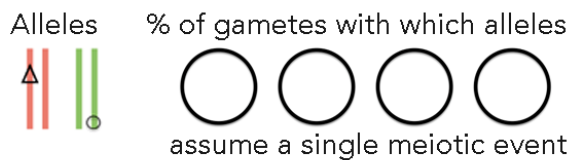




practice midterm questions



1 cM ~ 1 Mbp

assume hundreds of meiotic events



A person displays a genetic disease, called Whirly.

The disease occurs when a person carries a single copy of the **bf** allele of GENE1 and a single copy of the **up** allele of GENE2.

A person with Whirly disease mates with a person who carries neither **bf** nor **up** allele.

What factors will influence what percentage of the offspring of this mating have Whirly disease?

Now you find that the frequency of Whirly offspring is less than, but close to 50%. What can you conclude about GENE1 and GENE2?

Make a schematic of the common elements of a typical eukaryotic gene.

How might mutations in these components influence gene activity (provide examples).

Describe two possible mechanisms that could lead to a hypermorphic mutation.

Describe one possible mechanisms that could lead to neomorphic mutation.

Describe two possible mechanisms that could lead to a antimorphia mutation (in a diploid organism).

similar questions for amorphic & hypomorphic

Diagram the key events in the prokaryotic cell cycle.  
What are the key check points and what "bad" things could happen if their conditions (to proceed) are not met.

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Diagram the key events in the eukaryotic cell cycle.  
In what ways are they different/similar to those in the prokaryotic cell cycle?

What are the key check point(s) and what "bad" things could happen if their conditions (to proceed) are not met.

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Draw a typical prokaryotic chromosome, and the part(s) critical for cell division. What will happen if a mutation disrupts their function(s).

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Draw a typical eukaryotic chromosome, and the part(s) critical for cell division. What will happen if a mutation disrupts their function(s).

## Review questions

Consider a diploid eukaryote with two chromosomes.

In a somatic cell, draw out the behavior of the chromosomes from immediately after the previous cell division through to the completion of the next cell division. Indicate how the chromosomes do or do not interact, and which processes are occurring.

In a germ line cell, draw out the behavior of the chromosomes from immediately after the previous mitotic division through to the generation of gametes. Indicate how the chromosomes do or do not interact, and which processes are occurring.

Why do asexual organisms not display sexual dimorphism? Are all asexual organisms identical, and if not where does variation come from?

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What factors can lead to sexual dimorphism in sexually reproducing organisms? How does sexual reproduction influence variation between organisms?

A diploid organism has two different alleles at the XXE gene.

You look at a somatic cell from this organisms and discover only one of these alleles is expressed.

What process(es) could explain this observation, and how would you distinguish between them? What other data might you like to have to help you decide?

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An organism determines sex environmentally; it first develops as a female, and then (under the appropriate conditions) transforms into a male.

In the total absence of males, females of this species can undergo parthenogenesis, a sexual process that does not involve mating with another individual.

These organisms have a version of the SRY gene, known to determine sex in mammals. An amorphic allele of the SRY gene is present in the population and under strong positive selection – individuals with this mutant SRY gene cannot transform into males.

Provide a plausible predication for how the spread of the amorphic SRY allele will influence the population's reproductive behavior

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