Survey of Bio.

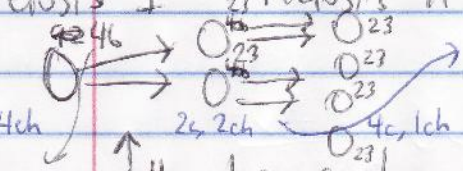
Wk. 9

Thripp Survey Pg. 1

MON. 2009-10-26, 8-9:20 AM:

Chromosomes move to middle (equator) in metaphase

Meiosis I Meiosis II

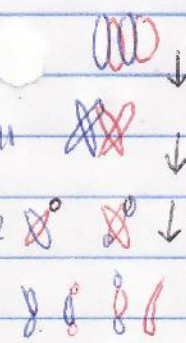


46 DUPLICATED chromosomes

Homologous chromosomes separate. (same or split)

Also in Meiosis I: ~~independent assortment &~~ 2 kinds of recombination: independent assortment (random movement of the chromosomes), random movement (separation of homologs), crossing over (break & exchange of DNA between homologous chromosomes)

black ink isn't working right



Crossing Over in Meiosis

M1 = Metaphase I

M2 = Metaphase II

↳ in Meiosis

Your parents can have 2^{46} combinations of chromosomes in a zygote. YOU ARE UNIQUE (unless you have an identical twin in which case you are a CLONE)

In Meiosis II, the chromatids separate. (also in mitosis)

In Meiosis I, homologs pair up a.k.a. synapse, homologs separate reducing # of chromosomes by $\frac{1}{2}$, and recombination occurs

46 DUPES → 23 DUPES → 23 SINGLES

MEIOSIS I MEIOSIS II

DOWN SYNDROME = nondisjunction in Meiosis (usually in women's egg)

MITOSIS: Chromosomes line up

MEIOSIS: Chromosomes pair up (chromatids)

Test Q: Trisomy 21 is called Down syndrome

Mon, 2009-10-26, 8-9:20 AM:

XXY = Klinefelter syndrome (XXXY, XXXXY, etc)
XO = Turner syndrome = female (only 1 sex chromosome)
XXX = female
Klinefelter = breasts, underdeveloped testicals
Turner = aorta constriction, underdeveloped breasts & ovaries

Mitosis yields genetically identical cells.
In animals (unlike in some plants), sperm & eggs don't live alone
☺
M: TOsis makes my toes. MEiosis makes my eggs (or sperm).
Chromatin only exists in interphase (relaxed chromosomes).
☺ Telomeres have something to do w/ aging & cancers.
☺ If you clone yourself at 60 your clone may die of old age at 20 as if he is 80. i.e Dolly the sheep
chromosomes = chroma (color) + soma (body)
→ (stain darker than chromatin)
Chromosomes contain DNA & proteins. DNA codes for genes or the blueprint to make proteins (most genes) — mainly enzymes
Telomere = end of eukaryotic chromosome
Centromere = area where 2 chromosomes meet in X formation
Homologous chromosomes = same genes, different DNA
→ found in diploid (2N) organisms — 1 from Dad, 1 from Mom
Two homologs are: same size & shape, same genes
(but non-identical DNA i.e brown or blue eyes)
Cytokinesis occurs in telophase = division of the cytoplasm.
Animals = furrow Plants = cell plate

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MON, 2009-10-26, 8-9:20 AM:

CH 26: SEX

☺ An elephant stays pregnant for almost 2 years.

☺ American women are 4 times more likely to have triplets now due to fertility drugs

☺ ejaculation releases up to 500M sperm

Asexual Reproduction = one parent produces genetically identical offspring

Bacteria reproduce by binary fission — divide into exact copy

NO mitosis because bacteria are prokaryotic — no nucleus or chromosomes.

Budding: splitting off of new individuals from existing ones by mitosis producing genetically identical offspring — i.e hydra

→ Fragmentation & regeneration (i.e cacti)

↳ break up → grow back

Sponge bob Square pants

Asexual reproduction is good if there ~~are~~ are no other organisms around. Also: produces genetic similarity.

Exploits a stable environment → MANY PRIZE WINNERS

→ but all can die @ once — no diversity

Sexual reproduction = fusion of gametes (sperm + eggs)

↳ Genetic variability — adapts to changing environments.

↳ Not all can be wiped out by one virus.

↳ Not mutations but new combinations of genes.

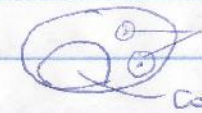
A few ~~animals~~ organisms can reproduce sexually and asexually.

Some are hermaphrodites — i.e earthworms, but they do not fertilize themselves.

☺ Some animals use external fertilization — i.e eggs & sperm in water. In women eggs are released once a month (ovulation) for a sperm cell to fertilize in the fallopian tube — egg then implants in the lining of the uterus.

MON., 2009-10-26, 8-9:20 AM

Ovaries contain: Follicles:



- single developing egg cell
- surrounded by layers of cells for food & shelter
- cells make estrogen

Many sperm cells are needed to break through the egg shell

Cilia in fallopian tube move the zygote to the ~~uterice~~ uterus after sex (takes days!).

TUE, 2009-10-27, 9:30-10:50 AM

Meiosis I: - homologous chromosomes pair up
- homologous chromosomes separate & ~~reduc #~~ reduce # by half
  ↳ 46 pairs → 23 pairs in M1

In M2: 23 chromosomes (46 chromatids) split

Recombination: 3a: random separation (independent assortment) of homologs, 3b: crossing over (break & exchange of DNA between homologous chromosomes)

Meiosis I is all the cool stuff.

Meiosis II is like mitosis (chromatids split).
  ↳ In Anaphase II the chromatids separate.

☺ Children from older women have Down syndrome more often.
  ↳ especially above the age of 40.

Klinefelter syndrome = XXY = girly boy
Turner syndrome = XO = boyish girl
  ↳ only 1 chromosome

} generally sterile

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TUE, 2009-10-27, 9:30-10:50 AM

Life cycle of sperm + eggs: meiosis makes egg & sperm
egg & sperm combine in fertilization forming a zygote
(fertilized egg) → male or female organism
In Meiosis II, duplicated chromosomes (chromatids) split
to make 4 cells from 2 cells.
Chromatin is made of DNA & protein. DNA itself is
made of nucleic acids (AGCT).
Chroma = color => Some => stain
☺ "The stained do-hickey" = chromosome

Proteins include enzymes. DNA codes for genes.
"Chromatid" is only used when we speak of a duplicated
chromosome.

Telomeres = ends of eukaryotic chromosomes. Tend to shorten
w/ age, causing death by old age.

Homologous chromosomes = 1 set (23) from Dad, 1 set (23) from Mom
Same size, shape, & genes but different alleles,
i.e. brown or non-functional (blue)
Cytokinesis in animals = furrow. Plants = plate.

Sci. Seminar Nov 4

☺ A woman is born with 500,000 eggs, but will use far less.
~~2009~~ - 1997-11-19: septuplets (7) born in Iowa
(by fertility drugs)
Asexual = no sex. Asexual organisms produce clones.

TUE, 2009-10-27, 9:30-10:50 AM

Binary fission is how prokaryotic cells divide.
↳ Grow & divide ↳ Bacteria & Archea
exact copies (clones)

Cacti & Sponges
can regenerate from fragmentation
→ would be good if we could re-grow arms, legs, etc.

Budding doesn't happen with advanced animals.

Asexual reproduction = binary fission, fragmentation, budding — good for a species when there are no sexual partners
→ good for a stable environment — genetic similarity means everyone can die

gamete = generic term for egg OR sperm

Sexual reproduction produces genetic variety for changing environments.

Test Q: What reproduction is good for a changing environment? Sex

Mutation is too rare to rely on — sexual or asexual reproduction is better (happens more often).

What reproduction is good for a static (unchanging a.k.a stable) environment? Asexual

Some animals are true hermaphrodites — they have fully function male & female genitalia. → Greek gods? Hermes, Aphrodites

Ovaries make eggs by oogenesis.

Ovulation = releasing egg into oviduct ~~= best time to ha~~

Corpus luteum doesn't move around — it just stays in plac

Drawings look different to show different stages
↳ have sex to make babies at this time

TUE, 2009-10-27 9:30-10:50 AM

Ovaries contain follicles that grow, grow, grow.
Some ~~a~~ become eggs. Some become the corpus luteum (body yellow — yellow body).
Ovulation = rupture of follicle to release egg into the fallopian tube (oviduct). Part of menstral cycle (~28 days). → egg moved in tube by cilia

WOMEN

Sperm have to swim through the cervix (after vagina) to get to fallopian tube. Then the fertilized egg moves to the uterus in a few days by the beating of the cilia in the tube. A baby grows in the lining of the uterus.

MEN

prepuce = foreskin on penis = cut off by Jewish rite called circumcision

Penis contains erectile tissue:
blood goes in to engorge the penis for sex & stays there until sex or arousal is over

☺ don't do this to your kids

Testes = male gonads in a sack called the scrotum
Seminiferous tubules within the testes make sperm by meiosis → stored in epididymis & matured

(don't call them testicals says Dr. Bucker)

epididymis is where sperm is stored & matured (above the testes)

During ejaculation, mature sperm leave epididymis via vas deferens.

vasectomy = cutting of vas deferens = sterilization

MEN

2009-10-27 TUE

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Prostate = makes alkalai, neutralizes acidic pH of the vagina. — makes most of semen

Seminal vesicles: secretes sugar to feed the sperm's mitochondria

Cowper's gland: lubricating fluid (pre-cum)

END