PMI 214 Notes

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- Pyrethroid resistance is growing
- Malaria drugs' complete failure
- Selfish genes
- Homing Endonuclease, X-shredder, **Population Suppression** through extreme set-ratio distortion. All offspring are males, then the male children also carry this mutation.
- CRISPR/Cas9: **Population replacement** of parasite susceptible with resistant. Make a mosquito incapable of transmitting Malaria..
- How do we genetically modify mosquitoes?
  - Transgenesis puts genes into mosquitoes
  - All progeny have the genes as well
- Mosquito ingests the gamete
- Then to a zygote
- Then to an ookinete
- Forms an oocyst - asexual reproduction
- cyst ruptures outside the midgut - releases sporozoites
- they reach the salivary glands
- A team at UCSD made transgenic mosquitoes which can't transmit Malaria - affects the ookinetes and the sporozoites
- Mendelian Inheritance prevents us from simply releasing them in to a village. At best we'll have a low equilibrium.
- We need a gene drive - promote the spread of the trans gene to spread to the wild population
- Gene Drive Inheritance will lead to trans gene fixation. This means getting away from standard Mendelian Inheritance
- A gene drive system utilizes homologous driven repair. The gene drive targets a specific sequence of DNA in the mosquito - it cuts the DNA, and "repairs" it with the trans gene. Forces offspring of mixed parents to be homozygote for the trans gene.
- The donor DNA includes the Control region, Effector region, and the Gene Drive
- "Nice thing about DNA is that DNA is DNA, so..."