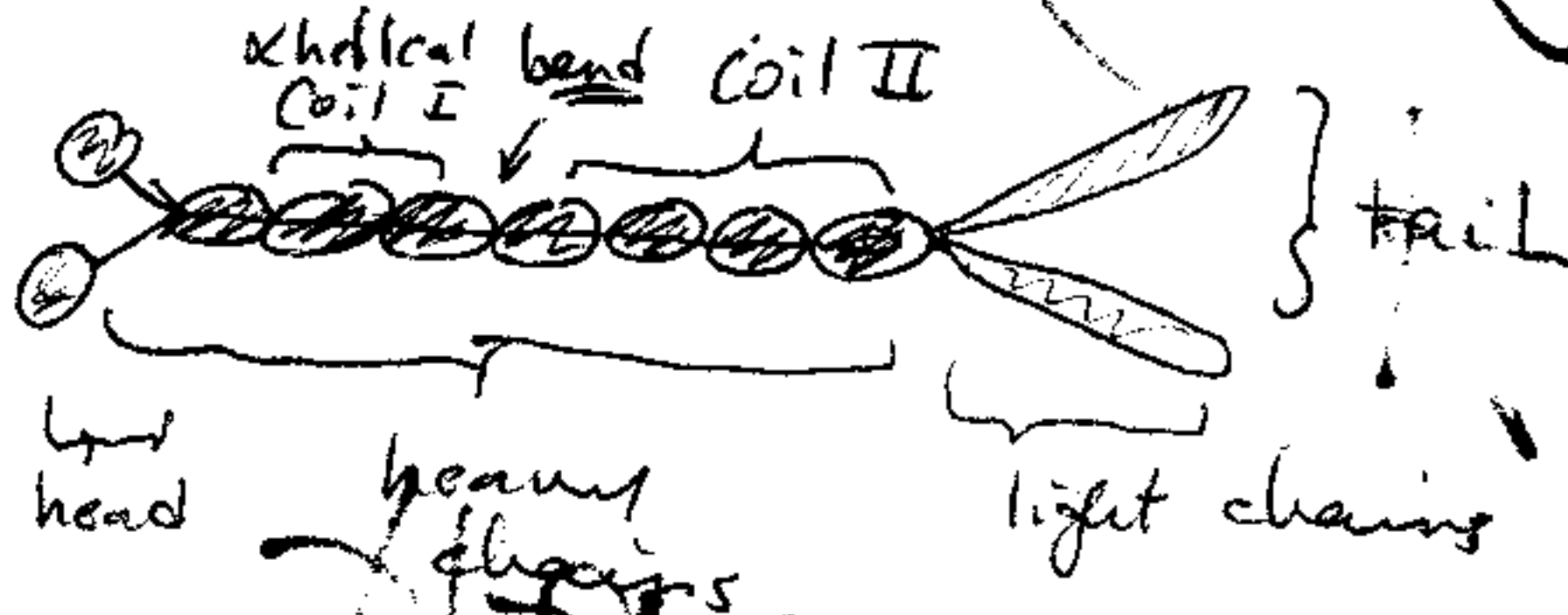
Microtubules



KINESIN

- "PLUS" directed motor
- one "chunk" functions as motor
- this chunk has been moved to other proteins

MT + ATP binding



- looks like myosin in general structure

LIGHT CHAIN

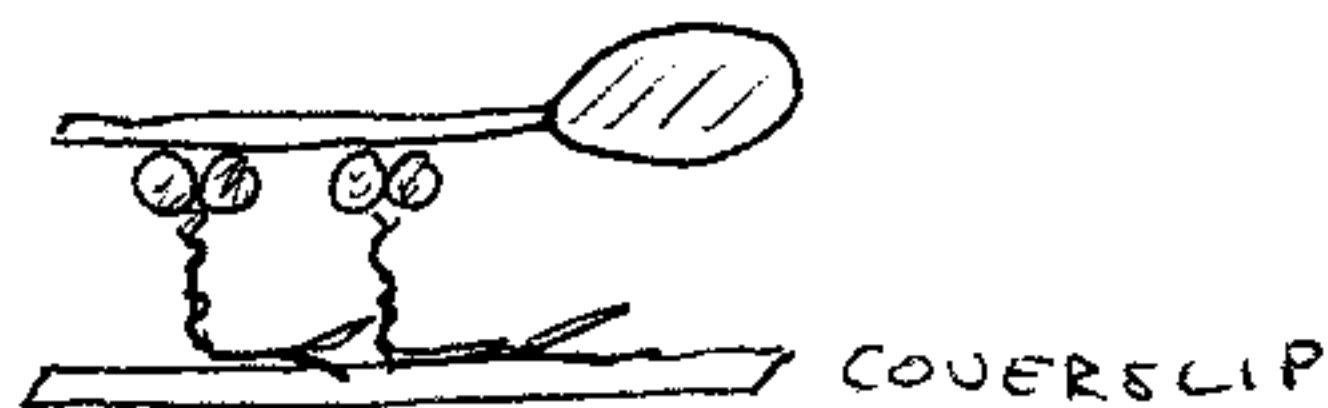
- v. highly conserved

STALK

- appears to be α -helical coiled coil
- clones spectrum onto end get rod ~~xxxxxx~~ tail
- but circular dichroism showed $< 80\%$ α -helix at 25°C
- coil I - appears to melt around 25°C

MOTOR ?

①



} sperm w/ MT should move
& it does

② characterize mutants w/ this assay
HEAD w/ any tail appears to be functional

OTHER KINESIN LIKE MOTORS?

- YES - LOTS

- Drosophila

- many have 350 aa w/ 35-55% homology to Kinesin head

- a variety of tails

- e.g. ^{motor domain} hcd most closely related to KAR3 in yeast
- suggests this is due to separation of motor domain
in ancient past

FUNCTIONS OF OTHER PROTEINS.

KINESIN

Axonal transport

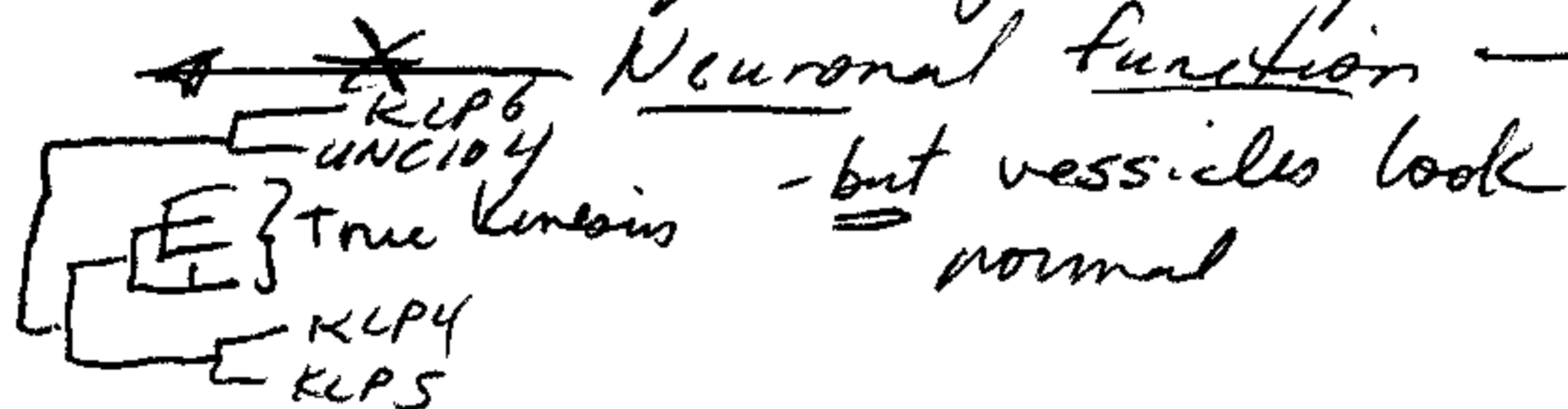
Tubular lysosome org.

Intermediate filament org.

Pigment granule placement

Neuronal function

- esp. in Drosophila
- mutations in Kinesin
show phenotypes only in
neuronal development



KLP5

- MOST EXPRESSION IN CNS IN EMBRYO

- SIMILAR IN TAIL TO KLP4

KLP6

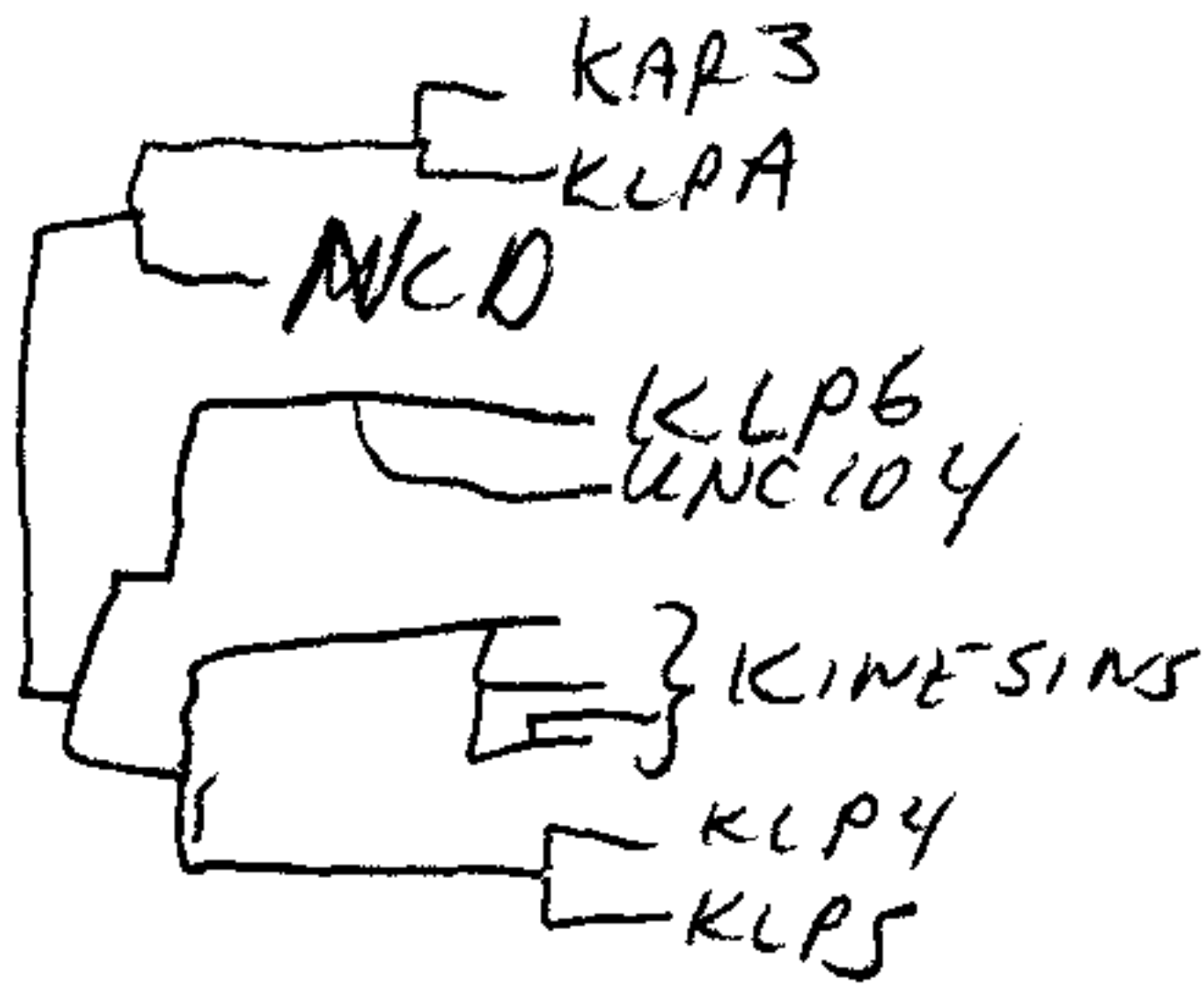
- looks like unc104

- expressed in stripes in embryo

- why? unknown - maybe involved in cell-cell
signaling

KLP2 = "urchin"

- in BimC family
- mutations in this family defective in spindle separation
- share some tail homology
- mutants arrested in "metaphase"
- expressed patchily in *Drosoph.* larvae
- in similar pattern to cell division



How tubulin important
How keyways affect tubulin?

NCD

- abnormal meiotic spindles
- "ends" at poles are frayed
- colocalized w/ tubulin

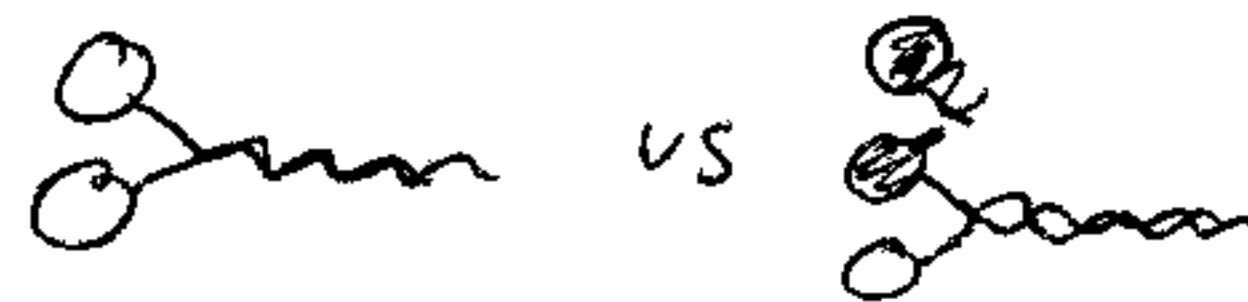
FUNCTIONAL REDUNDANCY?

- ① mutants in many of these localized to only one gene

GENERATION OF DIVERSITY?

① New tails

② Heterodimers?



③ Altered motors

power
speed

direction - NCD is (-) directed

So how are NCD & kinesin structurally different?

NCD - head at other end