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## Bill Wood - Development of Nematodes (C. elegans)

Autonomous vs. Inductive Determination of Cell Fate

eggs: chitinous, relatively impermeable

larvae: 4 molts

### General Development

① Timing & cell lineage known completely, invariant from 1 animal to next.

② Autonomous - some of the cells such as those w/ "P" bodies have determined effect

③ Inductive

### Cell Interactions in Early Embryo

- NB - Asymmetric L to R (in C. elegans)
- ∴ Embryo should have some polarity

### Induction

① Can "move" 2 nuclei after 2nd division and develops according to "environment"

② Compensates for handedness of early embryo by having slightly different developmental patterns on diff. sides. That is: NOT ALL CELLS THAT ARE FLXALLY and POSITIVALLY HOMOTOPIC do not have same lineage (no analogous lineage).

③ Change handedness of later embryos and mirror image adult results. ∴ cell-cell interactions are important. (Same conclusion from cell-filling experiments)

④ Remove chitin case (w/ chitinase) and study cells in culture.

① can separate cells

② can make fusion products and see which cells, when separated, continue to express genes respective of their lineages

AUTONOMOUS

## Sex Determination

- Hermaphrodite morphologically distinct from male

- sex determined by  $X/A$

- series of genes determining ♀ vs ♂

- Her 1 is 1st gene in system

- Tra 1 is last and determines sex ( $\text{tra 1}^+ = \text{♀}$ )

① Can add tra 1 on extrachromosomal piece.

During development, those <sup>cells</sup> that lose  $\text{tra 1}^+$  develop into ♂ like cells.

∴ Tra 1 is "autonomous"!

② but w/ Her 1 ... non-autonomous in two ways

NON-AUTONOMOUS ① if Her 1 lost in AB lineage ... cells are still masculine (thus signal coming from elsewhere)

② if Her 1 lost in other <sup>pt</sup> cells ... the AB cells will be feminized.

③ Her 1 is differentially expressed

Do the enantiomorphs have selection differences?