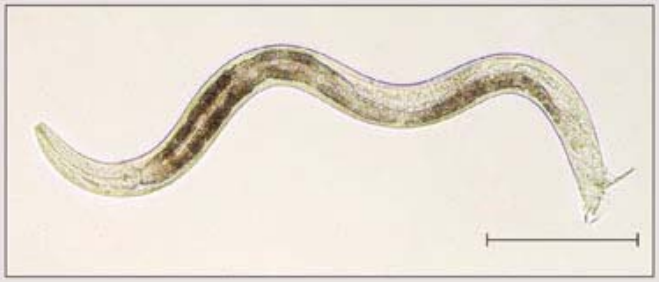
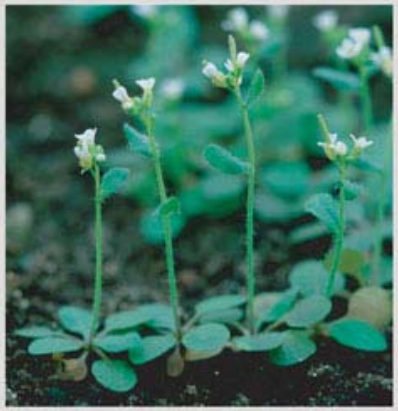
Genetic Control of Development

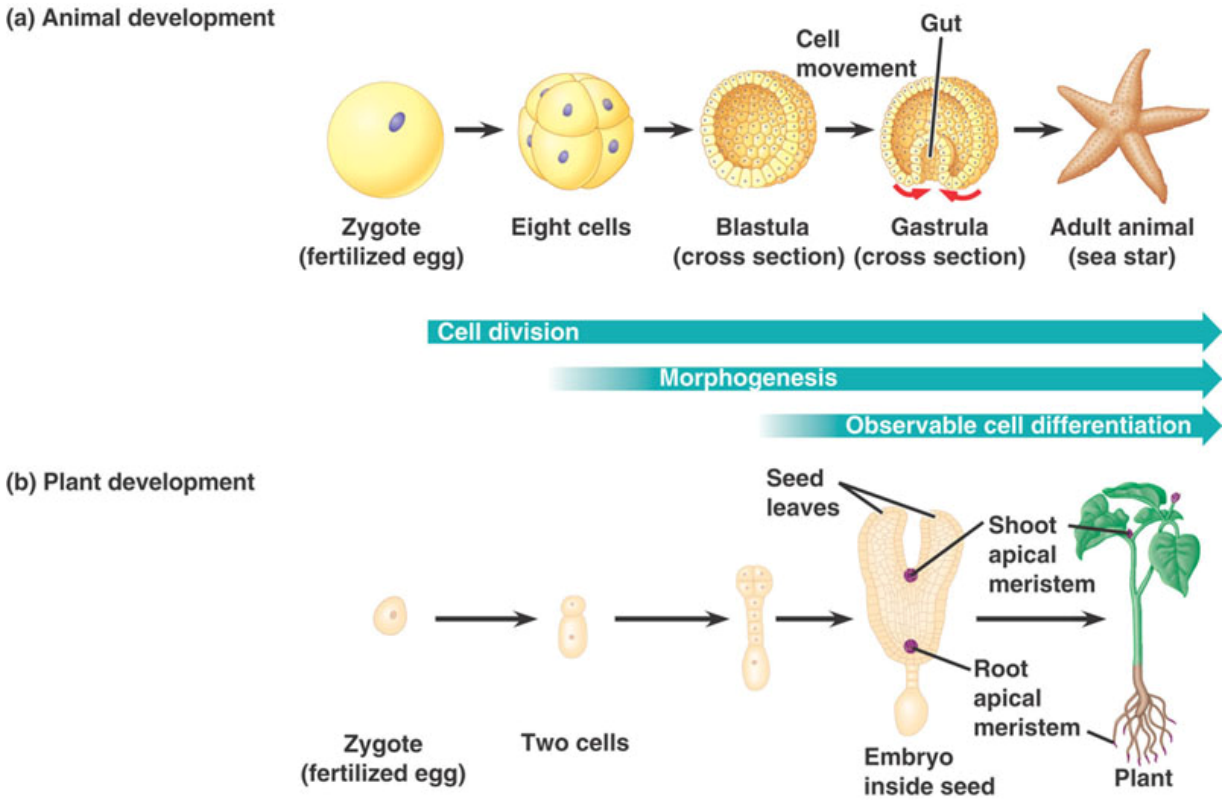
Model Organisms for Genetic Studies of Development

DROSOPHILA MELANOGASTER (FRUIT FLY)	*CAENORHABDITIS ELEGANS* (NEMATODE)
	

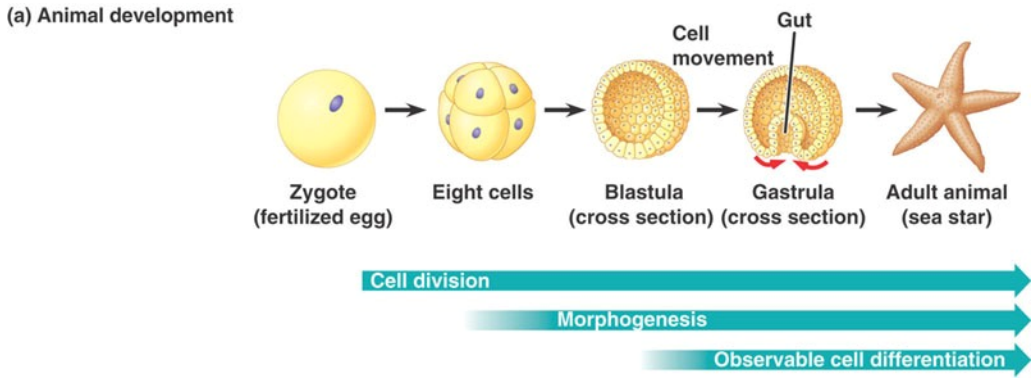
Model Organisms for Genetic Studies of Development

MUS MUSCULUS (MOUSE)	*DANIO RERIO* (ZEBRAFISH)	*ARABIDOPSIS THALIANA* (COMMON WALL CRESS)
		

Stages of Development in Animals and Plants



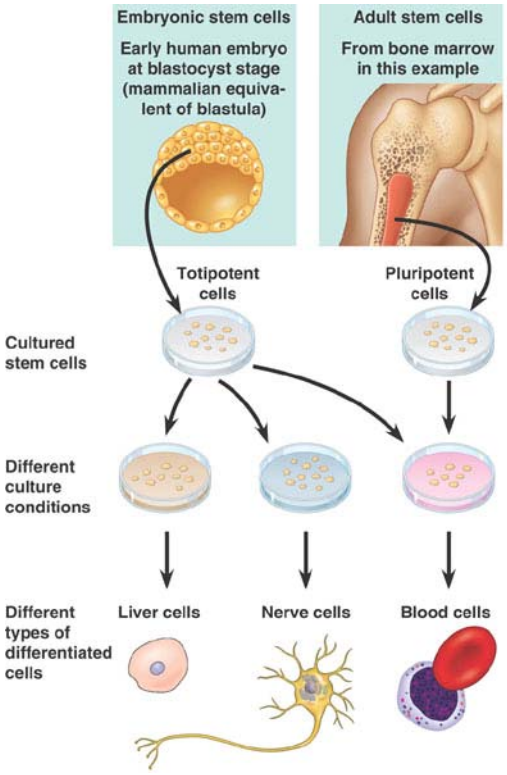
Undifferentiated and Differentiated Cells



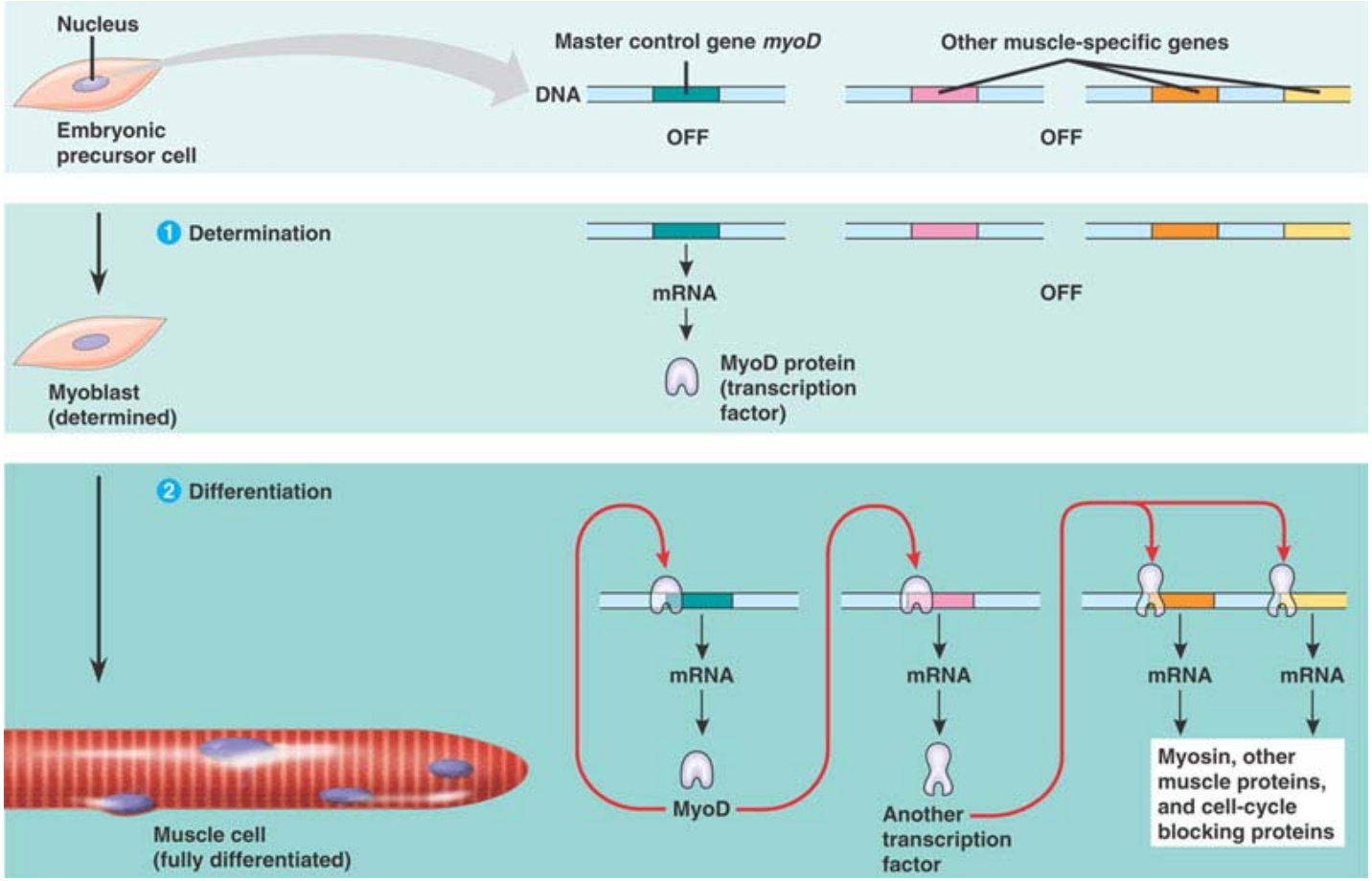
- Undifferentiated cells retain the ability to develop into any of the body's cell types
- Differentiated cells will produce certain cell types only

Animal Stem Cells

- Animal stem cells are relatively unspecialized cells that can both reproduce themselves indefinitely and differentiate into specialized cell types
- Stem cells replenish and generate cells that engage several differentiation pathways; they are present in adult individuals

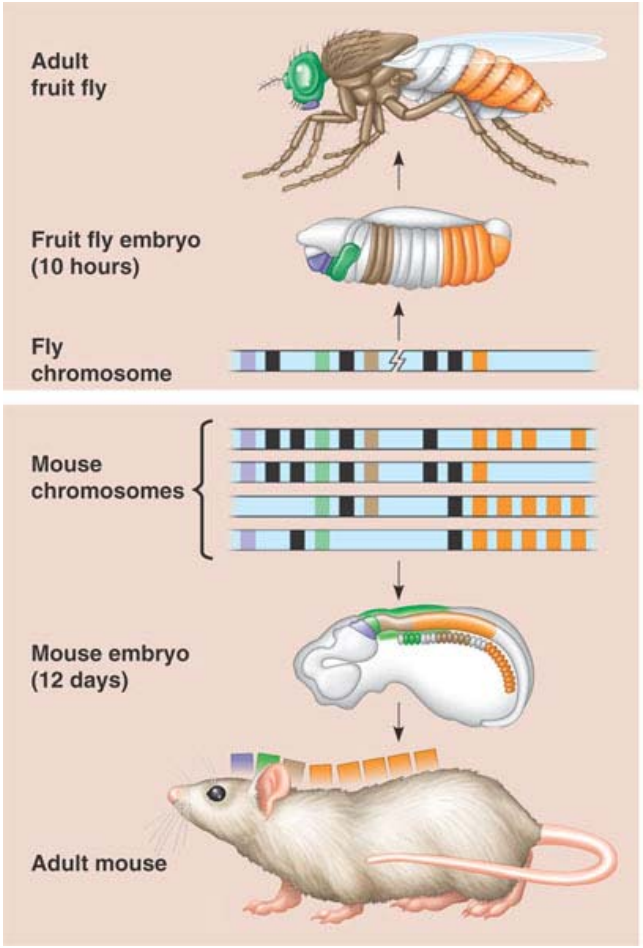


Cell Determination and Differentiation



Genes and Pattern Formation

- Pattern formation in animals and plants results from similar genetic and cellular organisms
- Developmental genes are widespreadly conserved
- Homeotic genes, which control the form of anterior and posterior structures of the body, occur in the same sequence in the fruitfly and in mice



Differences in *Hox* Genes Expression