

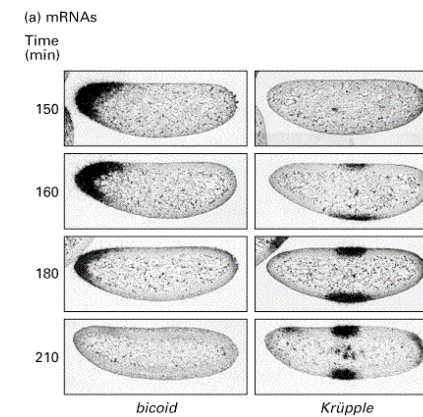
DEVELOPMENT

The egg/cell provides the molecular and architectural context for development

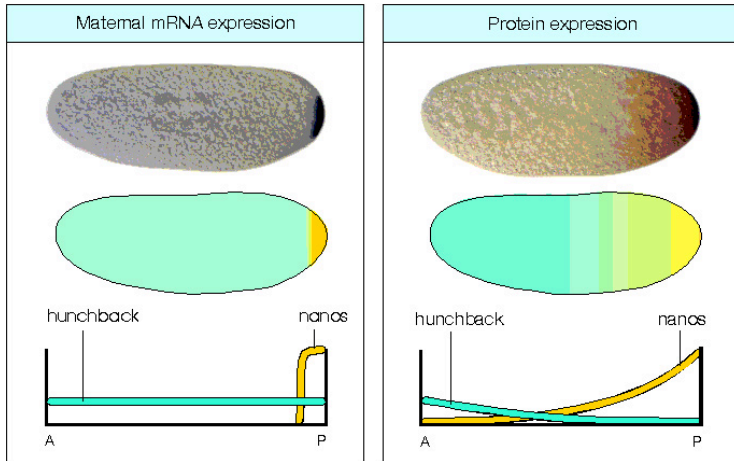
IMPORTANT ISSUES

1. The egg has information pre-stored in it. **How do we identify the genes encoding this information?**
2. Not all genes are expressed in each cell/tissue. **How do we determine whether a gene is required for a particular developmental event?**

The *Drosophila* egg has maternal gene products localized

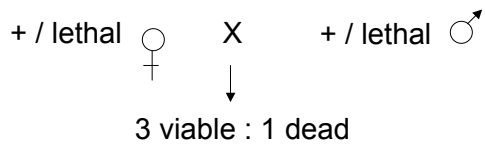


The Drosophila egg has maternal gene products localized

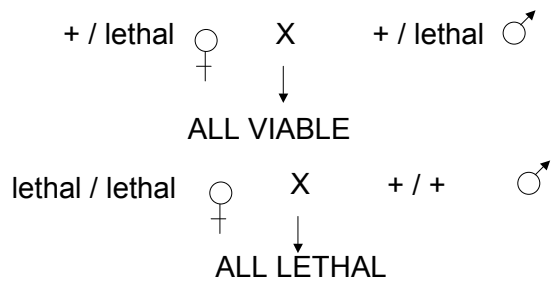


MATERNAL EFFECT MUTATIONS IDENTIFY DEVELOPMENTAL GENES WHOSE PRODUCTS ARE PRE-LOCATED IN THE EGG

ZYGOTIC LETHAL

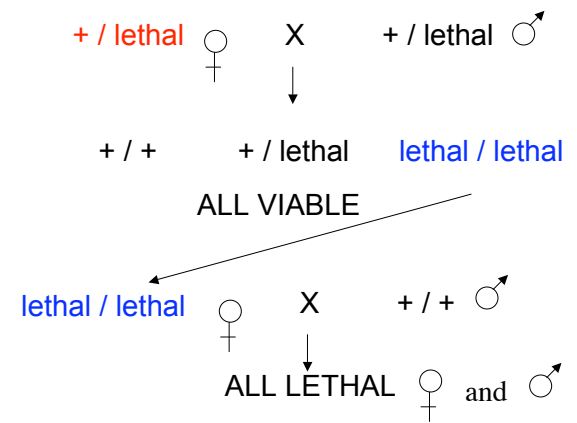


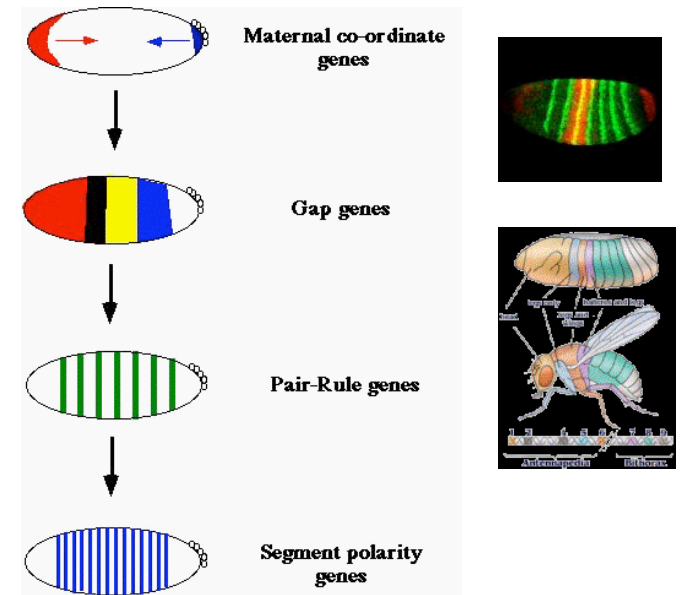
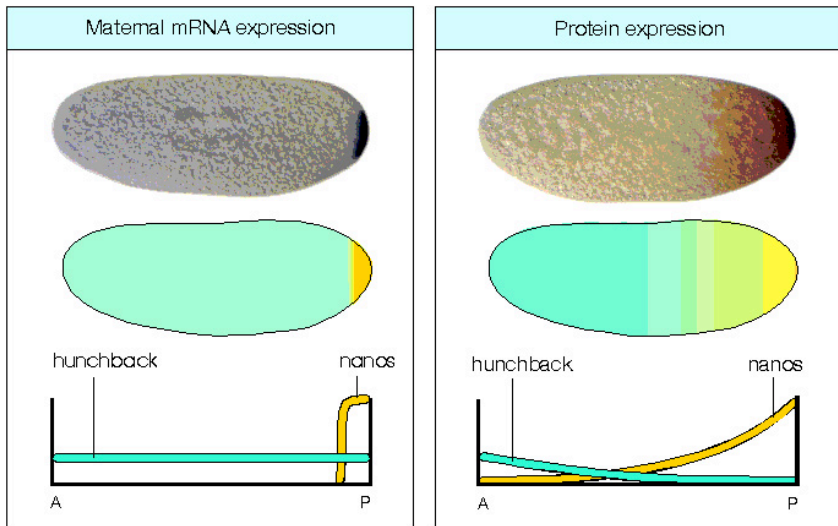
MATERNAL EFFECT LETHAL



MATERNAL EFFECT LETHAL

(Can the mother produce normal eggs)





HOW CAN WE DETERMINE WHETHER A GENE'S FUNCTION IS AUTONOMOUS OR NON-AUTONOMOUS?

A CELL OR TISSUE MAY RECEIVE INFORMATION:

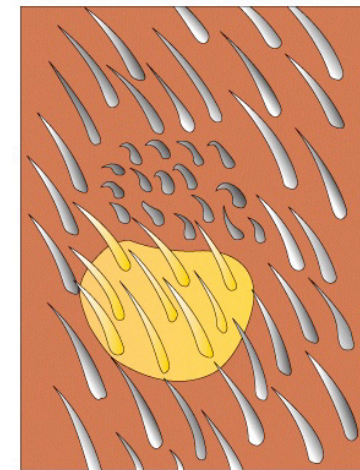
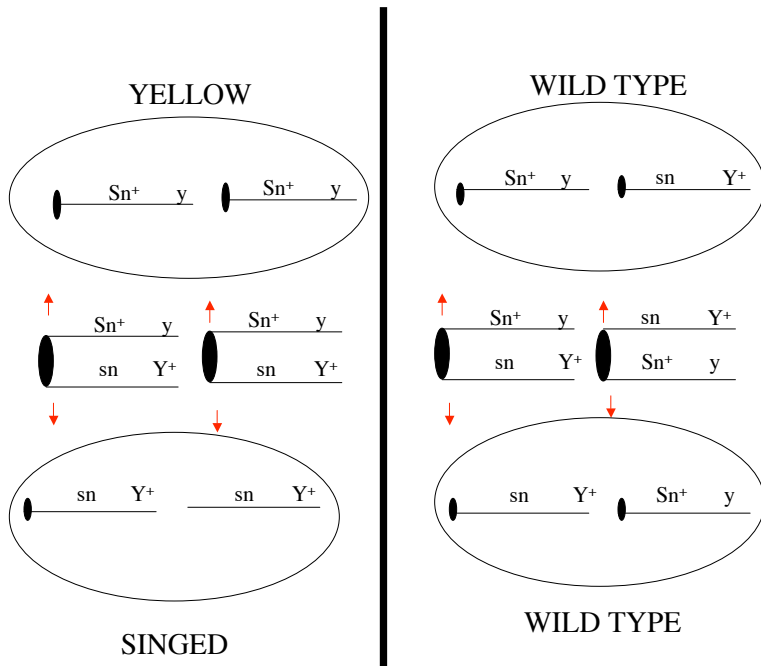
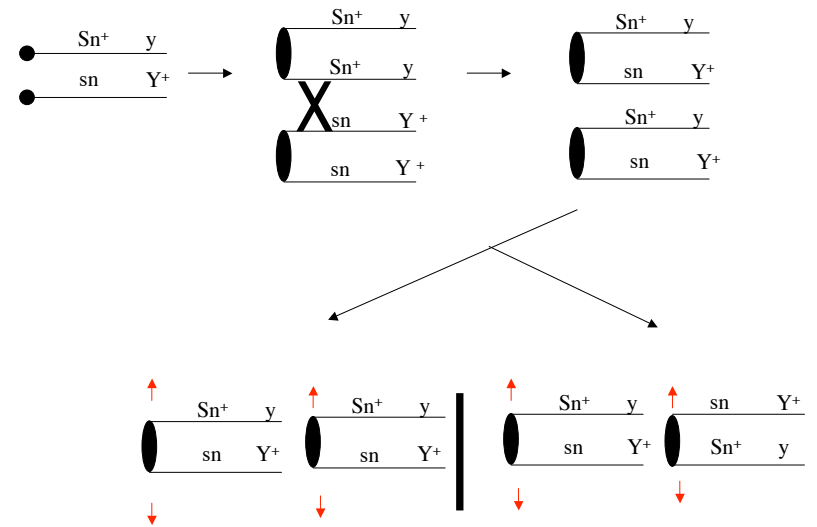
1. FROM THE CELL ITSELF-AUTONOMOUS
2. FROM ITS NEIGHBORS-NON-AUTONOMOUS

HOW CAN WE TELL IF A GENE FUNCTION IS REQUIRED IN A SPECIFIC TISSUE?

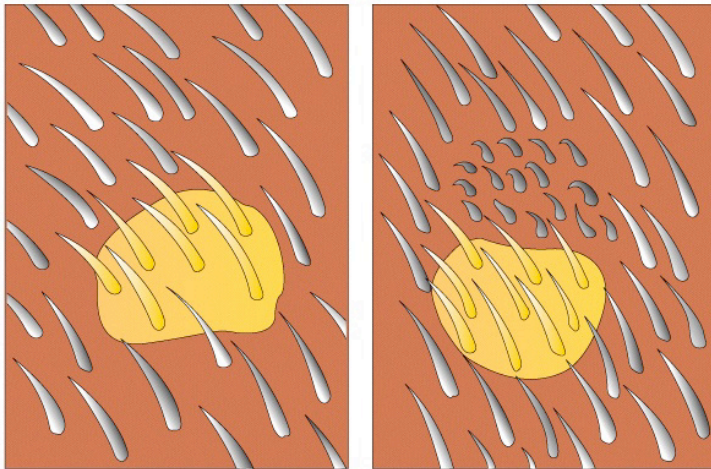
ANSWER:

GENERATE MUTANT CLONES WITHIN THE TISSUE

MITOTIC RECOMBINATION



(b) Twin spot



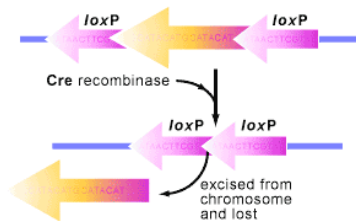
(a) Single yellow spot

(b) Twin spot

HOW CAN WE TELL IF A GENE PRODUCT IS REQUIRED IN A PARTICULAR TISSUE?

METHOD: USE THE CRE/LOX SYSTEM TO ELIMINATE THE GENE ONLY IN THAT TISSUE.

CRE IS A RECOMBINASE CAUSING RECOMBINATION ONLY BETWEEN TANDEM REPEATED LOX SITES



HOW CAN WE DELETE A GENE IN A PARTICULAR TISSUE?

METHOD: PLACE CRE UNDER A TISSUE SPECIFIC PROMOTER AND THE GENE IN QUESTION FLANKED BY TANDEM LOX SITES

A CELL TYPE SPECIFIC PROMOTER DRIVES CRE
EXPRESSION

