

WEEK 3.

Paper of the week:

Lima, L.; Espinosa-Álvarez, O.; Hamilton, P.B.; Neves, L.; Takata, C.S.; Campaner, M.; Attias, M.; de Souza W.; Camargo, E.P.; Teixeira, M.M. 2013. *Trypanosoma livingstonei*: a new species from African bats supports the bat seeding hypothesis for the *Trypanosoma cruzi* clade. *Parasit Vectors*. Aug 3;6:221.

Phylum Protozoa or Protista

Class Kinetoplastida – have kinetoplast – a large darkly staining body in the mitochondrion. This is comprised of numerous small rings of interlocking DNA.

DISTRIBUTION OF *TRYPANOSOMA CRUZI*.

Endemic in South America, Central America, and North America.

*appears that the North American strain – shows less pathogenicity in **humans**.

*South American strains are more pathogenic. Eradication campaign by the World Health Organization decreased number of cases in the Neotropics, still many people living in poverty are at risk. Estimated 120 million people can be infected at any time.

-First confirmed case in the US (**AUTOCHTHONOUS**) in 1955.

RESERVIORS – Endemic mammals, carnivores, marsupials, rodents, bats.

VECTORS – Various species of Reduviidae. (peridomestic and domestic life cycles)

Rhodnius prolixus

Triatoma infestans

Panstrongylus megistus

Common names for these bugs are cone-nosed bugs, kissing bugs, assassin bugs, triatomines, etc.



Formerly, biologists thought that there was a good chance that the disease could be eradicated from South America and there was a big program to try to do that funded by WHO and host countries. I worked in Bolivia from 1984 – 2000 and I knew, based on how the people live in the countryside in Bolivia, that this program was going to fail. **[Discuss with Slides]** P 75. Book – epidemiology.

See: Second paper of the week:

Citation:

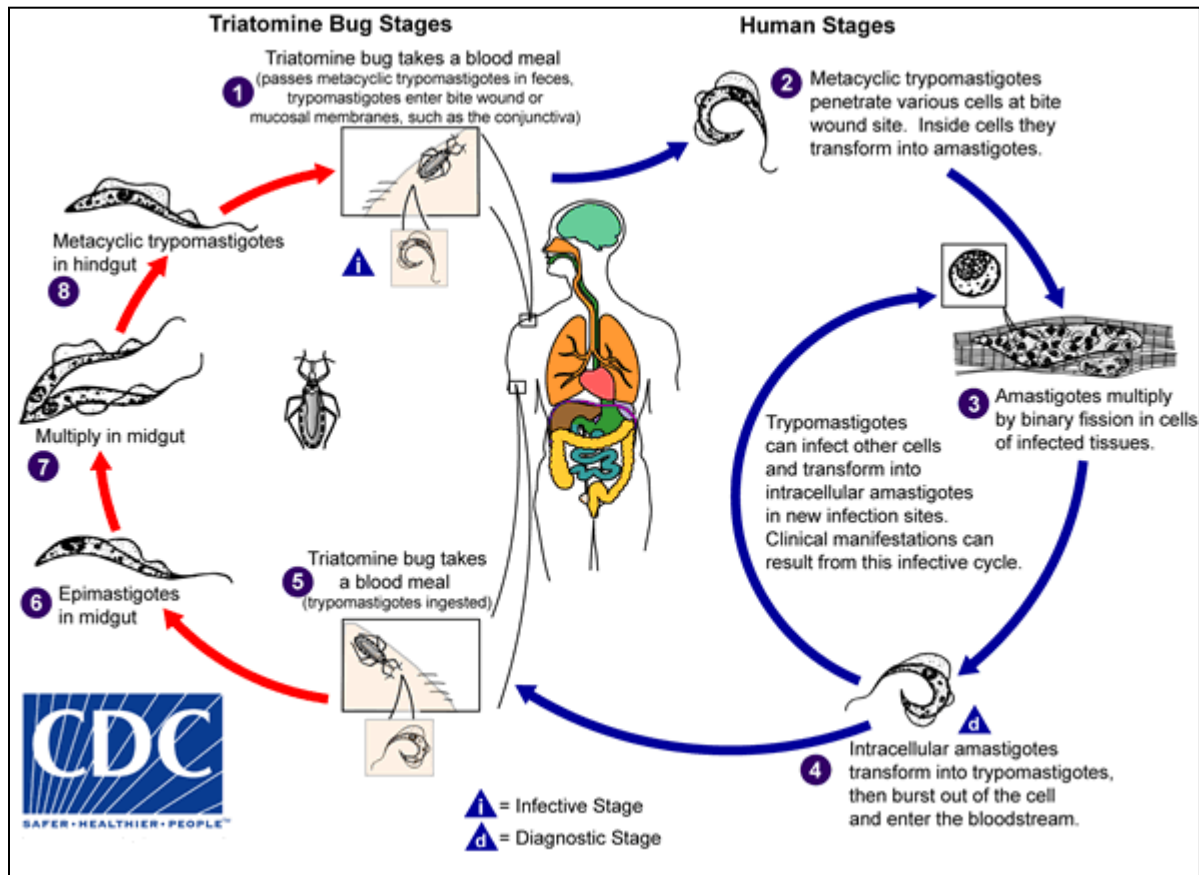
Coura, J. R.; Pedro, A.V.; Junqueira, A.C.V. 2014. "Ecoepidemiology, short history and control of Chagas disease in the endemic countries and the new challenge for non-endemic countries." *Memórias do Instituto Oswaldo Cruz* 109.7: 856-862.

Short Life-Cycle.

Bug → Bites infected marsupial, sloth, bat, xenarthran --- 4 / 5 weeks later, infectious metacyclic trypomastigotes onto skin in bug poop. Metacyclic means that they are actively dividing)

In some places in South America, bugs are eaten and direct infection occurs – some people think that these are an aphrodisiac).

Amastigotes form in connective tissues. Trypomastigotes disperse to other tissues, revert to amastigotes. Amastigotes are released into blood and are taken up by bug. See page 72 Schmidt and Roberts. Also, see the image below with the life-cycle and other data embedded.



*Lots of other species of Trypanosomes that we have not found yet.

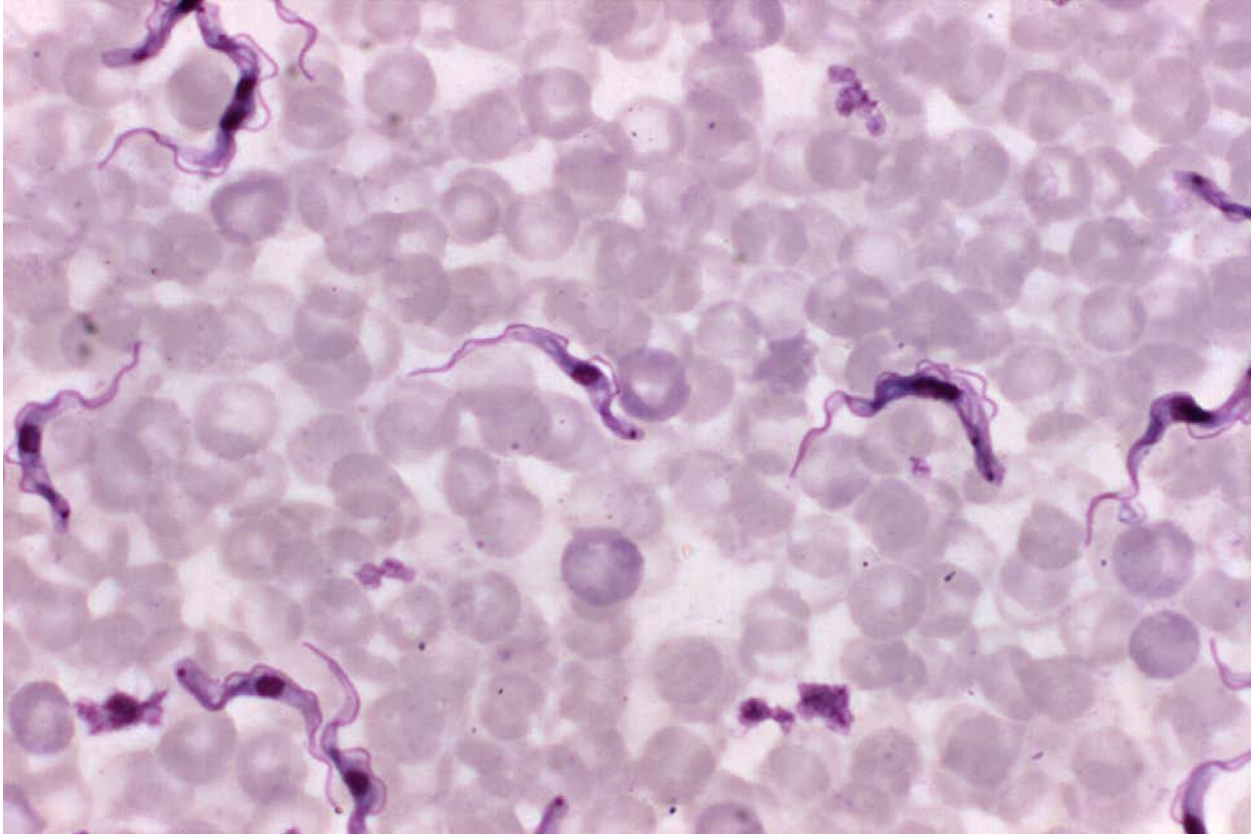
*Lots of species that have been described.

T. rangeli – can occur in people, easy to differentiate as it is bigger and has a tiny kinetosome.

T. lewisi – occurs in *Rattus* and other species of rodents. Probably is a complex of species, but nobody has bothered to look.

Occur in fish, lizards, birds, mammals and what else??? This list below is incomplete.

- ✓ *T. ambystomae*, in amphibians
- ✓ *T. antiquus*, extinct (Fossil in Miocene amber)
- ✓ *T. avium*, which causes trypanosomiasis in birds
- ✓ *T. boissoni*, in elasmobranch
- ✓ *T. brucei*, which causes sleeping sickness in humans and nagana in cattle
- ✓ *T. cruzi*, which causes Chagas disease in humans
- ✓ *T. congolense*, which causes nagana in ruminant livestock, horses and a wide range of wildlife
- ✓ *T. equinum*, in South American horses, transmitted via Tabanidae,
- ✓ *T. equiperdum*, which causes dourine or covering sickness in horses and other Equidae, it can be spread through coitus.
- ✓ *T. evansi*, which causes one form of the disease surra in certain animals (a single case report of human infection in 2005 in India was successfully treated with suramin)
- ✓ *T. everetti*, in birds
- ✓ *T. hosei*, in amphibians
- ✓ *T. irwini*, in koalas
- ✓ *T. lewisi*, in rats
- ✓ *T. microti*, in *Microtus*
- ✓ *T. melophagium*, in sheep, transmitted via *Melophagus ovinus*
- ✓ *T. paddae*, in birds
- ✓ *T. parroti*, in amphibians
- ✓ *T. percae*, in the species *Perca fluviatilis*
- ✓ *T. rangeli*, believed to be nonpathogenic to humans
- ✓ *T. rotatorium*, in amphibians
- ✓ *T. rugosae*, in amphibians
- ✓ *T. sergenti*, in amphibians
- ✓ *T. simiae*, which causes nagana in pigs. Its main reservoirs are warthogs and bush pigs
- ✓ *T. sinipercae*, in fishes
- ✓ *T. suis*, which causes a different form of surra
- ✓ *T. theileri*, a large trypanosome infecting ruminants
- ✓ *T. triglae*, in marine teleosts
- ✓ *T. vivax*, which causes the disease nagana, mainly in West Africa, although it has spread to South America



Trypanosoma brucei –trypomastigotes in blood

Creator CDC/ Dr. Mae Melvin

Source Collection [Public Health Image Library \(Centers for Disease Control\)](#)

Image Use This media file is in the [Public Domain](#).

Creation Date 1977

Attached to Group *Trypanosoma brucei* (*Trypanosoma*): [view page image collection](#)

Title trypanosoma_brucei10167.jpg

Image Type Photograph

Technical Information Magnified 1000X, this Giemsa-stained light photomicrograph revealed the presence of *Trypanosoma brucei* parasites, which were found in a thin film blood smear.

ID 34969

Vertical transmission does occur

TREATMENT. Antimonials,

TRAINING.

Few personnel are trained well enough that they could mount a mission to a hot zone or any zone to conduct an exploratory biosurvey of mammals, birds, and other vertebrates for the presence of parasites. There remains a largely unexplored part of the earth that includes the tropics, temperate zones, and oceans. Only approximately 5 – 10 % of the species on the earth have yet been inventoried. Although there not a lot of jobs out there that are open for people who do this kind of work (biodiversity surveys) there is the potential for these kinds of jobs to open up in the future. Therefore if you are a student in biodiversity, get training on how to do the collections of ALL the data, not just a part of what is out there in the wild.

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