BIO 4AE3
24 Oct 2023

EVOLUTION of VIRULENCE.

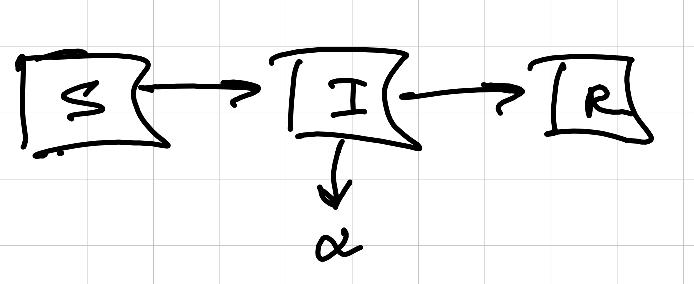
recognition vs effectors
(RQ)

effectors ↑ virulence (parasite); tolerance, resistance } (host)

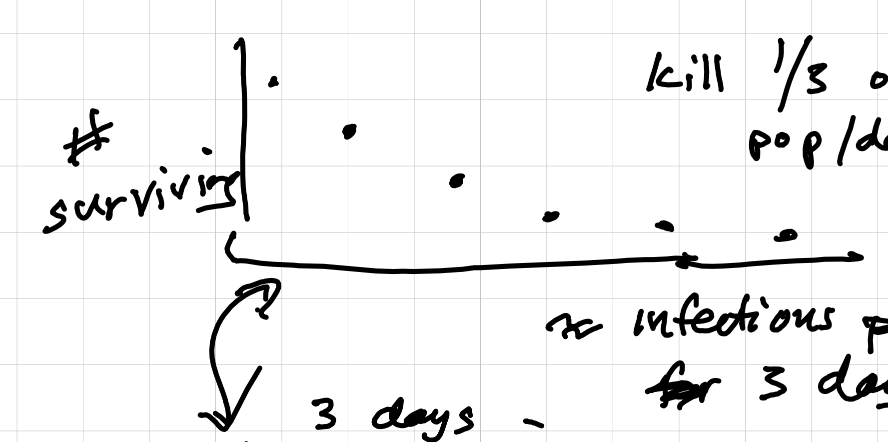
VIRULENCE.

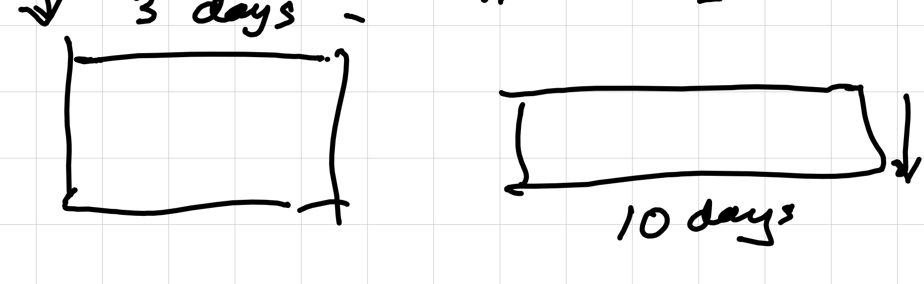
- loss of host fitness due to parasite infection -
  - host killing
  - loss of fecundity
    - castration
    - loss of resources

PROXIES.
↳ narrow-sense
rate of host-killing



≠ case fatality rate.
infection





- transmission rate ←+→ virulence
  - ↘ ↙ parasite load / replication rate / use of host resources

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classical dogma. (<1970s)
parasites always evolve toward commensalism (lower virulence)

- ~~evol~~ newer host-parasite associations would be more virulent
- syphilis.
  1495 'great pox'
  ~~dec~~ over 50 years, virulence decreased.

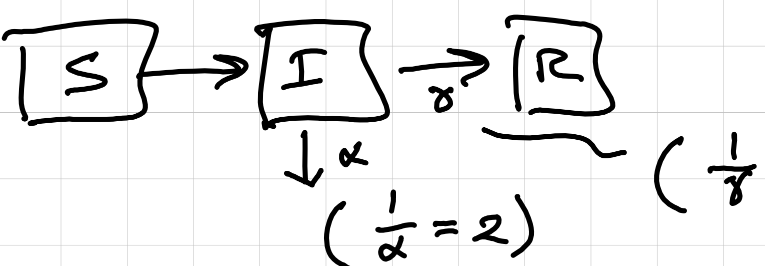
? host evolution?

→ group selection.

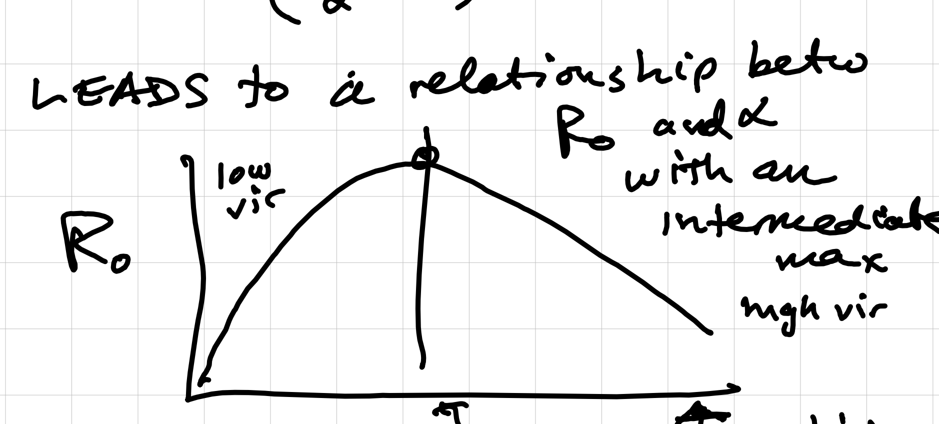
- tradeoff theory.
  host-level selection.

high relatedness

R_0 = transmission rate (β) · infectious period $\left(\frac{1}{\alpha+\gamma}\right)$



LEADS to a relationship betw R_0 and α with an intermediate max

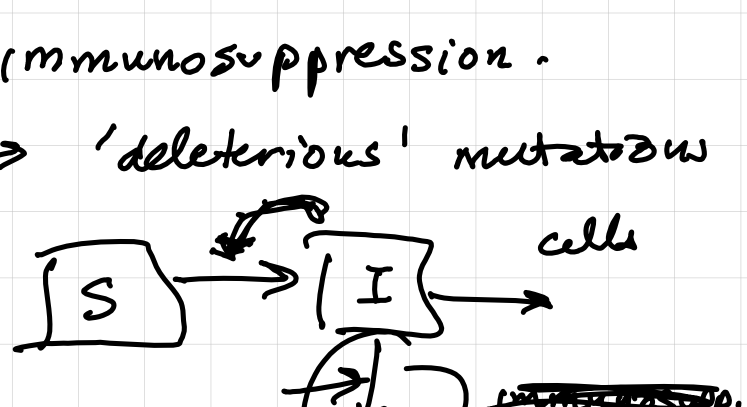


CLEARANCE rate ($\gamma+\alpha$)

classical dogma: from sampling bias?

MECHANISM.

- myxo: Australia, Europe.
- genomic analysis.
  - lower replication rate?
  - → immunosuppression.
    - ↳ 'deleterious' mutations



SPVL varies between individuals
RAKAI, Uganda.
measured · SPVL
- time to transmission
- time to progression

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classical dogma → tradeoff theory → ??
1970s ~2000

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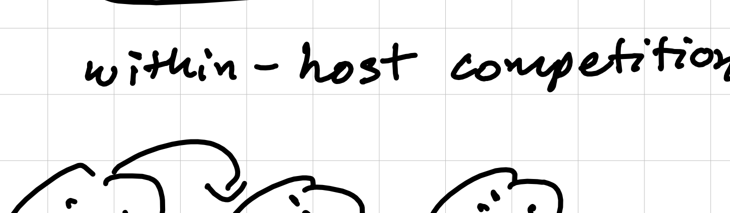
within-host competition.



mutation? SUPERinfection.
increases virulence

short-sighted evolution.
- paralytic polio strains
  CNS - dead end

~~Ex~~ in HIV,