

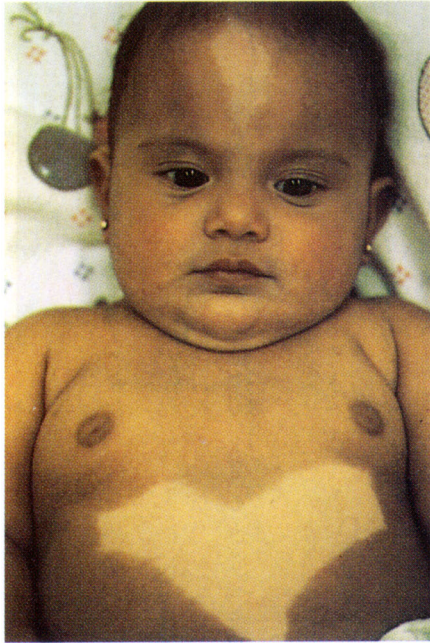
Biology 218: Developmental Biology

- The structure of the course
- My expectations
- Overview of topics
  - Diversity of form
  - Homology of gene function
  - Signaling pathways

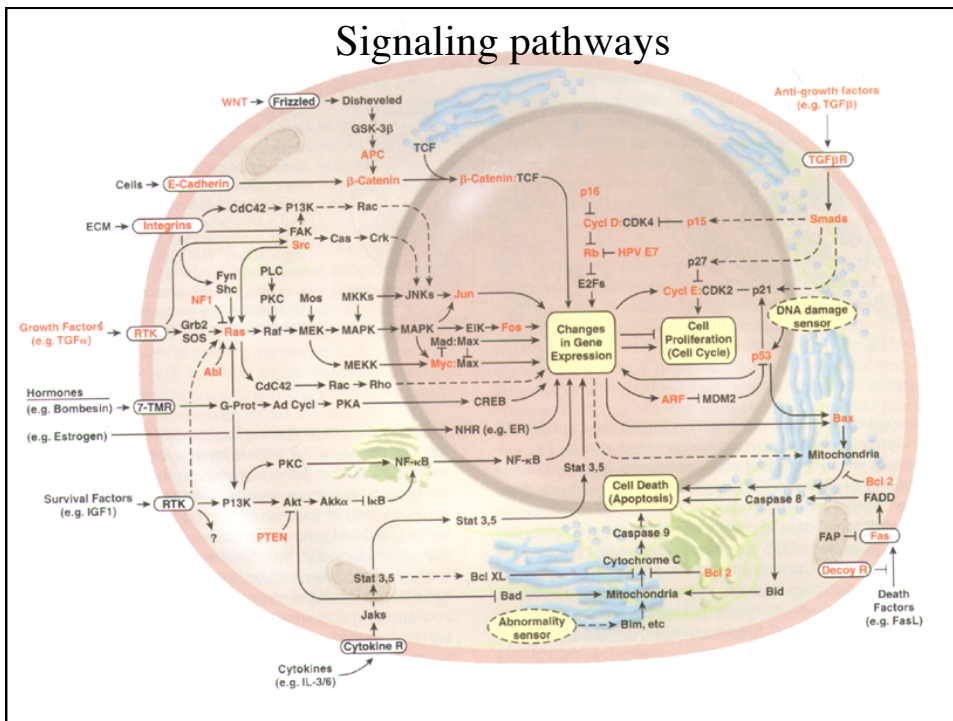
Diversity of Form: Genes are important



### Genes and development



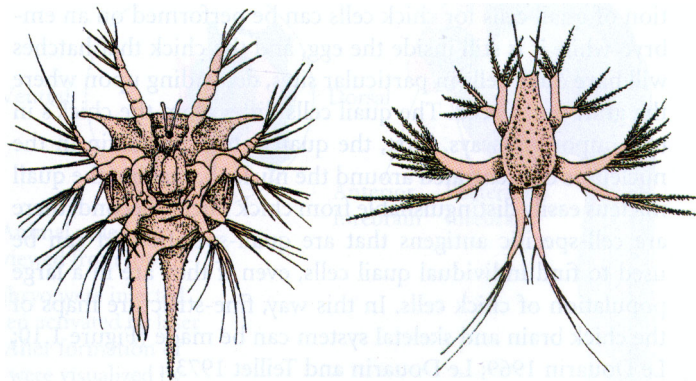
### Signaling pathways

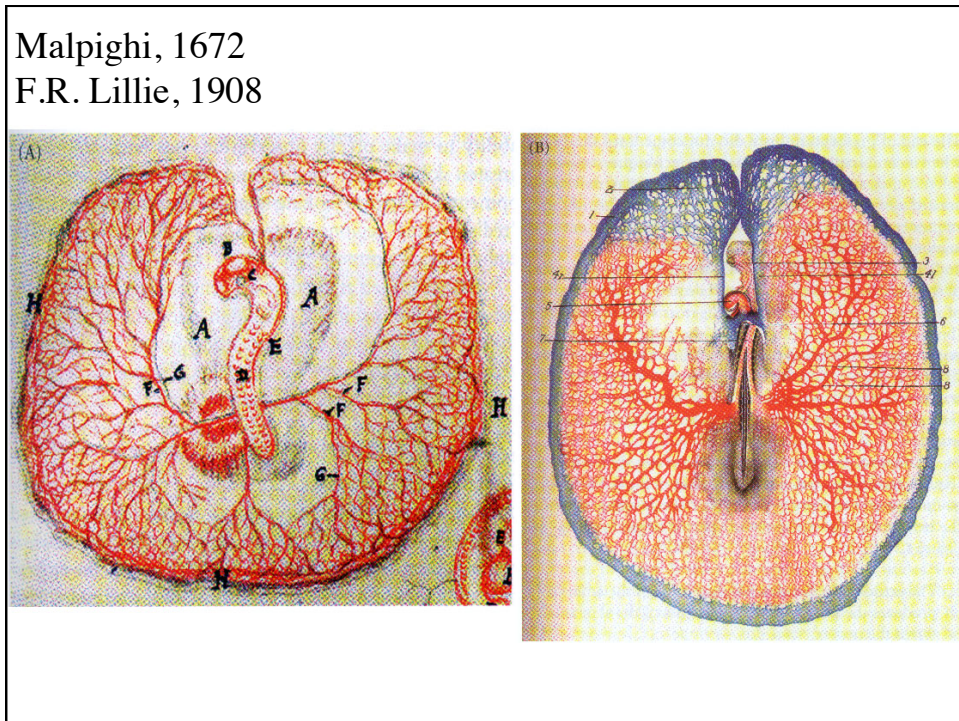
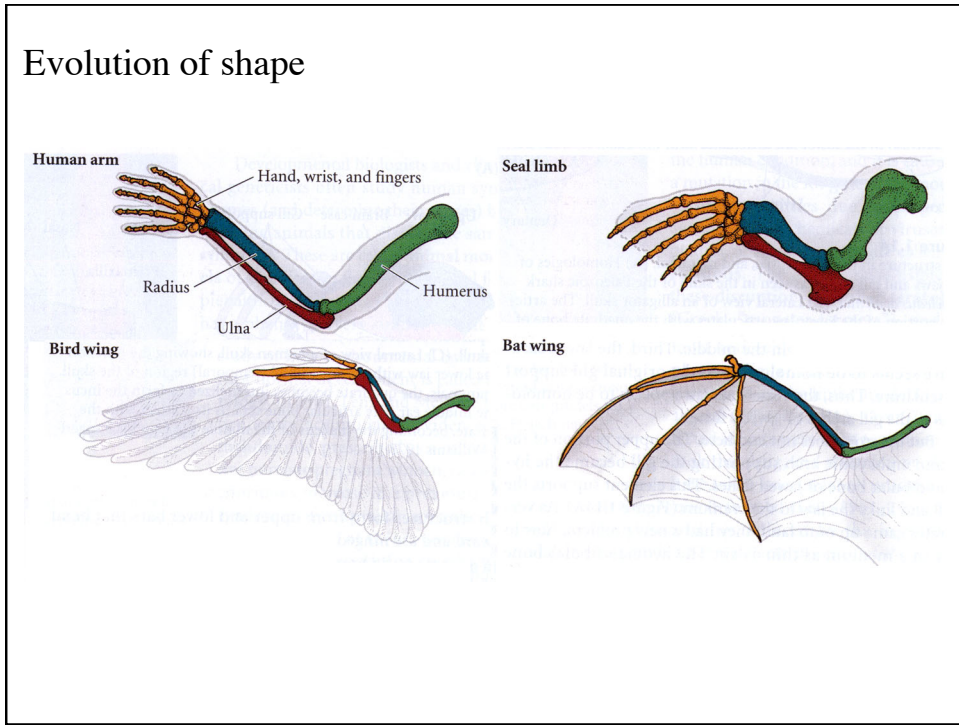


### Environment and development

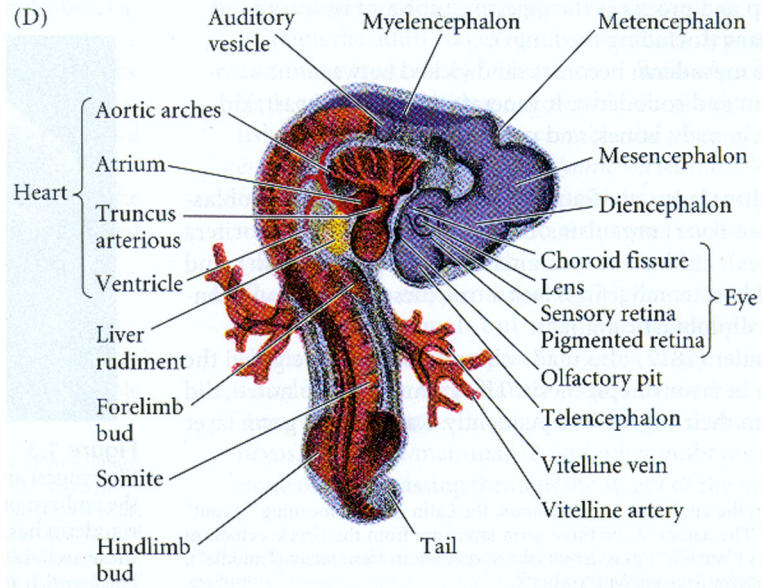


### Evolution and Development





## Anatomy



## Alan Turing

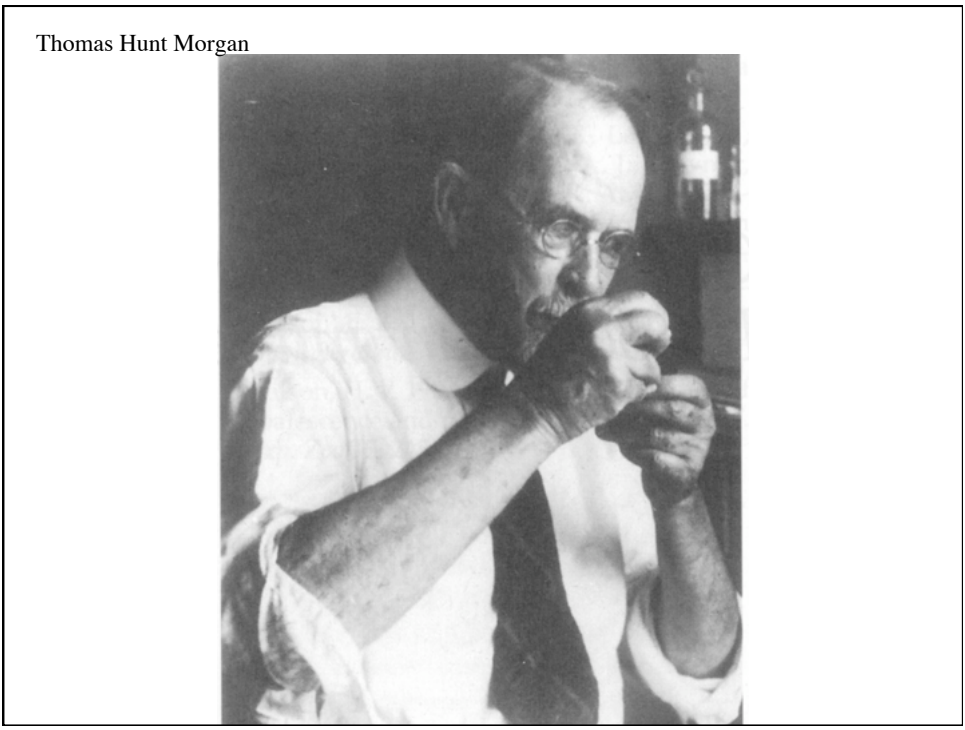
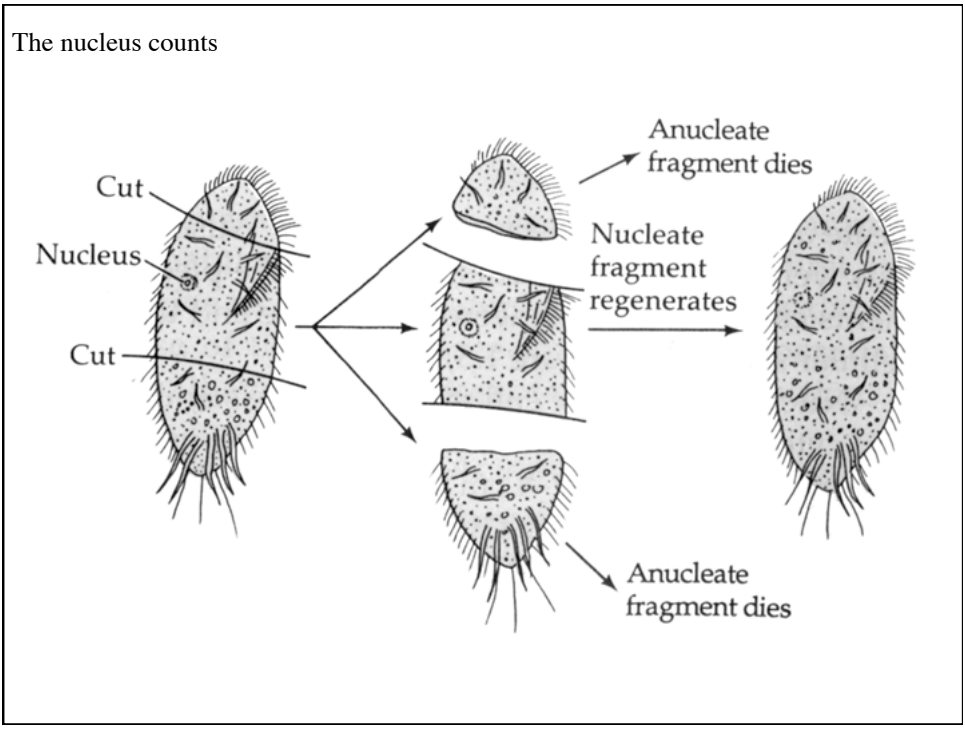


Bildungsfähigen Elemente



E.B. Wilson





Wilson and Morgan quotes

**This fact establishes the presumption that the nucleus is, if not the seat of the formative energy, at least the controlling factor in that energy and hence the controlling factor in inheritance. This presumption becomes a certainty when we turn to the facts of maturation [meiosis], fertilization and cell-division. All those converge to the conclusion that the chromatin is the most essential element in development.**

**E.B. Wilson (1896). The Cell in Development and Inheritance**

**Now, chromatin is known to be closely similar, if not identical with, a substance known as nuclein... which analysis shows to be a tolerably definite chemical composed of a nucleic acid (a complex organic acid rich in phosphorus) and albumin. And thus we reach the remarkable conclusion that inheritance may, perhaps, be effected by the physical transmission of a particular chemical compound from parent to offspring.**

**E.B. Wilson (1897).**

**Here, although the entire segmentation nucleus is present, yet by loss of cytoplasm, defects are produced in the embryos... There seems to be no escape from the conclusion that in the cytoplasm and not in the nucleus lies the differentiating power of the early stages of development.**

**Thomas Hunt Morgan, 1897**

Boveri and Stevens

Theodor Boveri



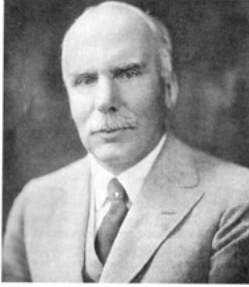
(A) Polyspermy and chromosomes

Nettie Stevens




Number of X chromosome determines sexual development

Frank Lillie

(A) 


Hans Spemann, Ross Harrison

(B) 

“Genetics is a Joke”

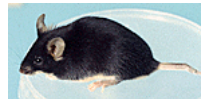
- no mutants to control early embryogenesis
- genes are identical in all cells
- environment can influence development

Lillie, Spemann, Harrison, Just

(C) 

Ernest Just

Salome Gluecksohn-Schoenheimer  
1907 - 2007



T mice