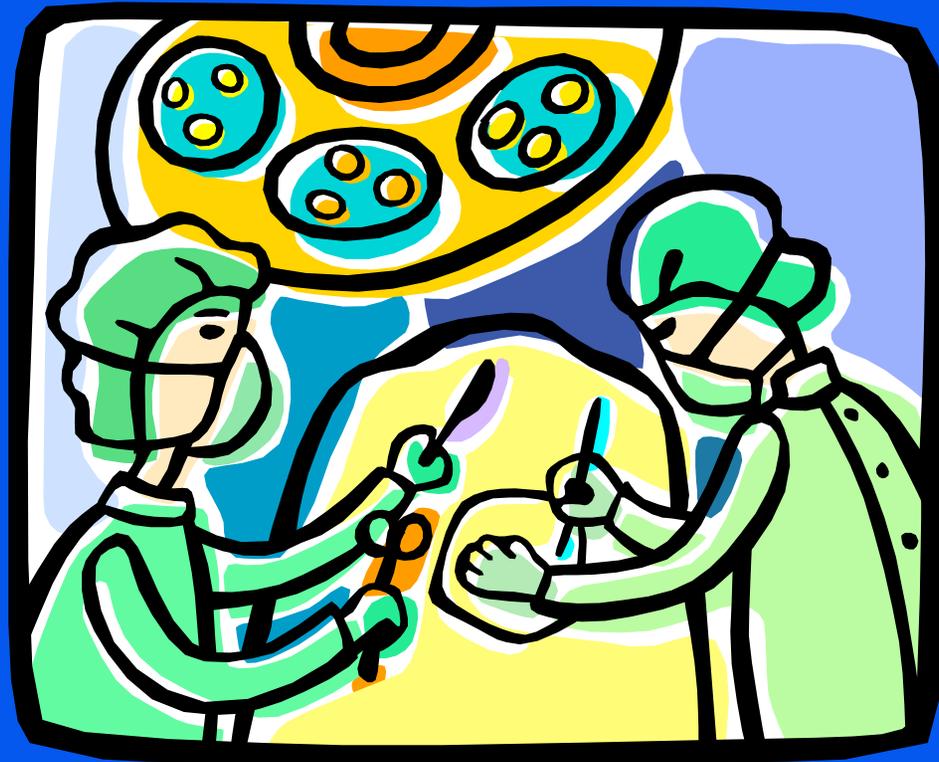


# Welcome to Pathogen Group 3

- *Plasmodium vivax*
- *Entamoeba histolytica*
- *Trypanosoma cruzi*
- Yellow fever virus
- Dengue virus
- Rabies virus



# *Plasmodium vivax*: Malaria

- Protozoan
- also *P. falciparum*, *P. malariae*, *P. ovale*
- Vectors: Mosquitoes of genus *Anopheles*
- intracellular parasites in RBCs
- complex life cycle (see figure 12.18)
- cyclic attacks: fever, chills, headache, back pain, myalgia, sweating, nausea, vomiting, diarrhea, cough
- possible death from renal failure, pulmonary edema
- Check out the National Geographic July 2007 issue....Malaria: Stopping a Global Killer is the cover story

According to the CDC...

In 2008, an estimated 190 - 311 million cases of malaria occurred worldwide and 708,000 - 1,003,000 people died, most of them young children in sub-Saharan Africa.

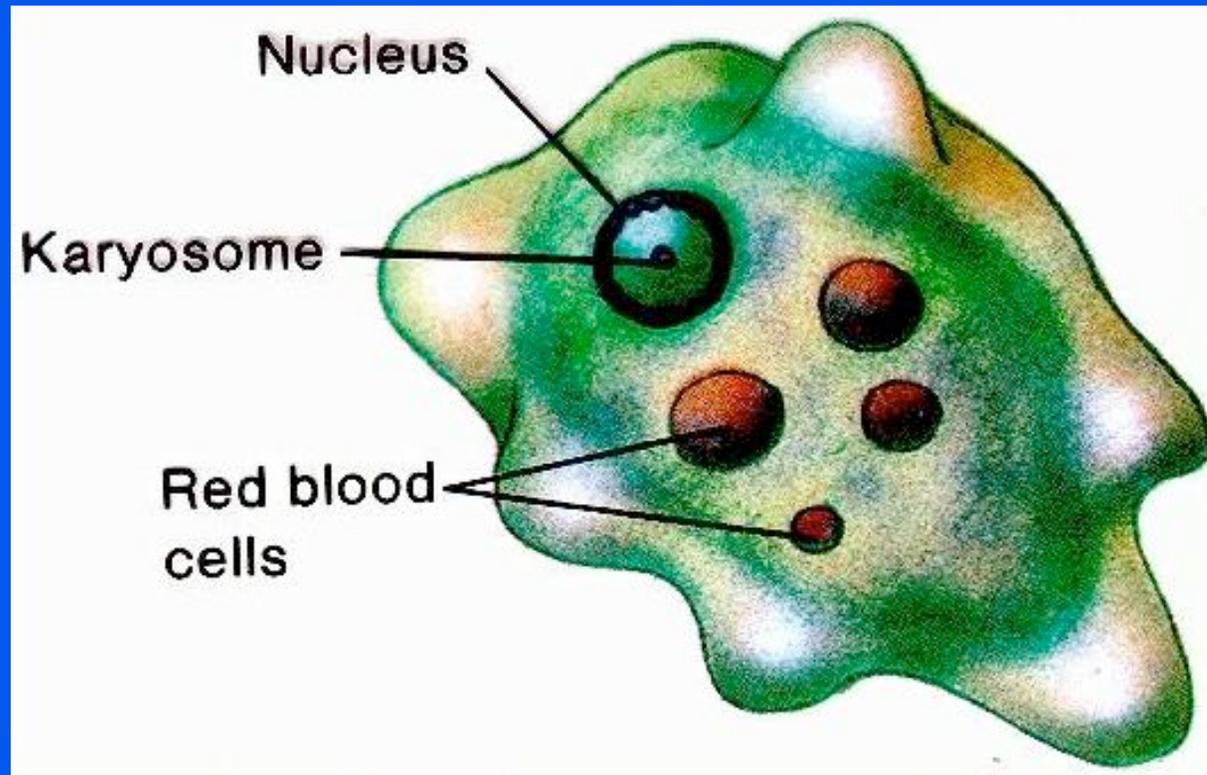
About 1,500 cases of malaria are diagnosed in the United States each year. The vast majority of cases in the United States are in travelers and immigrants returning from countries where malaria transmission occurs, many from sub-Saharan Africa and South Asia.

Don't forget to check out the CDC website

<http://www.cdc.gov/malaria/about/disease.html>

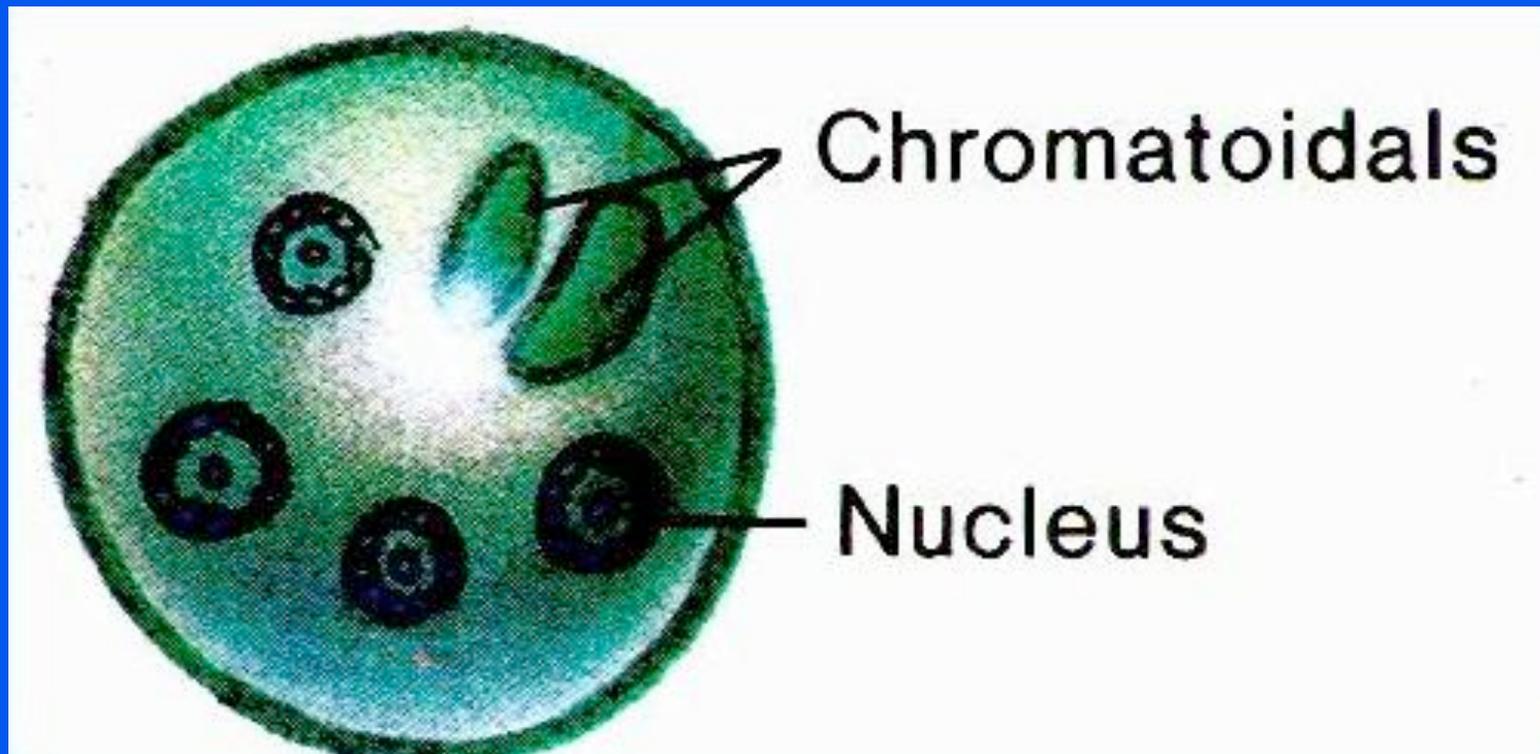
# *Entamoeba histolytica*: amoebiasis (amoebic dysentery)

- Protozoan kills 100,000 per year (world)
- Transmission: fecal contamination of food or water
- 2 cell forms: trophozoite, cyst
- Trophozoite:
- Dysentery, mild to severe
- Chronic



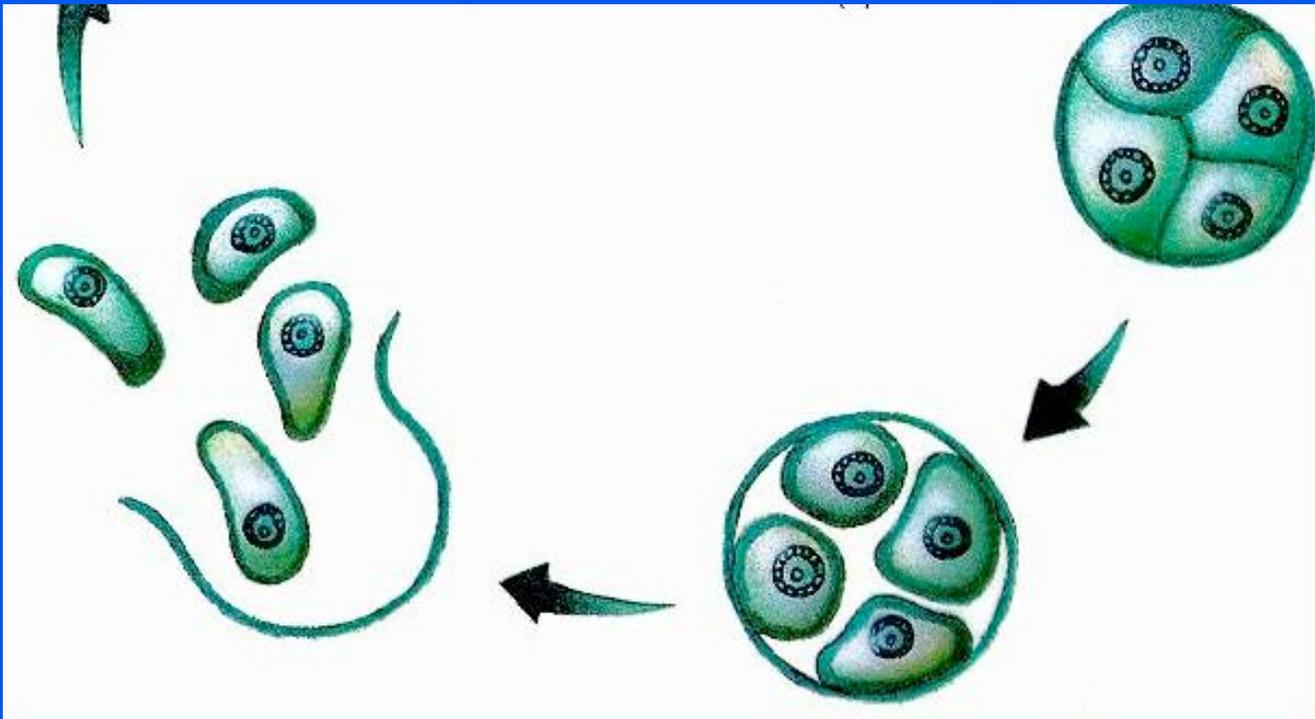
# Entamoeba

- Entamoeba cyst:



# Entamoeba

- excystment (activation of cyst)



# *Trypanosoma cruzi*

- American trypanosomiasis or Chagas' Disease

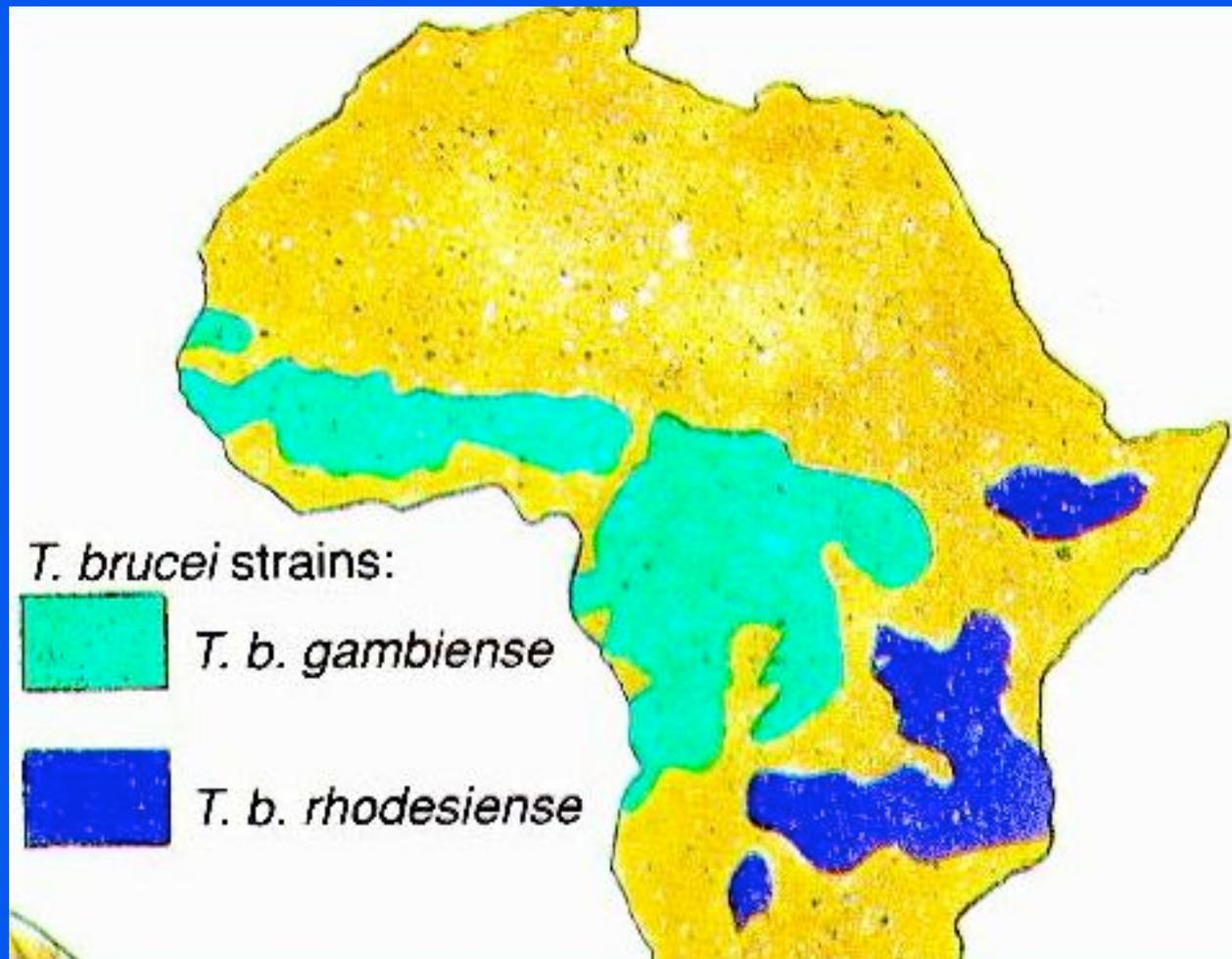


# *Trypanosoma cruzi*

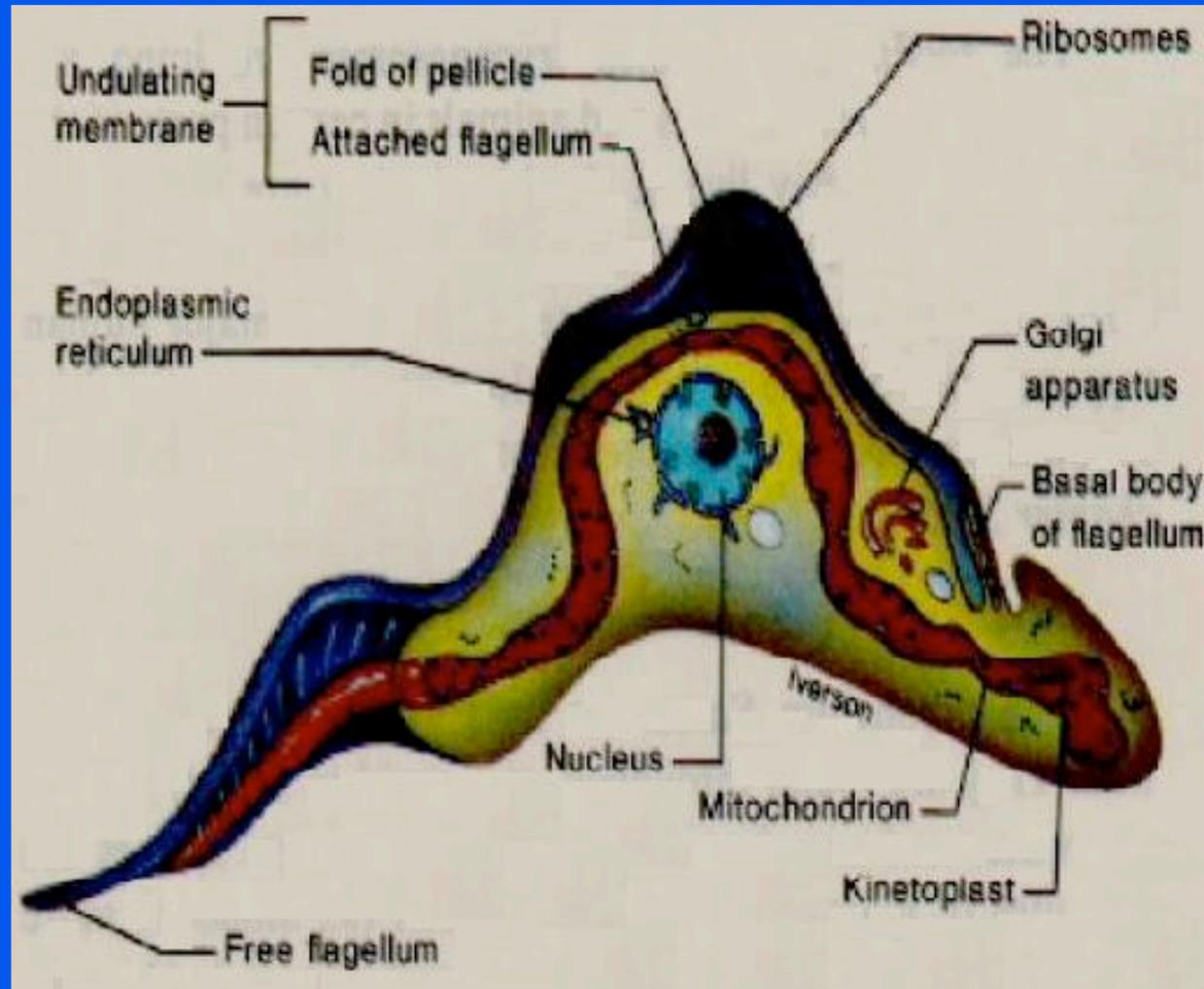


- Trophozoite (middle photo) multiplies in the intestinal tract of the reduviid bug and is harbored in the feces. The bug bites the mucous membranes of its host, usually of the eye, nose or lips. As the bug fills with blood, it soils the bite with its feces containing the trypanosomes.
- This protozoan multiplies in muscle and white blood cells.
- Can spread, due to host cell ruptures, to many systems including the lymphoid organs, heart, liver and brain.
- Can be fatal.
- <http://www.cdc.gov/parasites/chagas/>

***Trypanosoma brucei gambiense*: African trypanosomiasis (sleeping sickness) we will be studying in the lab.....**

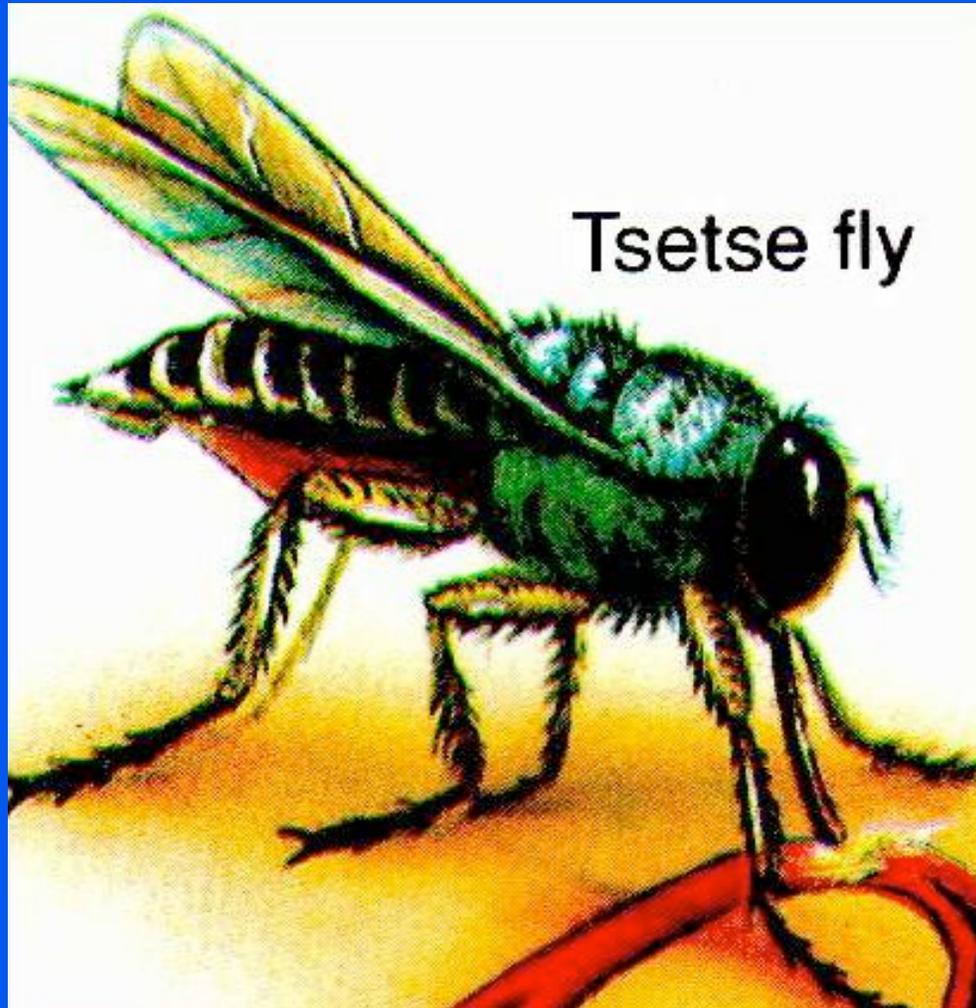


# Trypanosoma spp.

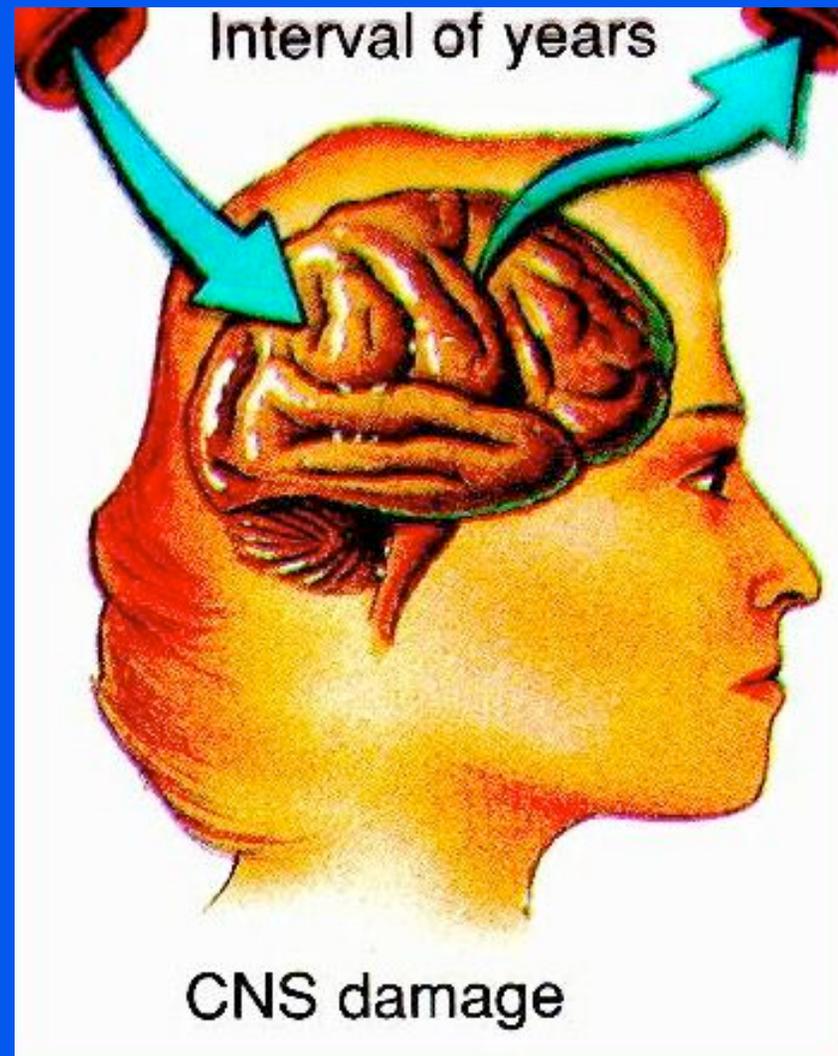


# Trypanosoma brucei gambiense

- vector



# T. brucei gambiense

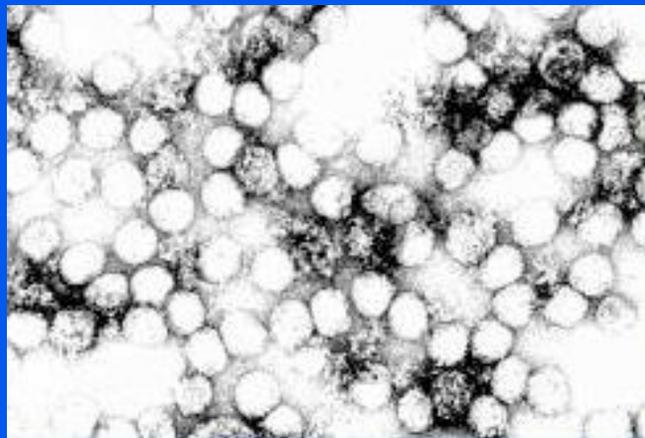


# Yellow Fever Virus: Yellow Fever

- a flavivirus (related to dengue)
- ss-RNA with envelope
- vector: *Aedes* spp. mosquitoes
- now rare in the Americas; still common in Africa
- effective vaccine
- infects liver (yellow is jaundice)

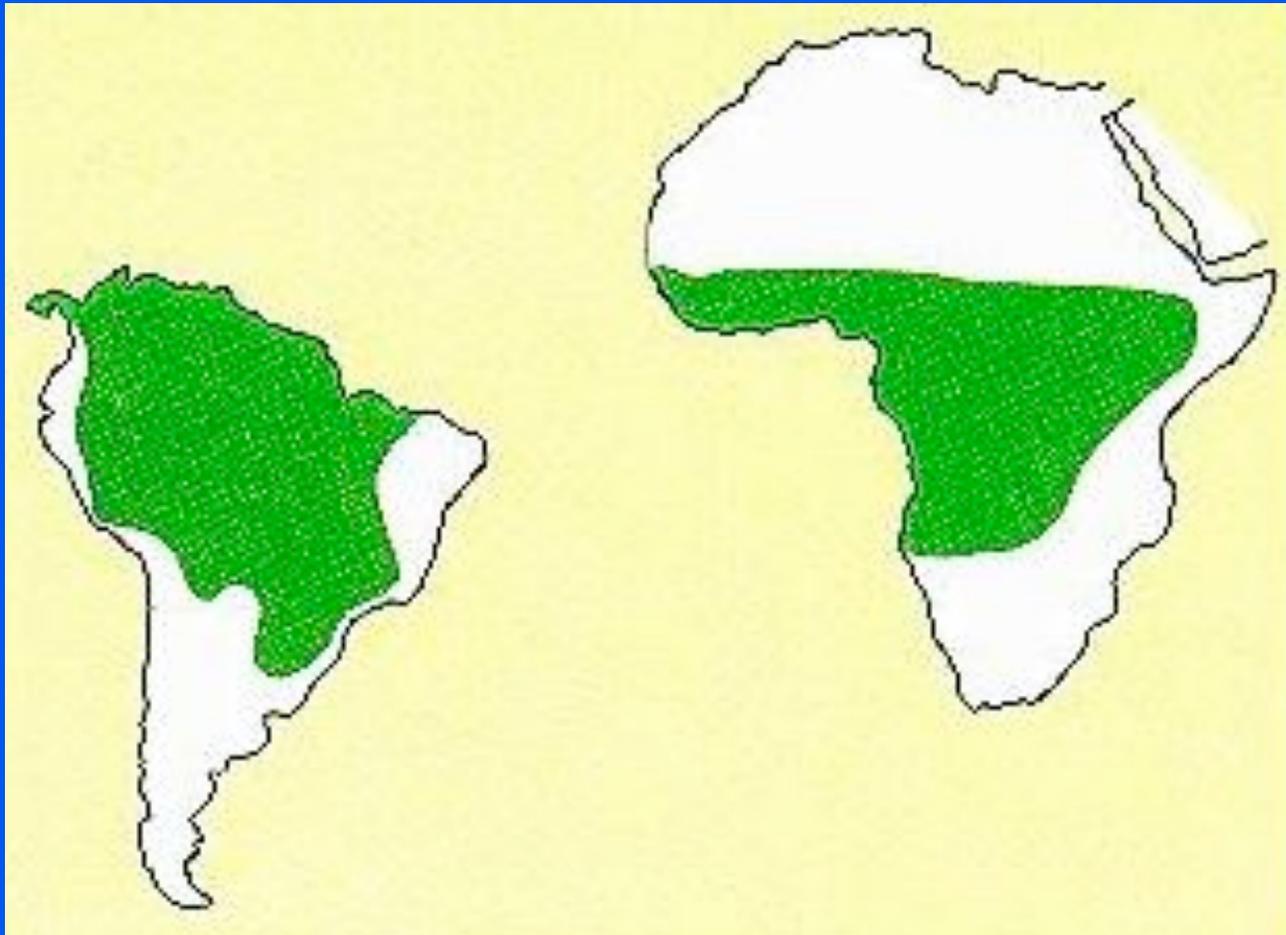


*Aedes* mosquito

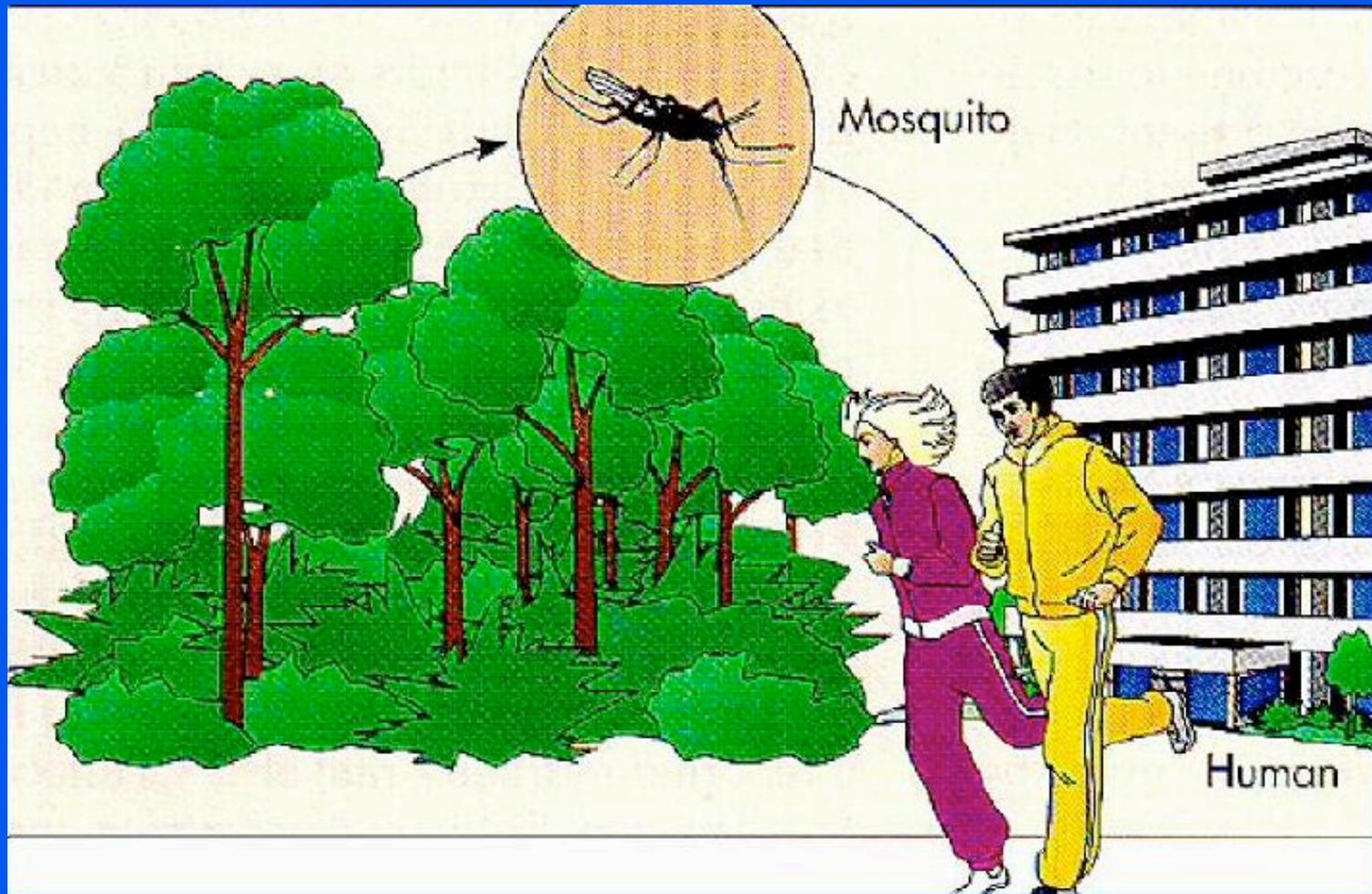


virus

# yellow fever distribution



# yellow fever

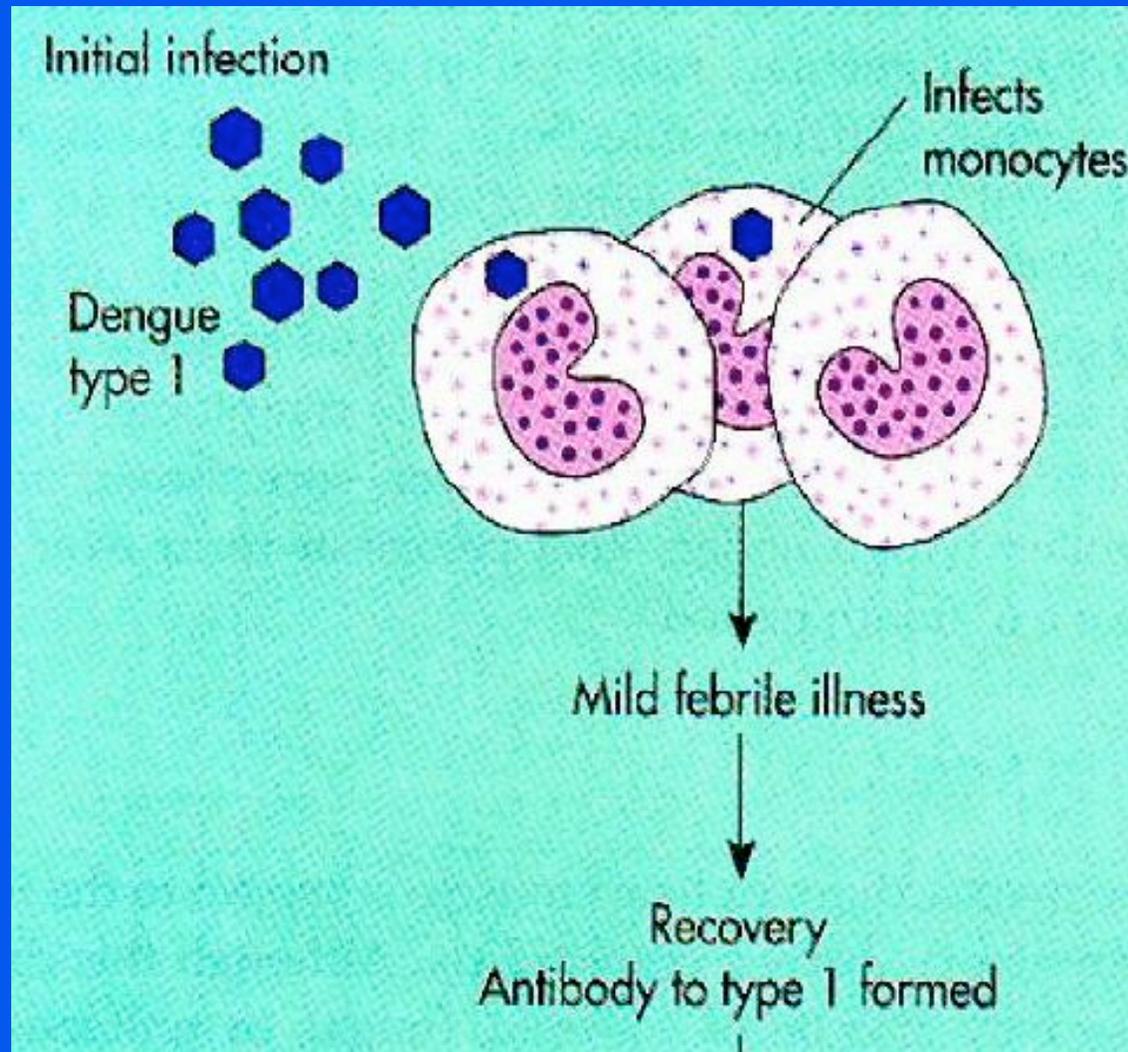


# Dengue viruses: Dengue

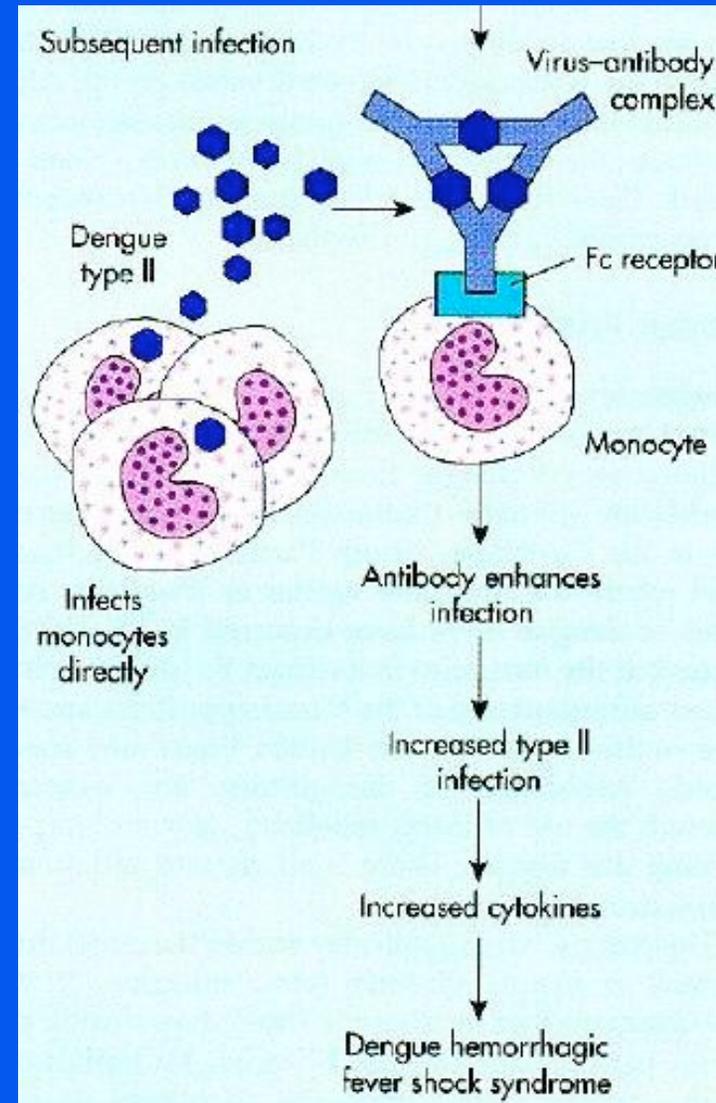
- ss RNA with envelope
- 4 types: 1, 2, 3, 4
- vector: *Aedes* spp. mosquitoes
- tropical resort areas
- 20-100 million cases annually
- 250,000 cases dengue hemorrhagic fever annually



**first exposure to dengue: mild illness,  
followed by immunity to that type virus**

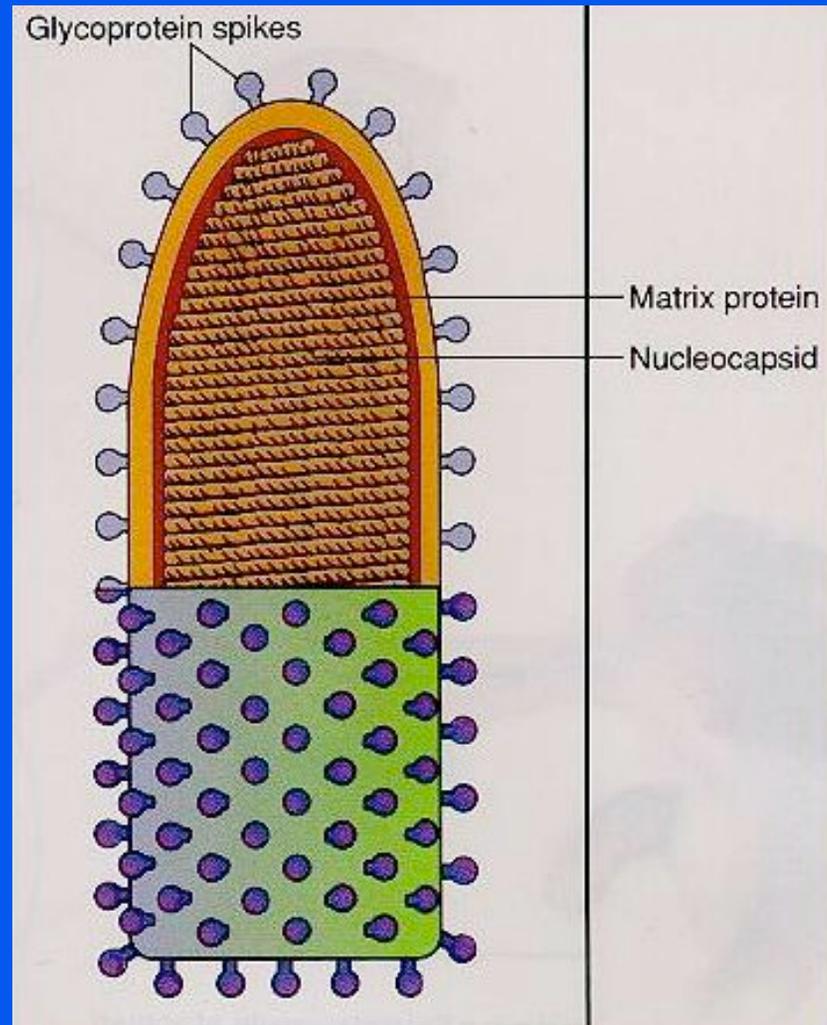


- subsequent exposure to different type dengue virus: immune response causes hemorrhagic fever (may be fatal)
- Antibodies enhance viral growth and increased vascular permeability



# Rabies virus: Rabies

- ss RNA, bullet-shaped envelope
- Encephalitis
  - Agitation
  - Dyspnea
  - Dysphagia
  - Hypotension
  - Much more
- Fatal!
- Most U.S. cases bat-associated
- long incubation period (up to 6 years but usually 30 to 60 days)
- Killed virus vaccine for humans in high risk professions



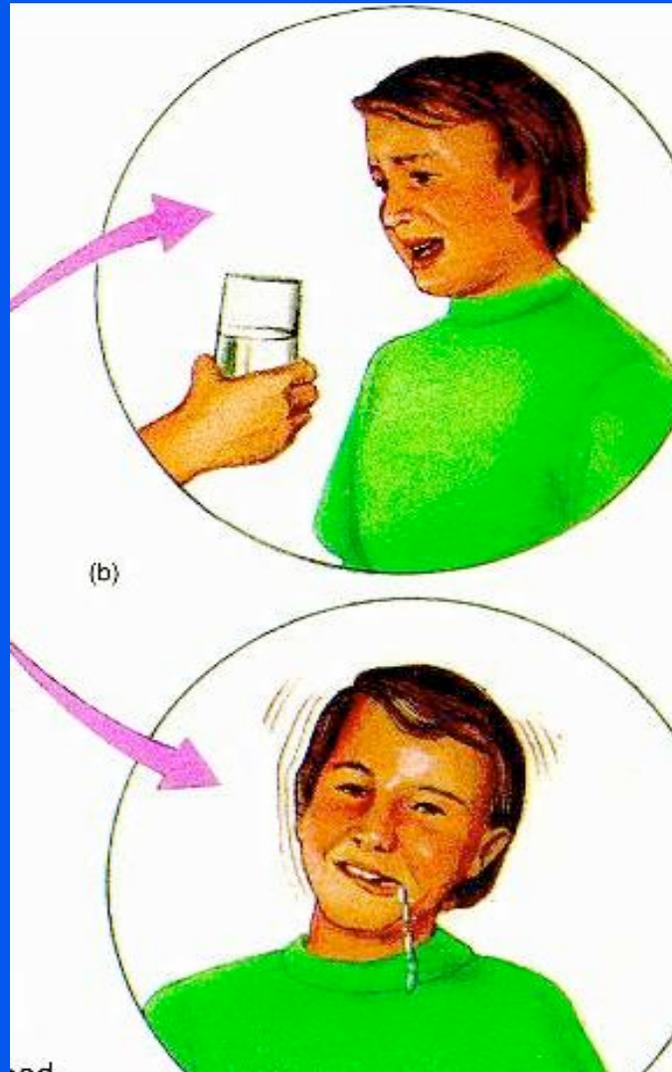
# More on Rabies

- **First described in 2300 BC**
- **Currently worldwide deaths – 40,000 to 60,000, mostly canine transmissions in third world countries**
- **USA- 27 deaths since 1990**
  - **18,000 people receive pre-exposure 3 doses vaccine**
- **Fatal encephalitis, no treatment after symptoms appear!**
- **Organ donor transmission of rabies- July 2004**
  - **Donor was a 21 year old Arkansas man who visited 2 hospitals in Texas with severe mental status changes. DX subarachnoid hemorrhage leading to cerebral herniation and death.**
  - **His lungs, kidneys and liver transplanted into 3 recipients, 2 of these recipients died of rabies from this rabid donor (not diagnosed at the time of organ transplant)**
  - **Previous cases of rabid donors involved 8 corneal transplant recipients (world wide)**

- travel of rabies virus after infection



# Rabies symptoms include spasms of the muscles of mouth & throat, coma & death



# rabies diagnosis

- Nuchal (neck) skin biopsy: direct fluorescent antibody test
- DNA tests on saliva and CSF
- Autopsy: look for Negri bodies

