Review session: Th Apr 5, 7-9 pm
(location to be determined)
midterm: M Apr 9

Reading on sex:
pp85-88 (In many species…)
pp109-110 review (Analysis of rare mistakes…)
pp516-518 (Changes in chrom. # --to--Some euploid…)
Table 14.2 (p526)
pp664-665 (RNA splicing helps regulate gene expres-
pp669-676 except 670-71 (Sex determination in Drosop

DNA breaks and improper repair after S phase
generate the “twin-spot” of cells homozygous for y and sn

Will we see a true twin-spot phenotype in this case?

What if we had induced a NEW recessive MUTATION on a mutagenized
y sn chromosome (in the father’s sperm) that affected cell growth parameters
..appearance of an ABNORMAL homozygous yellow patch next to homozygous
singed patch would SIGNAL that the female carried a new mutant allele

The (inferred) abnormal growth behavior of cells in the homozygous yellow patch
located next to “normal” homozygous singed patch would SIGNAL that fact that
MOST OF THE CELLS OF THAT F1 FEMALE (including her germ cells)
were heterozygous for a new mutant allele affecting cell growth

..and such a female would be fully viable
even if
the new recessive mutant allele would have been lethal
(perhaps even embryonic lethal – killing long before adult stage)
if a significant fraction of her cells had been homozygous for it.

..lethal either because of a defect in the same function
affecting adult cuticle, or because
of a defect in some other process
Problems (limit use for genetic screens):
-- mitotic recombination infrequent
-- position of exchange not controlled
-- radiation used to induce is damaging
-- tissues in which occurs are not controlled

Solution:
induce using site-specific yeast recombination system

FLP: recombinase (protein that catalyzes recombination at FRTs)
FRT: DNA target (34 bp) site for recombinase

Genetic mosaics have zillions of uses besides just facilitating mutant isolation

...and geneticists have ways of controlling exactly when and where FLPase is generated
...and hence exactly when and where mitotic recombination is induced

Sex education... from a genetical perspective
Forces in evolution
(and evolution is what genetics — and life — is really all about):

(1) **Natural selection**: reproduction of the fittest
...remember, responses to changes in biological environment (including parasites) are as important as responses to changes in physical environment.

(2) **Sexual selection**: reproduction of the sexiest
(this term is NOT in your glossary)

*runaway sexual selection* generally leads to maladaptive sexually selected traits

human brain = peacock tail?

...but a tail with the capacity to change the way life evolves

Sex:

- Sexual reproduction
- Asexual reproduction

Coming together of genetic material from (two) individuals to form progeny that:
- **symmetrical sex**: equal genetic contribution from each partner
  - **us**
  - **bacteria**
- **asymmetrical sex**: unequal genetic contribution from each partner
  - **qualitative exceptions**: mitochondria & Y chromosome

Can there be sex without gender?

(males & females)

Recall:

Sex:
- Sexual reproduction vs. Asexual reproduction

Coming together of genetic material from (two) individuals to form progeny that combine genes from all (both) parents
GAMETES (sex cells)

**Isogamous** sex systems:
gametes from each parent are of equal size

**Anisogamous** sex systems:
gametes from each parent are of different sizes

- **Males**: sperm/pollen (smaller)
- **Females**: eggs/ovules (larger)

(pARENTS have to be separate to qualify)

Sex is ancient and ubiquitous

**Nevertheless**: bdelloid rotifers: no sex for millions of years

**Evidence**:
- no meiosis (genes are missing)
- unusual distribution of DNA variation suggests no gene mixing for ages

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