PMI 214 Notes - Greg Lanzaro

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- Leishmania has flagella
- vectored by sand flies in the family Psychodidae
- a few Leishmania species cause visceral leishmaniasis
- lifecycle
  - infected sand fly
  - attachment in macrophage in mammal (parasites delivered into the skin, not the blood vessels)
  - macrophages get into bloodstream (maybe to the liver in the case of visceral leishmaniasis)
  - change into amastigote, undergo sexual reproduction (survive in a parasitophagous vacuoule)
  - infected cells rupture and new parasites invade again, or,
  - into sandfly via bite
  - infects the fly
- 12 million people in 88 countries known infected - 350 million at risk
- 2 million (0.5 million visceral) new cases new cases per year
- 20 species of Leishmania parasites which cause disease in man
- spectrum of clinical disease
  - cutaneous
  - mucu-cutaneous
  - visceral
- visceral (Kala-Azar)
  - up to 100% fatal in some areas
  - mainly Ethiopia and other African countries, and also cases in Brazil (some from Mexico down to Argentina)
  - symptoms
    - bouts of fever
    - enlargement of liver and spleen
    - wasting and weakness
    - darkening of the skin (kala azar means black fever)
    - loss of certain immune responses
  - cutaneous
    - self-limiting
    - systemic signs are absent - it's a local site
    - legions on skin start out small and could get up to 2cm in diameter.
    - untreated sores can leave massive scars
  - muco-cutaneous
    - can completely destroy the face
    - currently much less common

  - zoonotic disease
  - humans are (mostly) dead-end hosts
  - but opposoms, burrowing rodents, wild canids, domestic dogs can infect sandflies
- diagnosis
  - microscopic examination of lesions
  - isolation of parasites in culture
  - most simple: detection of antibodies to the parasites
- treatment
  - cutaneous - most heal without treatment
  - other forms are much more difficult to treat - requires long course of treatment with toxic drugs (essentially chemo - many people die from the treatment)
  - drug resistance is starting to become a problem
- DON'T GET THIS DISEASE! No prophylactics! Use insect repellents and keep your fingers crossed
- prevention
  - no vaccine or prophylactic
  - avoid outdoor activities
  - protective clothing, repellents
  - insecticides, bed nets
- disease in the sandfly
  - most species (400/500) are in the Americas
  - only 70 are known to carry the disease
  - sandflies can lay eggs in moist areas.. don't need water
  - they don't fly very well - mostly flight-assisted hopping
  - mating biology is complicated
  - only females bite
  - like malaria, insect part of lifecycle is most complicated - many stages - metacyclic stage is the one which infects hosts
  - 0-4 days post-infection
    * parasites undergo transformation into flagellated form
    * attach to lining by the tip of the flagella while blood meal is ingested and excreted (must happen otherwise fly excretes them)
  - 7-15 days
    * replicate while attached to the lining
    * move toward the mouthparts in the digestive system
    * move up against a valve which opens and closes to prevent food from being regurgitated
    * parasites destroy the valve
      · causes the fly to regurgitate while feeding
      · these don't infect salivary glands. rather, they are regurgitated into the wound via destruction of valve
      · causes sandflies to bite more often since it's harder for them to feed
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