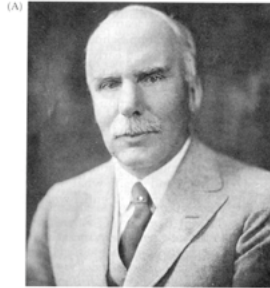


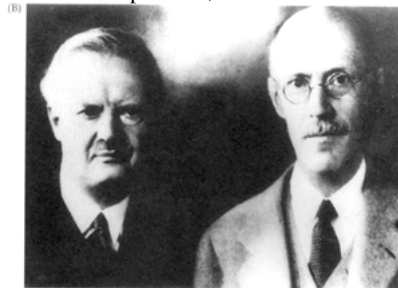
1947

The widest gap, still to be filled, between two fields of research in biology, is probably the one between genetics and embryology. It is the repeatedly stated--and thus far unsolved problem--of understanding how cells with identical genomes may become differentiated, that of acquiring the property of manufacturing molecules with new or, at least, different specific patterns or configurations. **Jacques Monod, 1947**

Frank Lillie



Hans Spemann, Ross Harrison



“Genetics is a Joke”

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

Lillie, Spemann, Harrison, Just



Ernest Just

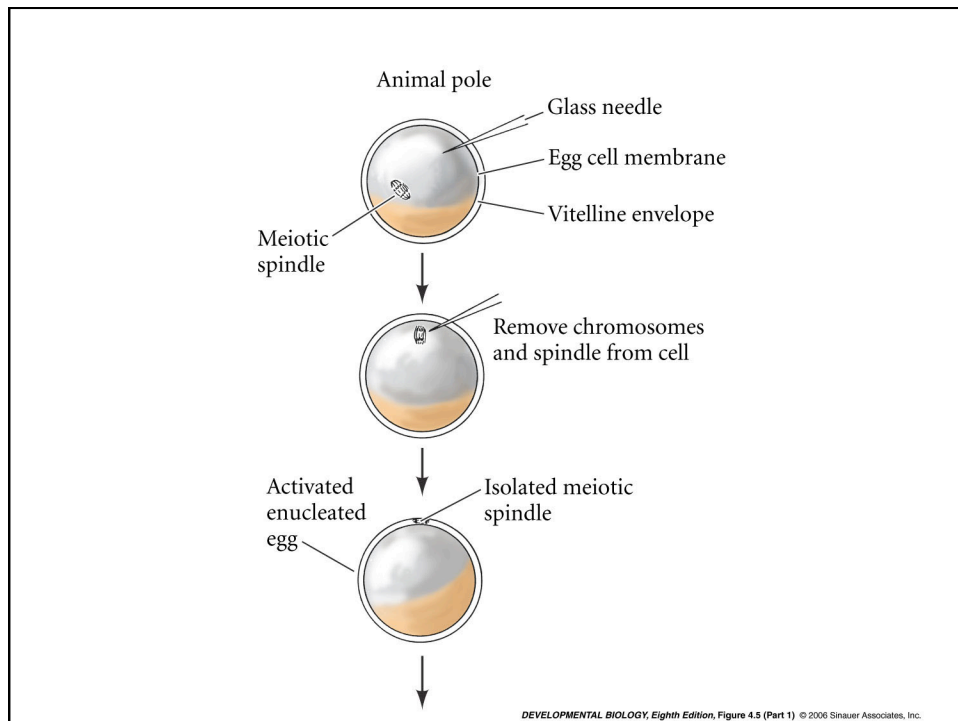
The developmental capacity of nuclei transplanted from keratinized skin cells of adult frogs.
By J.B. Gurdon, R.A. Laskey, and O.R. Reeves

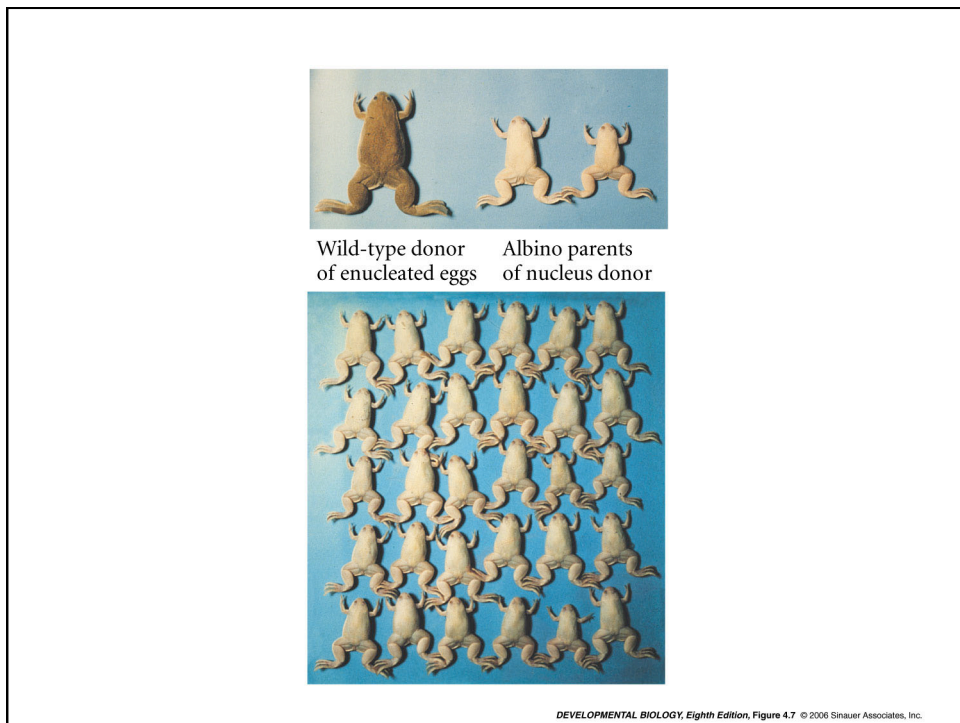
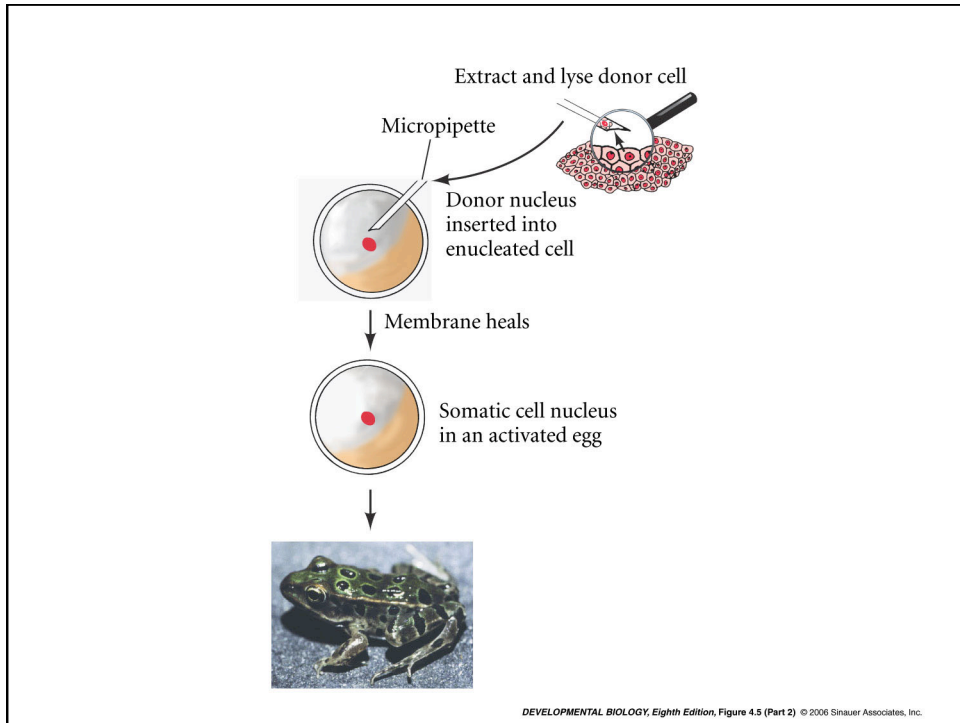
Goal:

- To determine whether nuclei undergo irreversible changes during cellular differentiation.

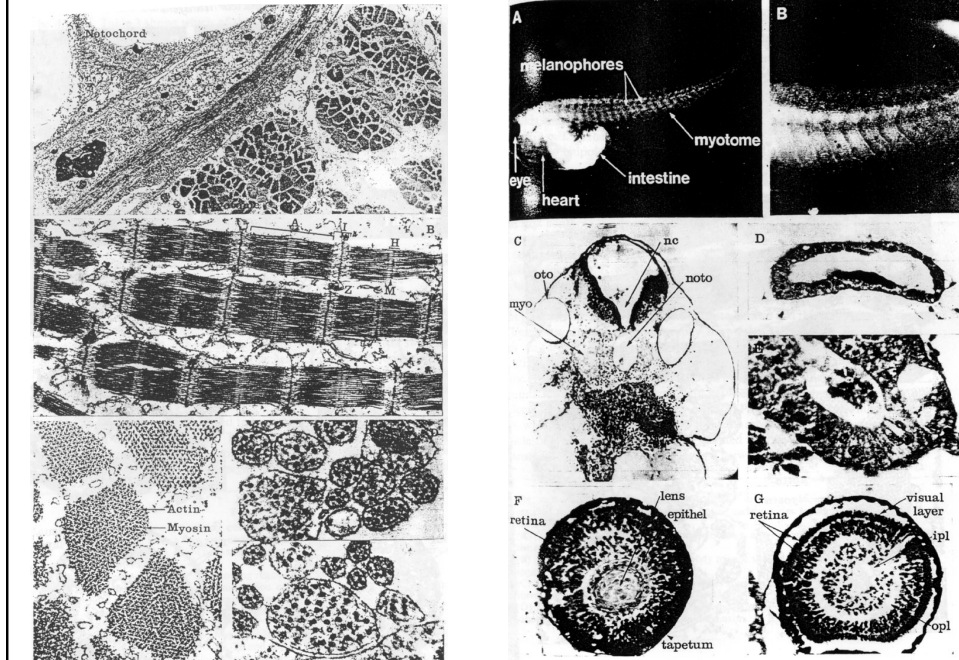
Technique:

- Use adult, differentiated nucleus to generate frog





These really have developed all types of specialized tissues



The developmental capacity of nuclei transplanted from keratinized skin cells of adult frogs.
By J.B. Gurdon, R.A. Laskey, and O.R. Reeves

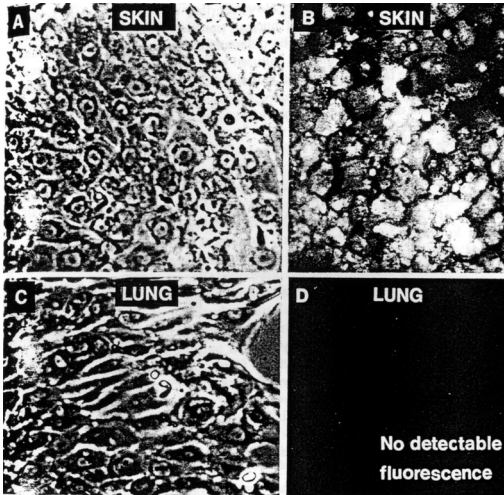
Goal:

- To determine whether nuclei undergo irreversible changes during cellular differentiation.

Technique:

- Use adult, differentiated nucleus to generate frog

Skin is 6697/6700 X 100 % differentiated skin



Gurdon conclusions

Goal:

- To determine whether nuclei undergo irreversible changes during cellular differentiation.

Technique:

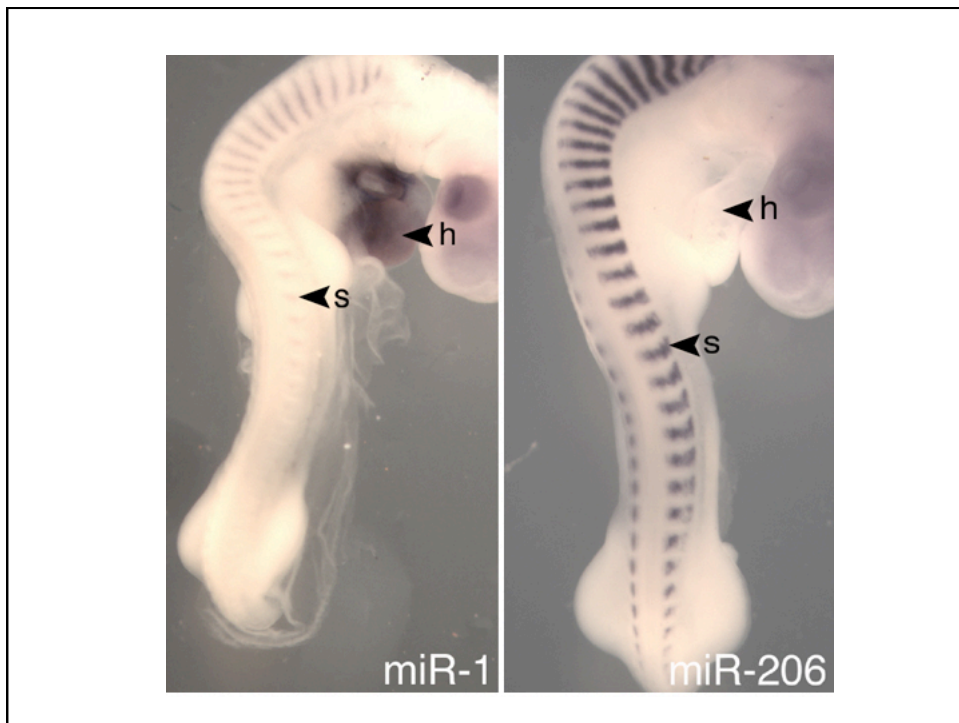
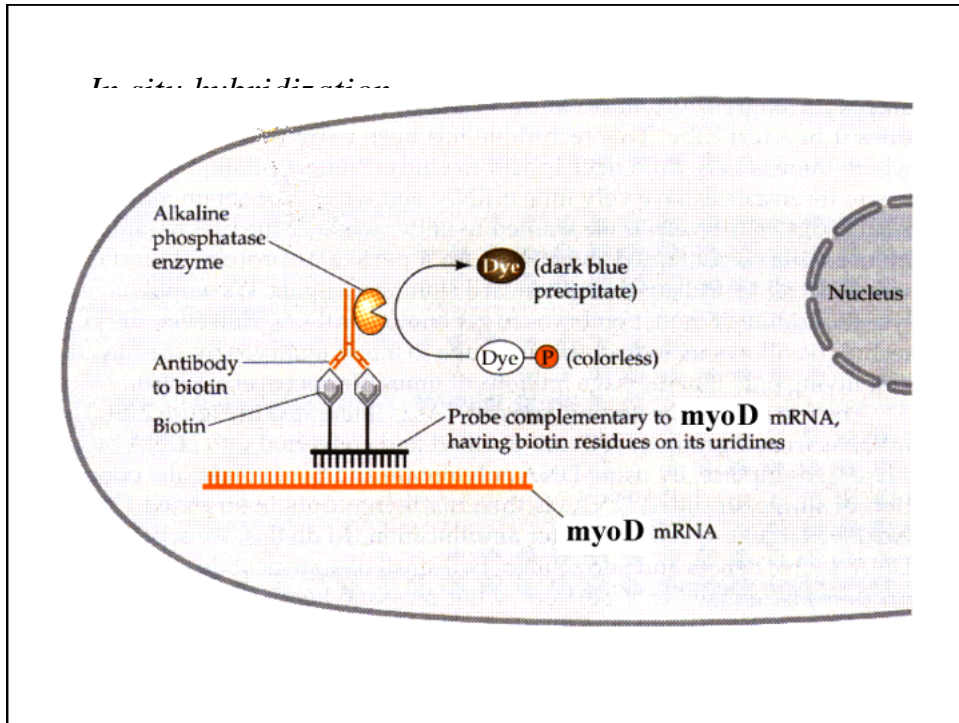
- Use adult, differentiated nucleus to generate frog

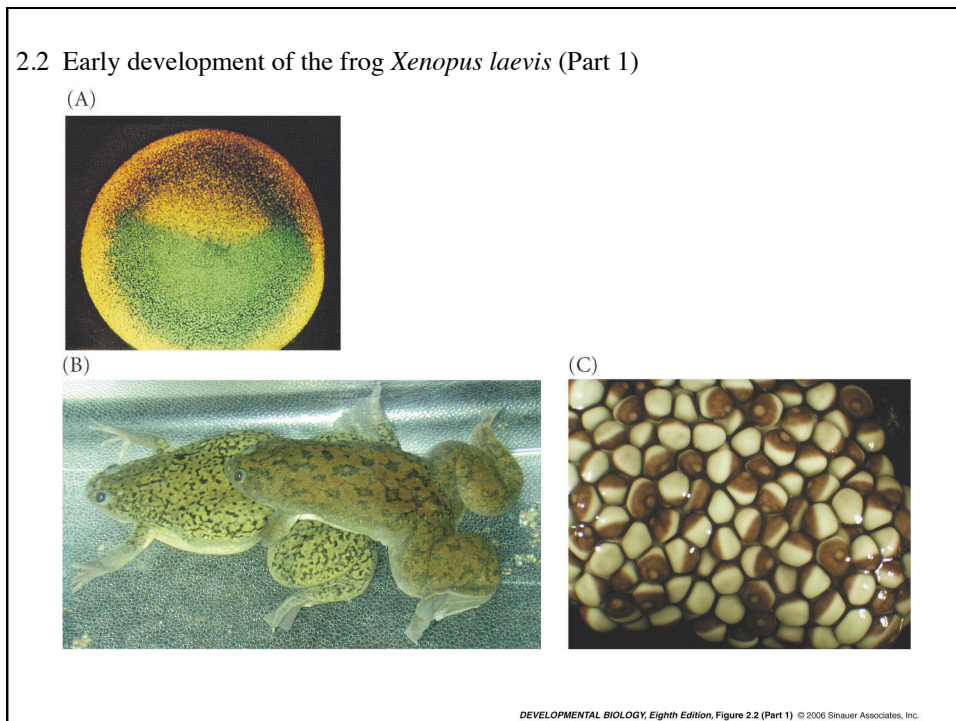
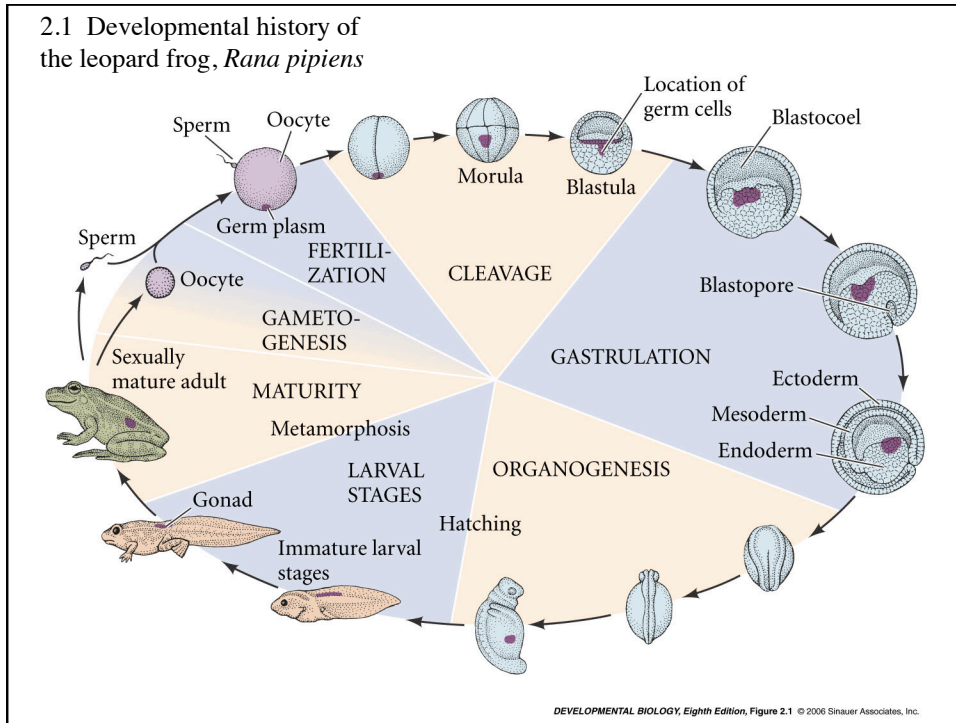
Major questions:

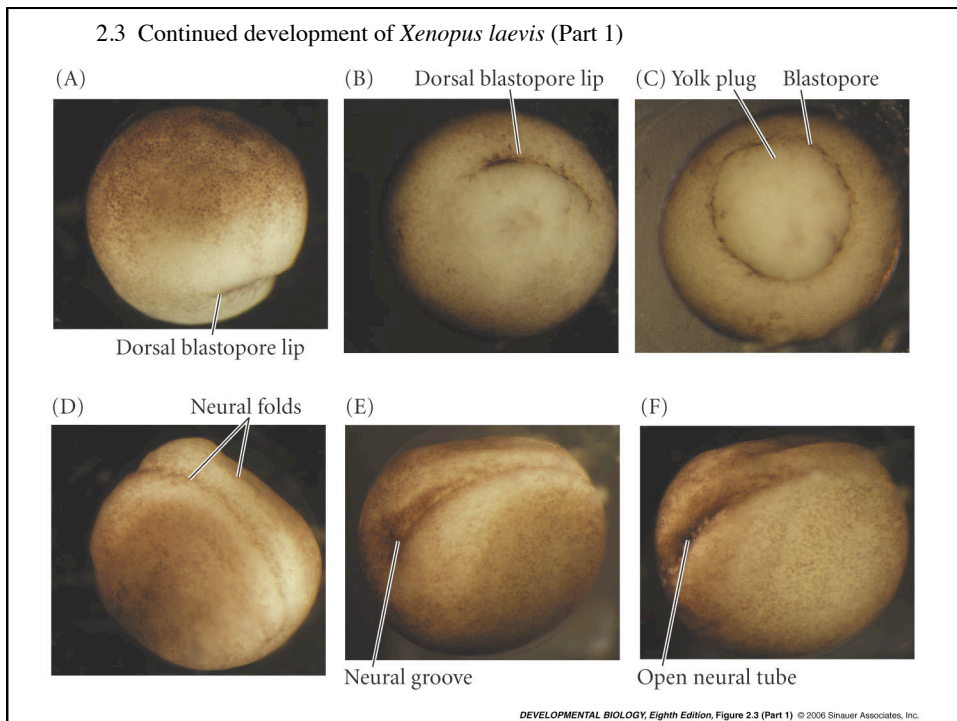
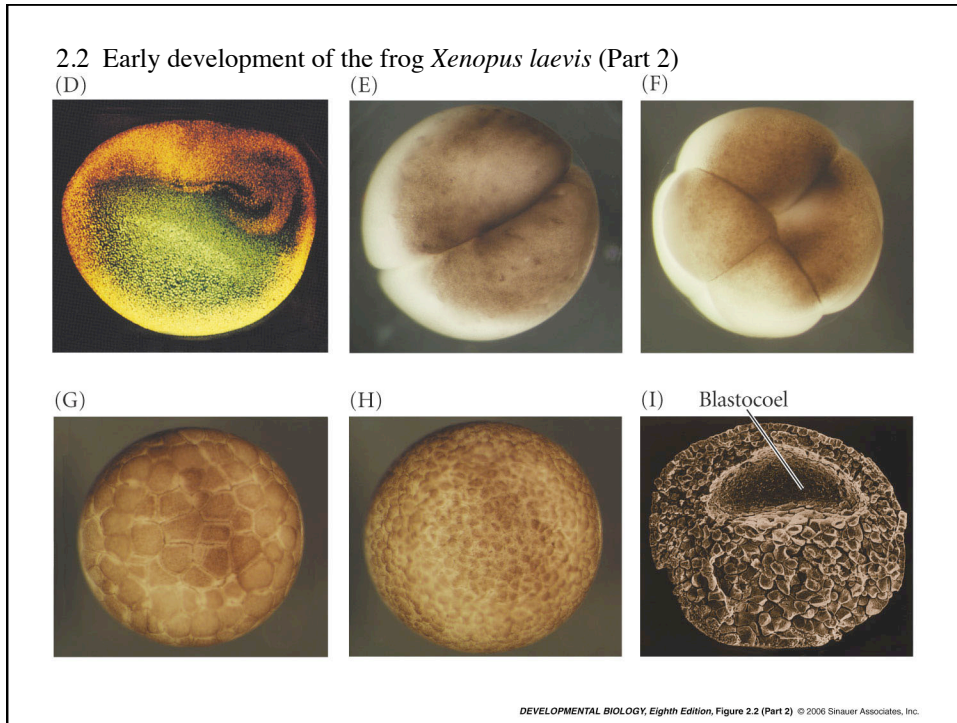
- Was it an adult (donor) nucleus?--YES
- Was it a differentiated nucleus?--YES
- Did it generate a frog?--YES

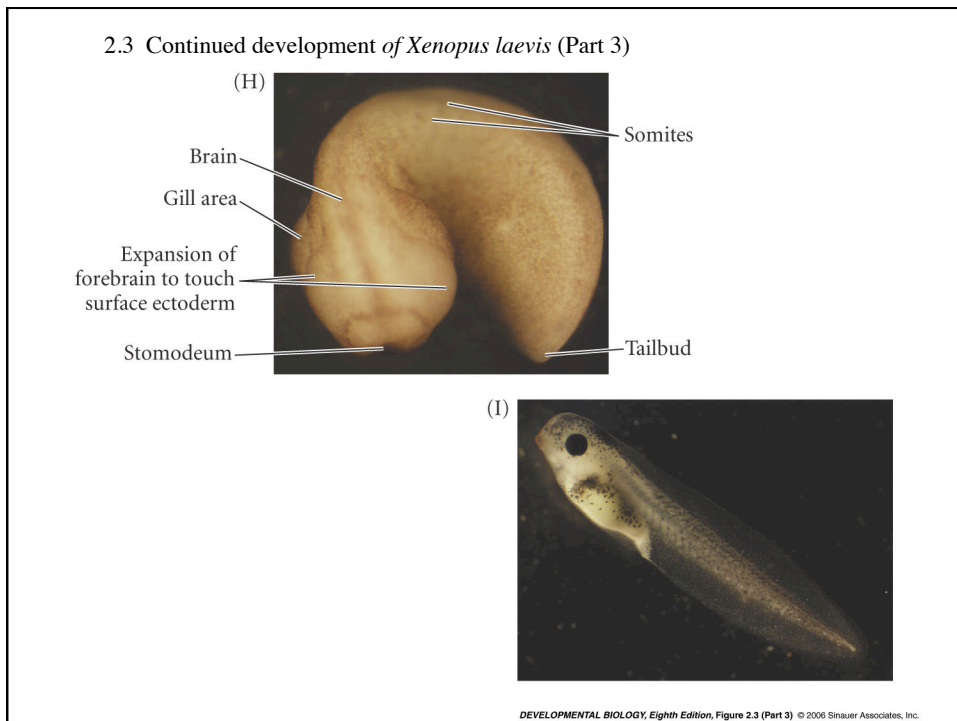
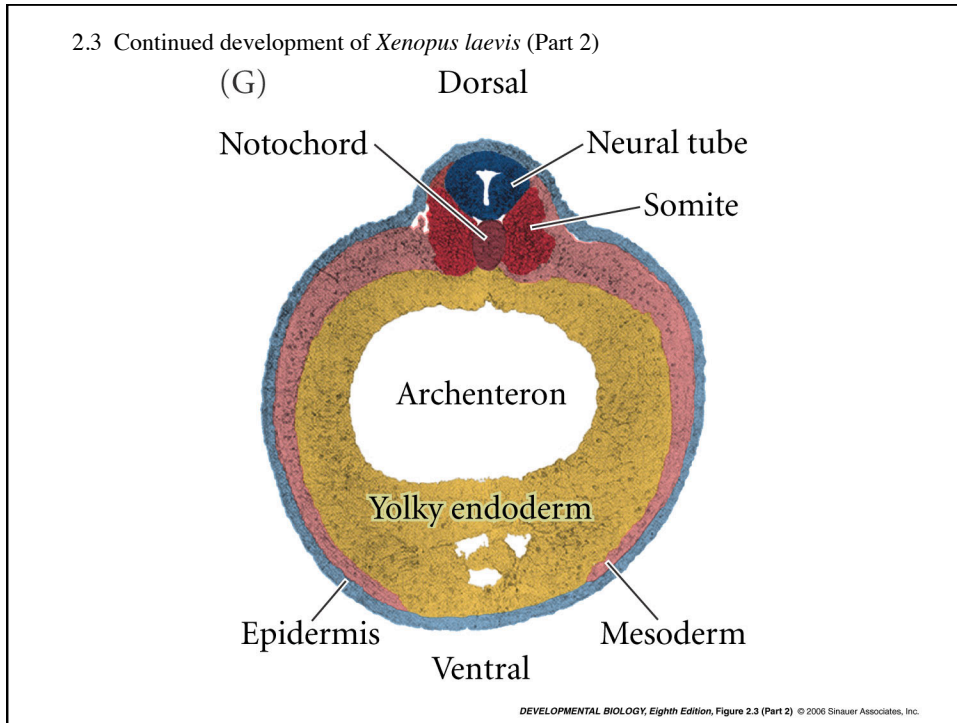
Conclusion: after differentiation, there is:

- No loss of information
- No irreversible inactivation
- No permanent change in genes required for normal development.



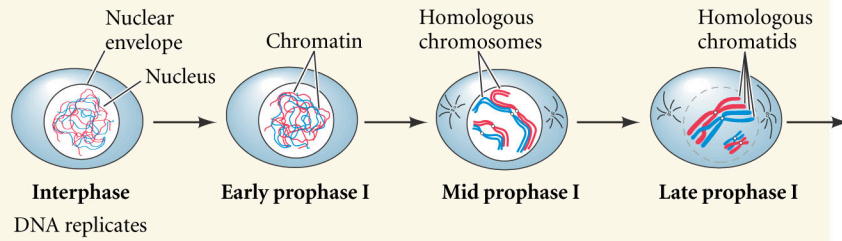






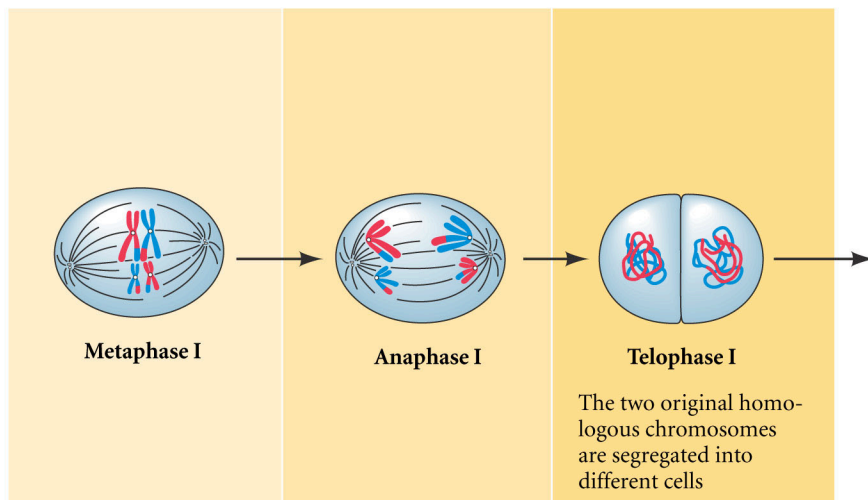
2.5 Summary of meiosis (Part 1)

Meiosis I: Separation of homologous chromosomes

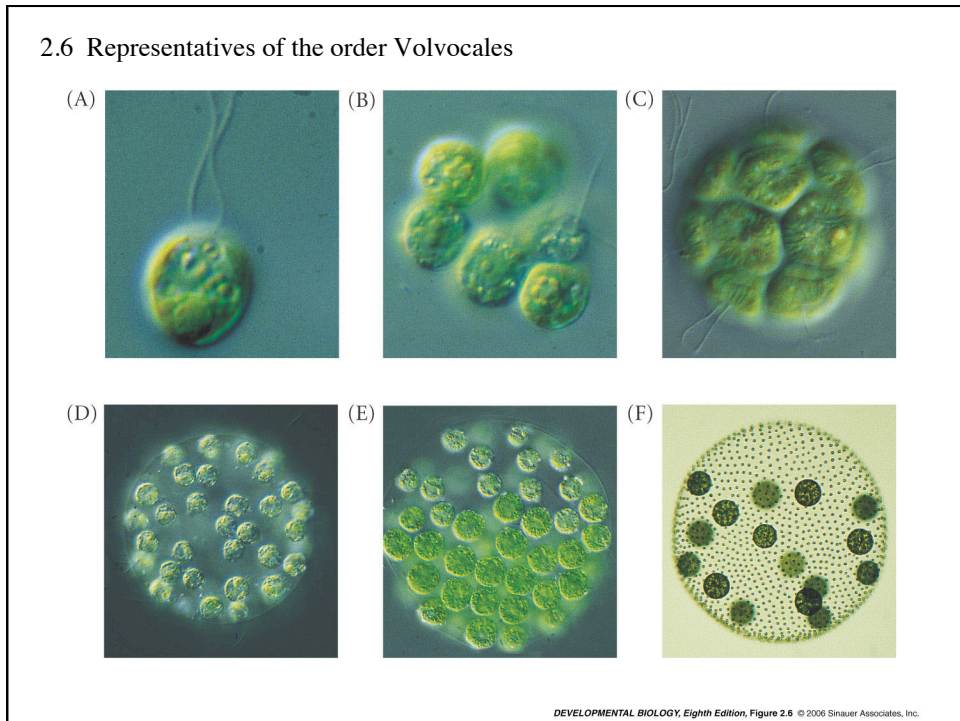
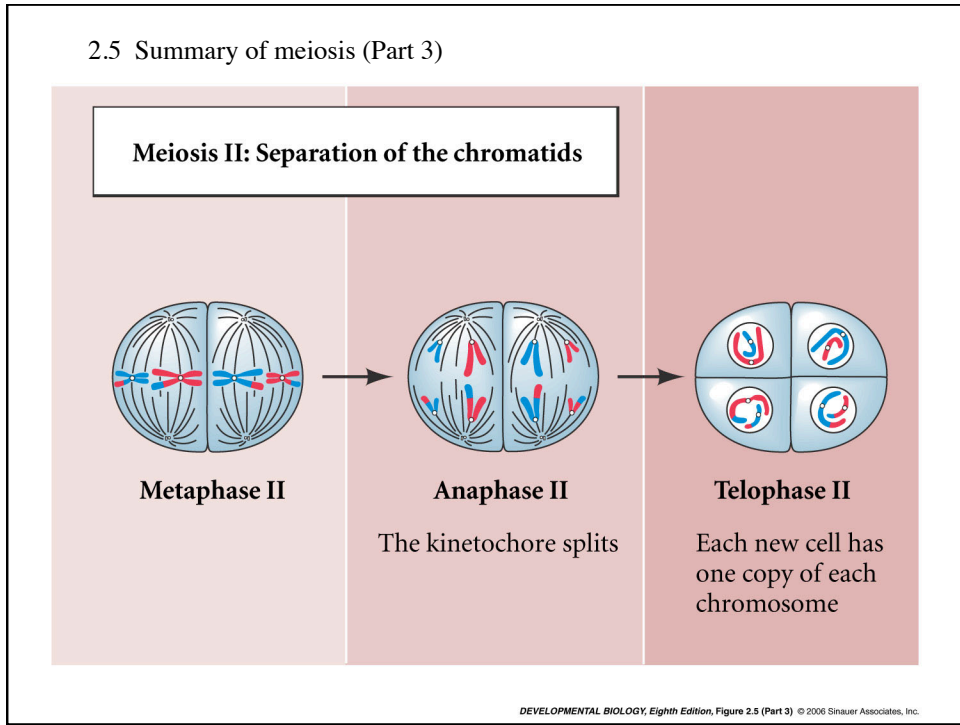


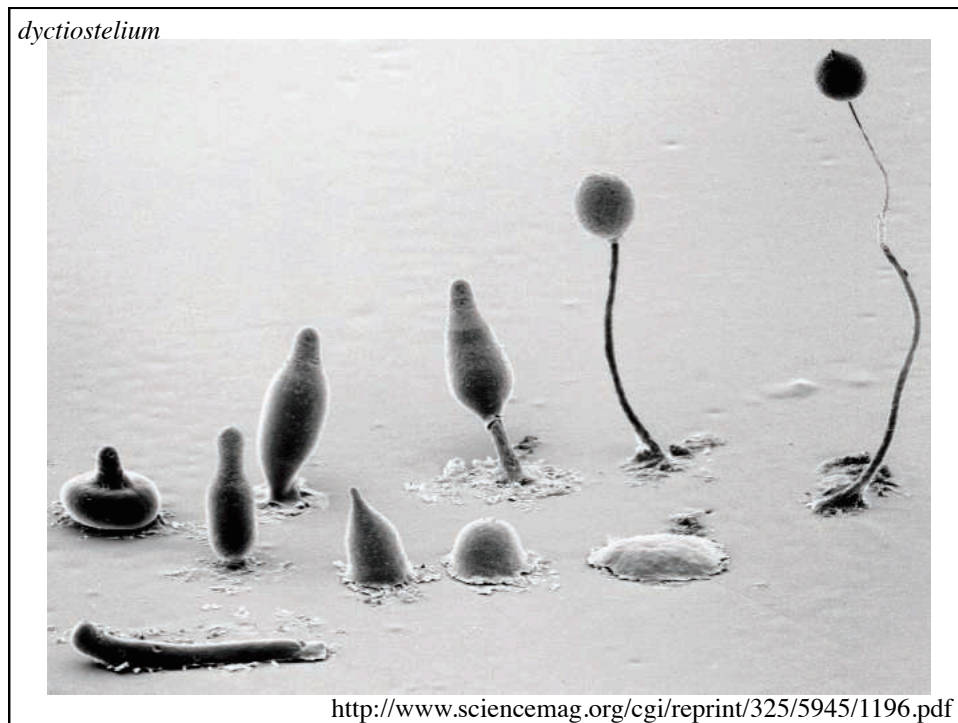
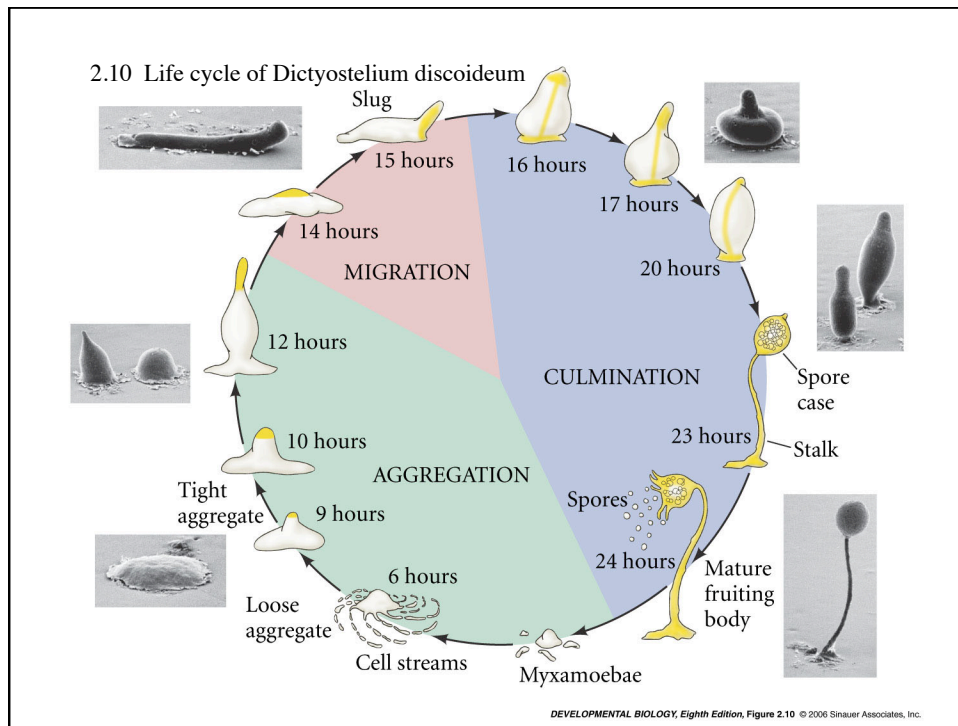
DEVELOPMENTAL BIOLOGY, Eighth Edition, Figure 2.5 (Part 1) © 2006 Sinauer Associates, Inc.

2.5 Summary of meiosis (Part 2)



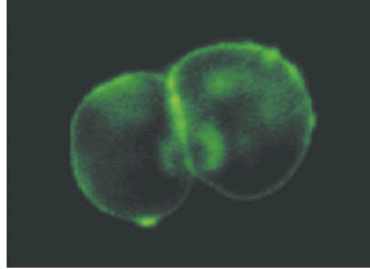
DEVELOPMENTAL BIOLOGY, Eighth Edition, Figure 2.5 (Part 2) © 2006 Sinauer Associates, Inc.



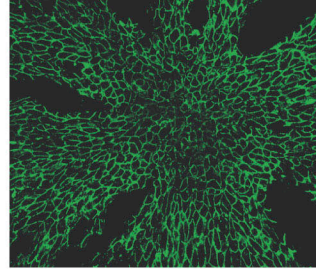


2.12 The three cell adhesion molecules of Dictyostelium

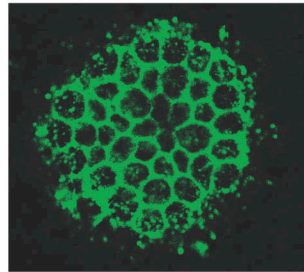
(A)



(B)



(C)



DEVELOPMENTAL BIOLOGY, Eighth Edition, Figure 2.12 © 2006 Sinauer Associates, Inc.