

# *Leishmaniasis*



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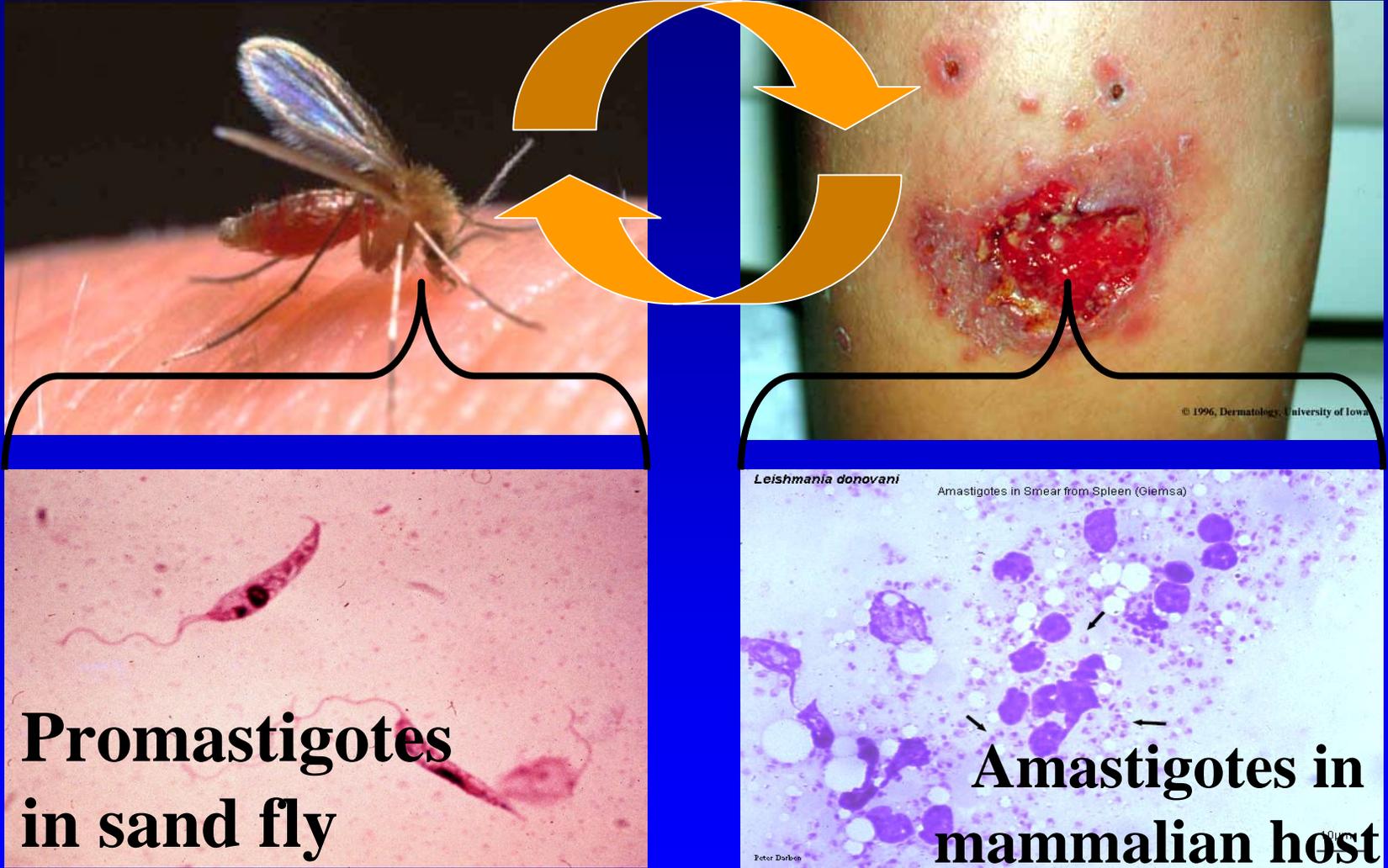
# Cutaneous Leishmaniasis Acquired in Iraq

- Over 200 cases of cutaneous leishmaniasis
- caused by *L. major*
- Incubation period (in months, defined as the first time of possible infection, such as arrival in Iraq, to initial recognition of the lesion) is 2.19 months (range, 1 week to 6 months)

# The Leishmaniases

- A diverse group of protozoan parasites
- Intracellular pathogens of the macrophage
- Different clinical manifestations / syndromes
- Zoonosis
  - Sand fly insect vector
  - Mammalian reservoir(s)
  - Man is incidental host
    - Indian VL and *L. tropica* CL are exceptions

# Parasite Life Cycle



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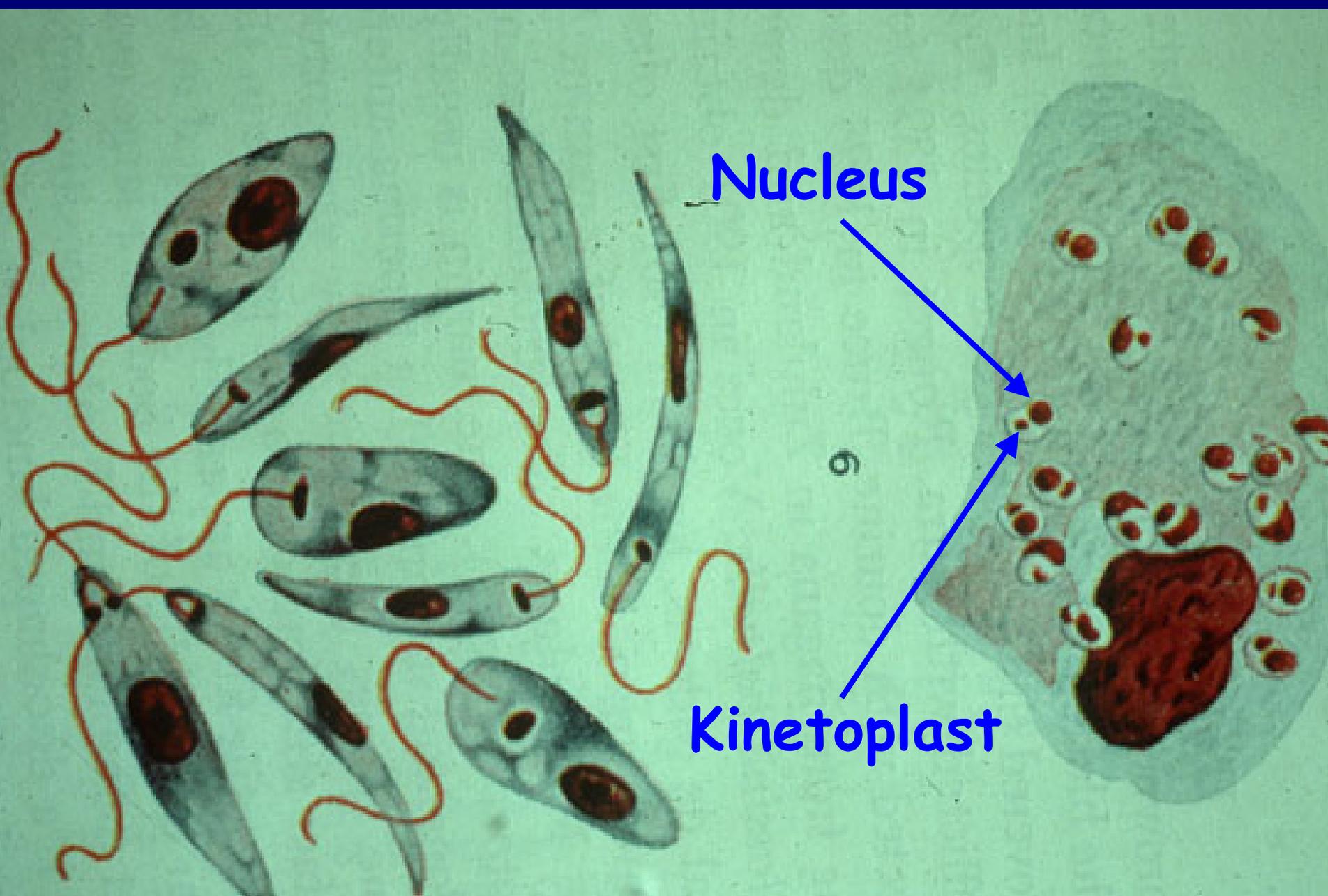
Leishmaniasis





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Nucleus

Kinetoplast

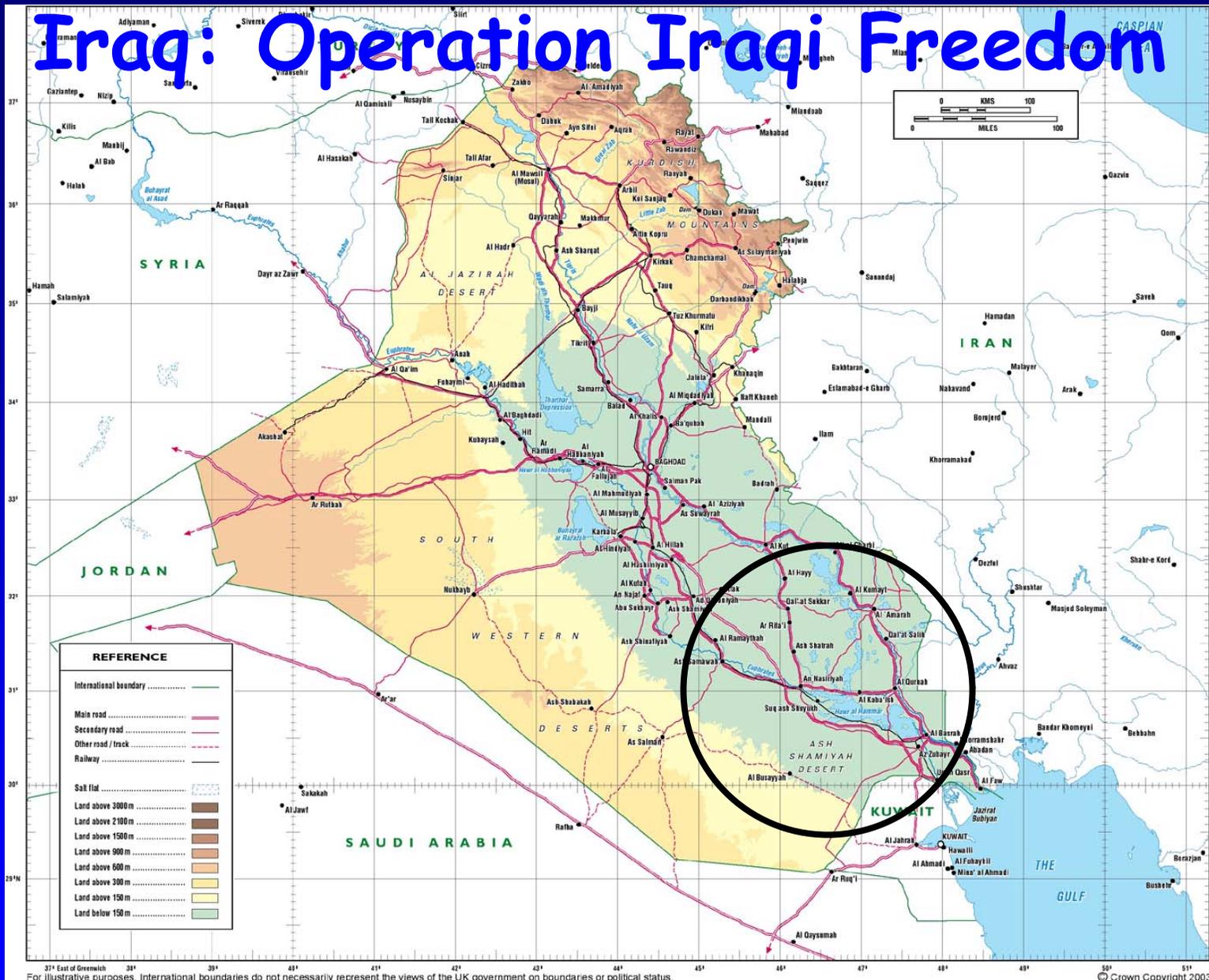
## 3 Major Clinical Syndromes

- Visceral leishmaniasis
- Cutaneous leishmaniasis
- Mucosal leishmaniasis

# What is possible from Iraq?

- Cutaneous leishmaniasis
  - *L. major* (all cases to date)
  - *L. topica* (3 cases from Afghanistan)
- Visceral Leishmaniasis
  - *L. donovani* (no cases or sand flies to date)
  - *L. infantum* (infected sand flies confirmed)

# Iraq: Operation Iraqi Freedom



For illustrative purposes. International boundaries do not necessarily represent the views of the UK government on boundaries or political status.

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Talil air base

# The Epidemiological Triangle: *L. major*

## Enzootic Cycle

*Sand fly*



*Incidental Host*



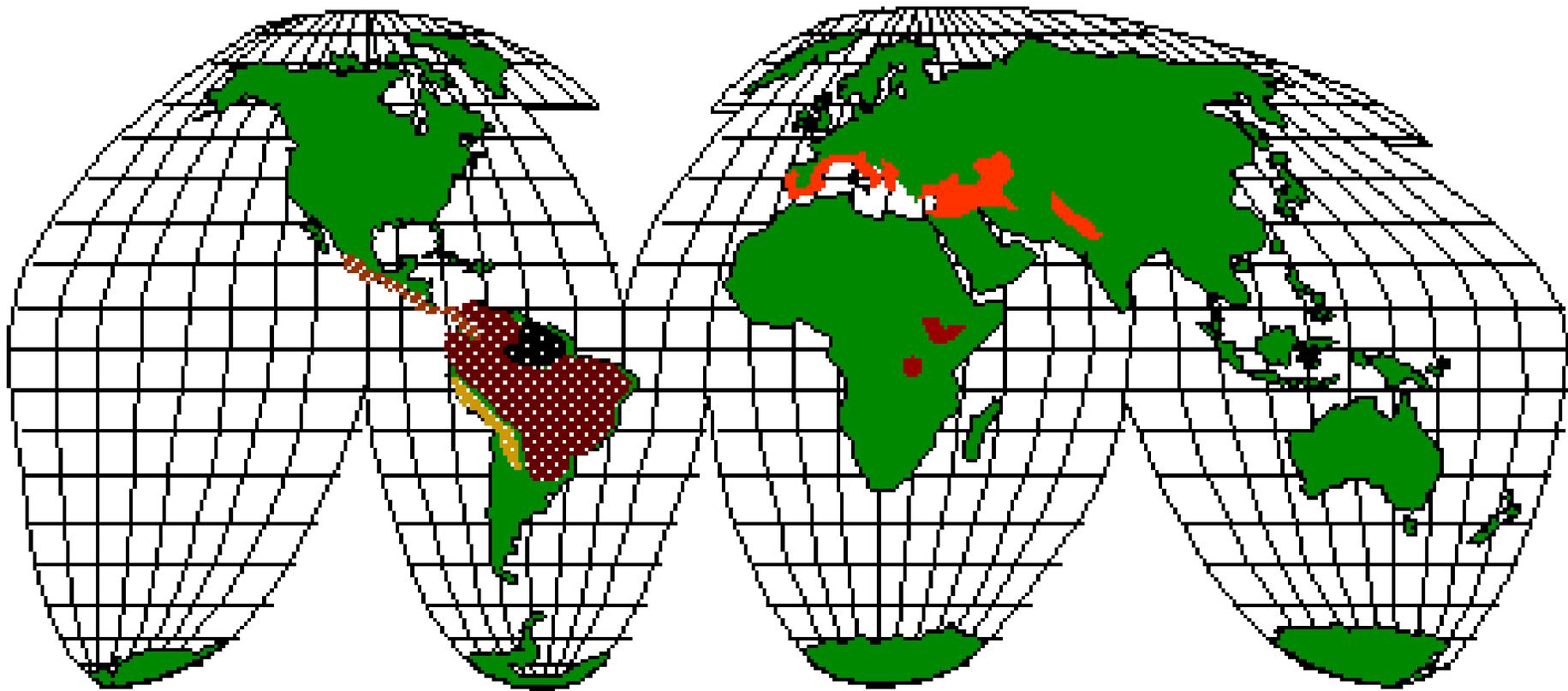
*Mammalian Reservoir*



*Man and his Activities*

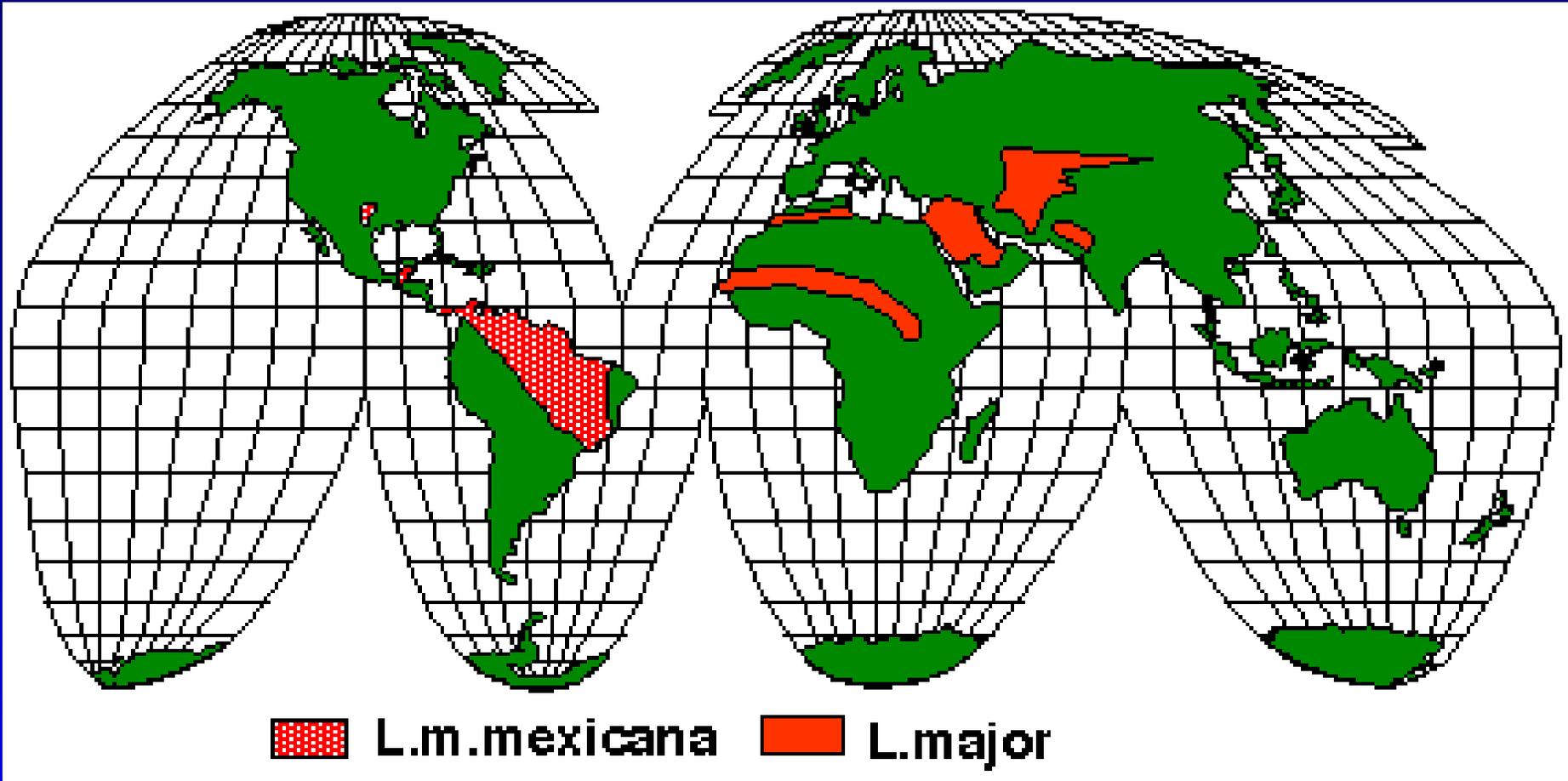
# Cutaneous Leishmaniasis

- Cutaneous leishmaniasis
  - Localized, ulcerative
  - Nodular
  - Other: Psoriaform, verrucous, plaque, macules
- Self healing
- Incubation period of days to years
- Slowly enlarging nodule at bite site
- Crust forms centrally leading to ulceration with raised margins
- Healing leaves a hypo-pigmented and depressed scar
- Characteristic but inconstant clinical differences between species



- |   |   |
|---|---|
|  <b>L.b.braziliensis</b> |  <b>L.b.guayanensis</b> |
|  <b>L.b.panamensis</b> |  <b>L.aethiopica</b>  |
|  <b>L.b.peruviana</b>  |  <b>L.tropica</b>     |

Courtesy of <http://www.icp.ucl.ac.be/~opperd/parasites/leish4.htm>



Courtesy of <http://www.icp.ucl.ac.be/~opperd/parasites/leish4.htm>





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# The Epidemiology of *L. tropica*

## Anthroponotic Cycle

*Sand fly*



*Human Reservoir*

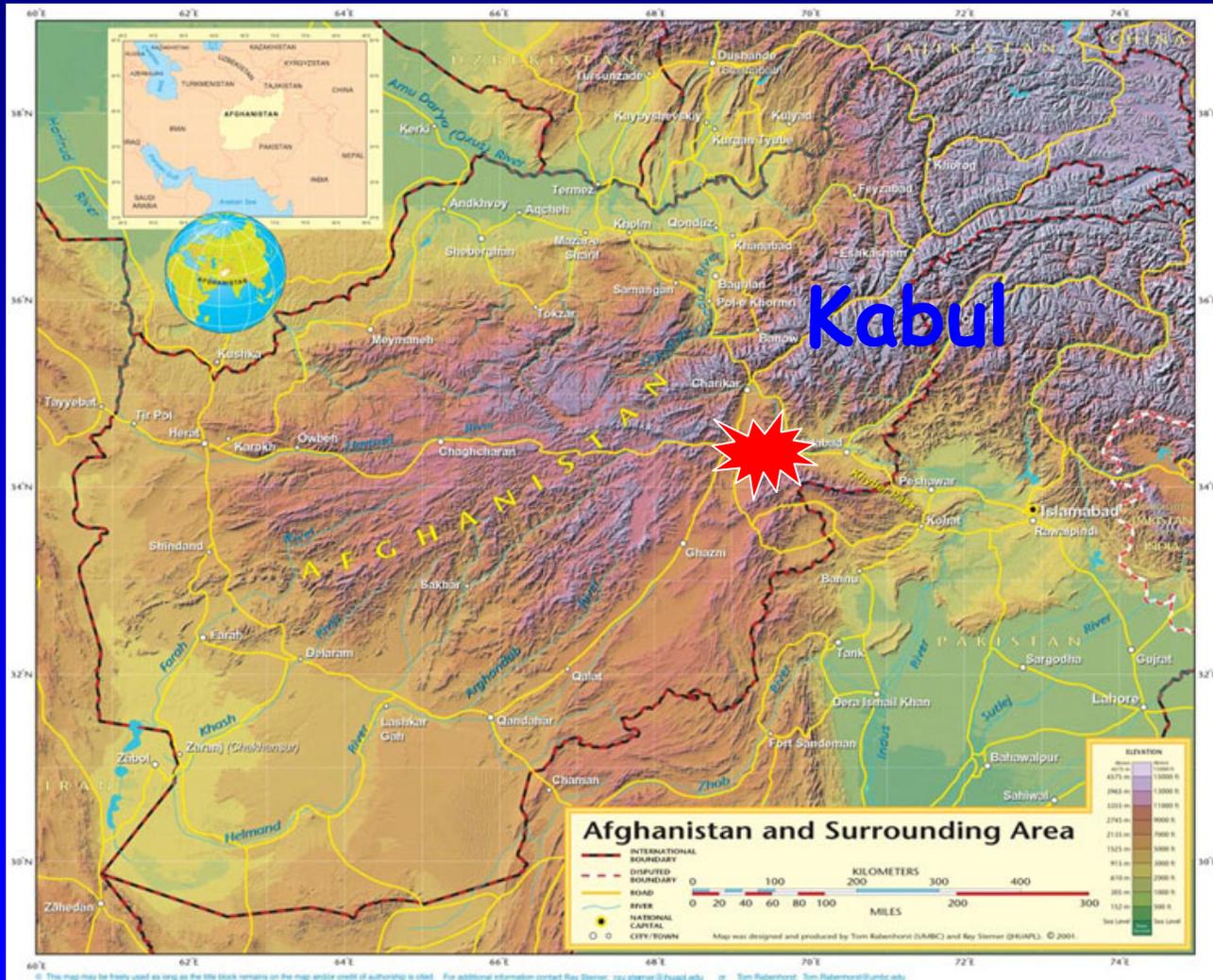


## Incidental Host?



*Small rodents*  
*Dogs*

# Epidemic *L. tropica*: 1990s to present



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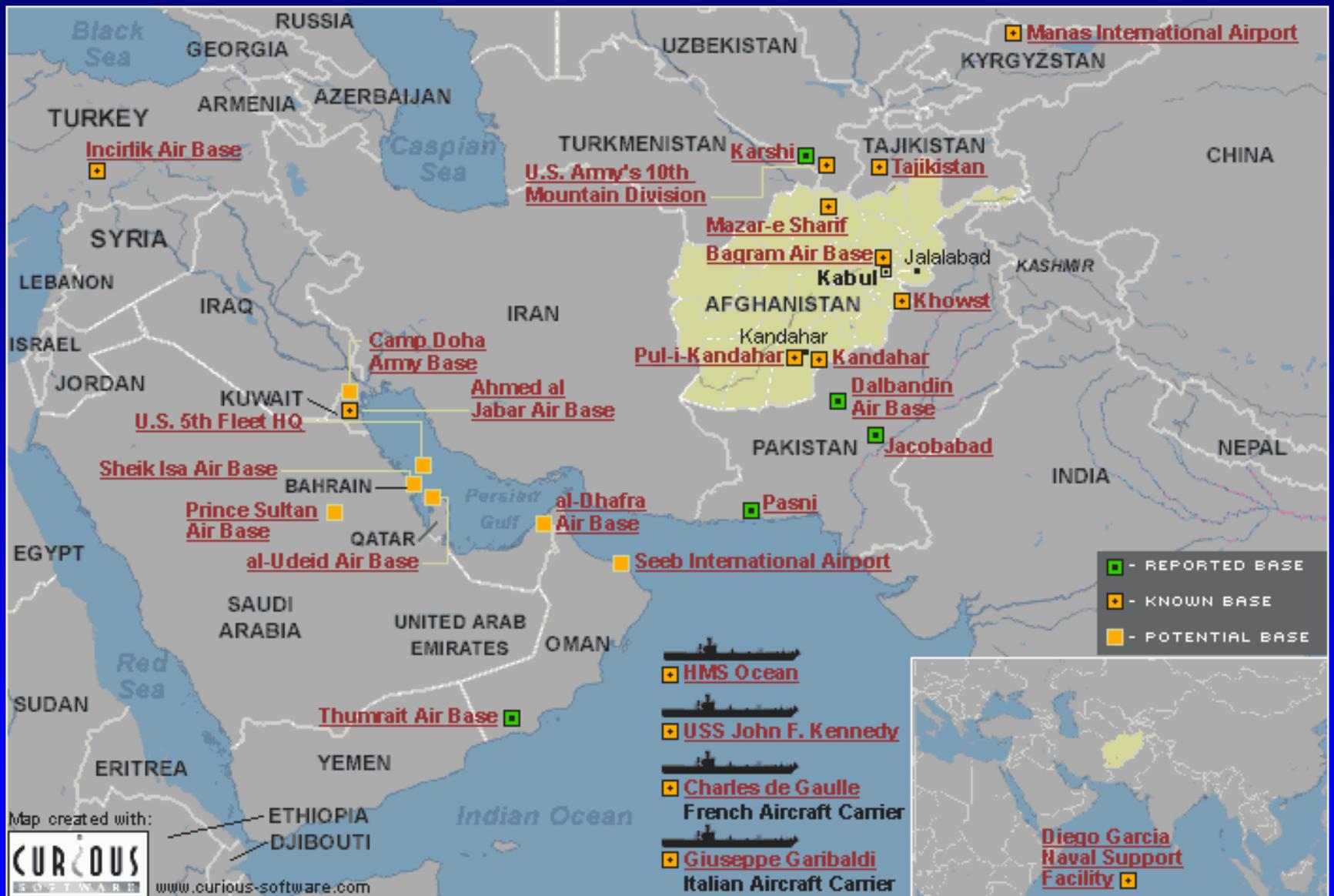
# Afghanistan

- Epidemic *L. tropica*
- Kabul and elsewhere
- Reservoir = Man,  
? dog
- *P. sergenti* is vector
- ?? Risk for deployed  
troops

QuickTime™ and a  
Photo - JPEG decompressor  
are needed to see this picture.

# Why we expect to see very little *L. tropica*

- Urban disease
- Requires close contact (sleeping in same room) as infected person
- Unlikely to have transmission in fixed US facilities (Bagram)



# Visceral Leishmaniasis



- *Classic "pentad"*
  - Fever
  - Cachexia
  - Splenomegaly
  - Pancytopenia
  - Hypergamma-globulinemia

# VL Case Report: History

- 25 yo AD USAF male presents with CC of increasing difficulty completing a 2 mile run
- ROS reveals fatigue, night sweats, 30 pound weight loss over 3-4 months
- Lived in Spain from March 93 to June 94
- One visit to MD in June 94 for abrupt onset of fever, malaise
  - 5 X increase AST.
  - Resolved w/o specific dx or intervention

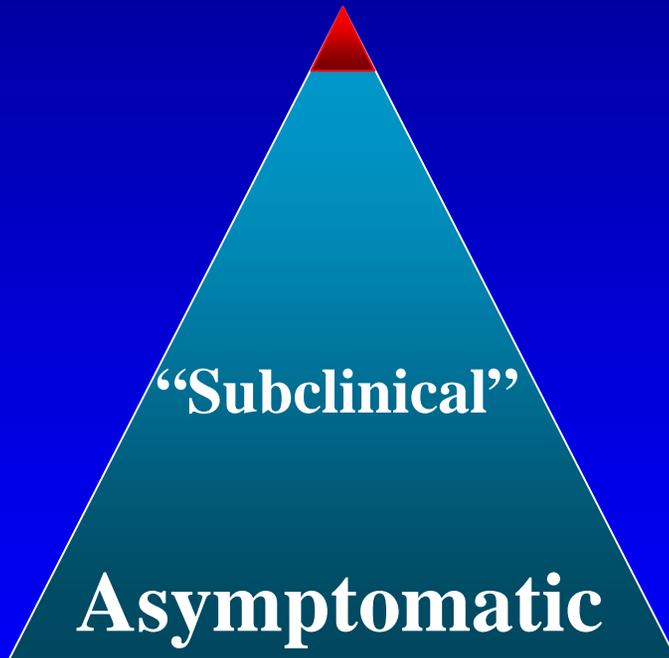
# VL Case Report:

## Physical Exam and Lab

- Thin, chronically ill appearing male
- Afebrile
- Marked splenomegaly (30 cm below costal margin)
- Anemia (Hb / Hct = 7.7 / 23)
- Thrombocytopenia (WBC = 2600)
- Marked increase in total protein to 18 .4 g / dl (NR = 6.4 - 8.2 g / dl)

# Visceral Leishmaniasis Disease Spectrum

1-3% with overt VL



- “Subclinical” Syndromes
  - Chronic systemic illness
  - Acute febrile illness
- Risk factors for progression
  - Malnutrition
  - Immunosuppression (AIDS)
  - Genetic?
- Cause of death
  - Measles
  - Pneumonia
  - TB
  - dysentery

## Why we expect to see very little L. infantum / L. donovani

- Requires close contact (sleeping in same room) as infected person
- Less likely to be transmitted in fixed US facilities
- A few sporadic cases not unexpected

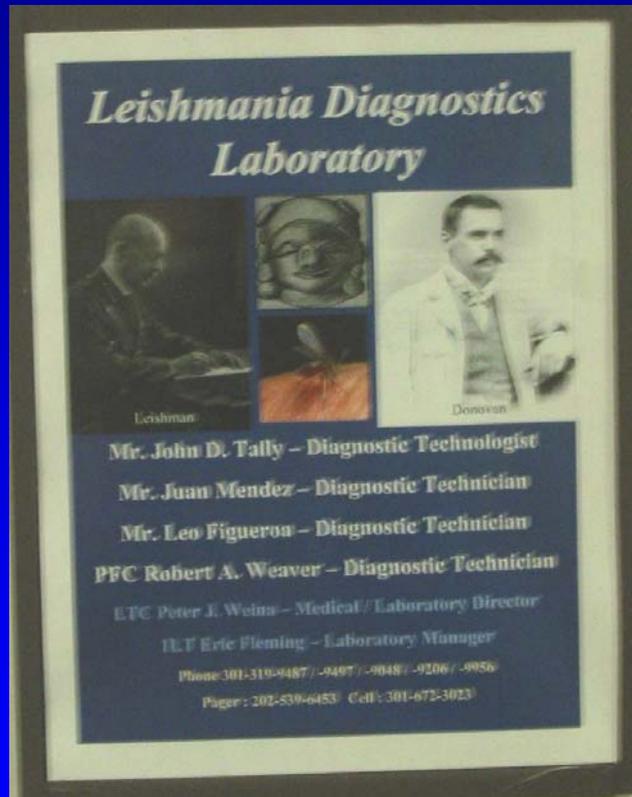
# Leishmaniasis as an OI in the Immunocompromised Host

- *Primary disease*
  - HIV, SLE, Hodgkin's disease, acute leukemia
- *Immunosuppressive drugs*
  - Cyclosporin A, prednisone, cyclophosphamide, azathioprine
- *Organ transplantations*
  - Kidney, Heart, Liver
- *L. infantum, L. donovani YES*
- *L. major, L. tropica NO*

# Modes of Transmission

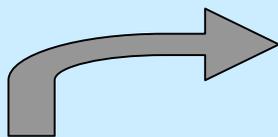
- Sand fly insect vector
- Parenteral
  - Blood transfusion
  - Intravenous Drug Abuse (needle sharing)
- Congential
- Occupational (laboratory needle stick)
- Sexual
- Person to person?

# WRAIR Leishmania Diagnostic Laboratory

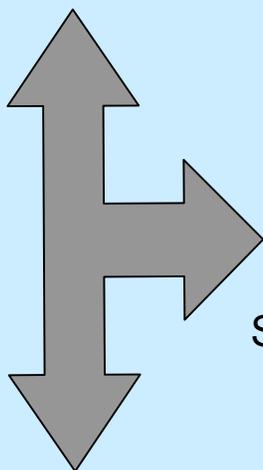
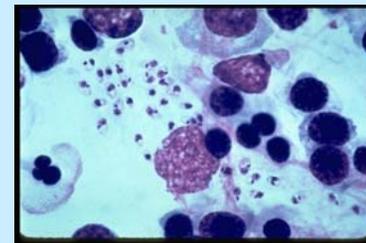
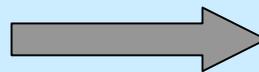


- LTC Peter Weina, Director
- CAP & CLIP certified
- 301-319-9956, 7733, 9497, 9487

Touch preps



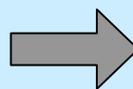
Giemsa staining



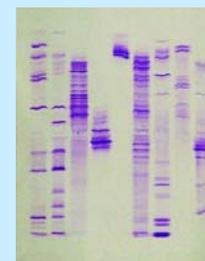
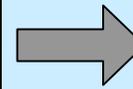
Lesion biopsy or aspirate



Schneider's, MMI, NNN  
culture media

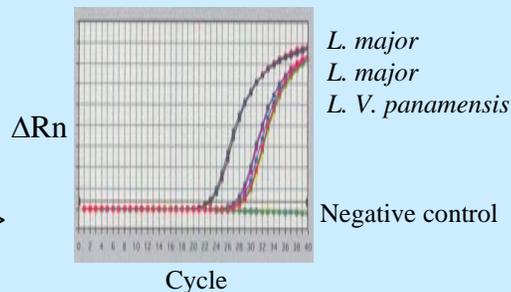
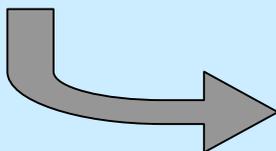


Promastigotes  
in culture



Electrophoresis  
for speciation

PCR



rRNA Probe for Genus Level Identification

Processing of  
diagnostic  
material for  
Leishmaniasis  
evaluation

# WRAIR "mail out" diagnostic kit



- Instructions
- Culture media
- Return mailing box with permits
- Vials with EtOH for PCR
- Vials with 10% formalin for histopathology
- Slides, slide holders, punch bx, gauze, etc.

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# CDC Diagnostic Services

- Frank Steurer, 770-488-4475
- Microscopy
- Culture with isoenzyme analysis
- Serologic testing (IFA)
- No Mab or PCR testing

# Treatment of *L. major* cutaneous leishmaniasis



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# Drug Therapy: Current Status (2004) in USA

- AmBisome® (Liposomal amphotericin B)
  - Approved for Rx of VL by the FDA
- Pentostam® [pentavalent antimony, (SbV)]
  - Available under an IND
    - Military personnel - Walter Reed Army Medical Center
    - Civilian personnel - CDC

# Why is Pentostam® an "Investigational New Drug"



- Rare disease in USA
- Manufacturer (GSK) has not applied for licensure in USA
- Standard of care for decades
- Not really "investigational" or "new"

# Heat Treatment

- ThermoMed device
- Being used at WRAMC





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Any  
Questions??

# Prevention

- Avoidance of sand fly vector
- Individual Measures
- Unit measures

# Avoidance

- Microhabitats lead to focal areas of high risk
- Sand flies are evening and night time biters
- Sandflies are poor fliers
  - Windy areas
  - No vegetation

# Barriers

- PPMs!
  - Proper uniform and use
  - DEET repellants
  - Use of bednets
  - Permethrin impregnated clothing and bed nets

# Unit Measures

- Cleared compounds
- Rodent control
- Area or barrier insecticide use
- Education of the soldier and chain of command
- Use of a "knowledge card"



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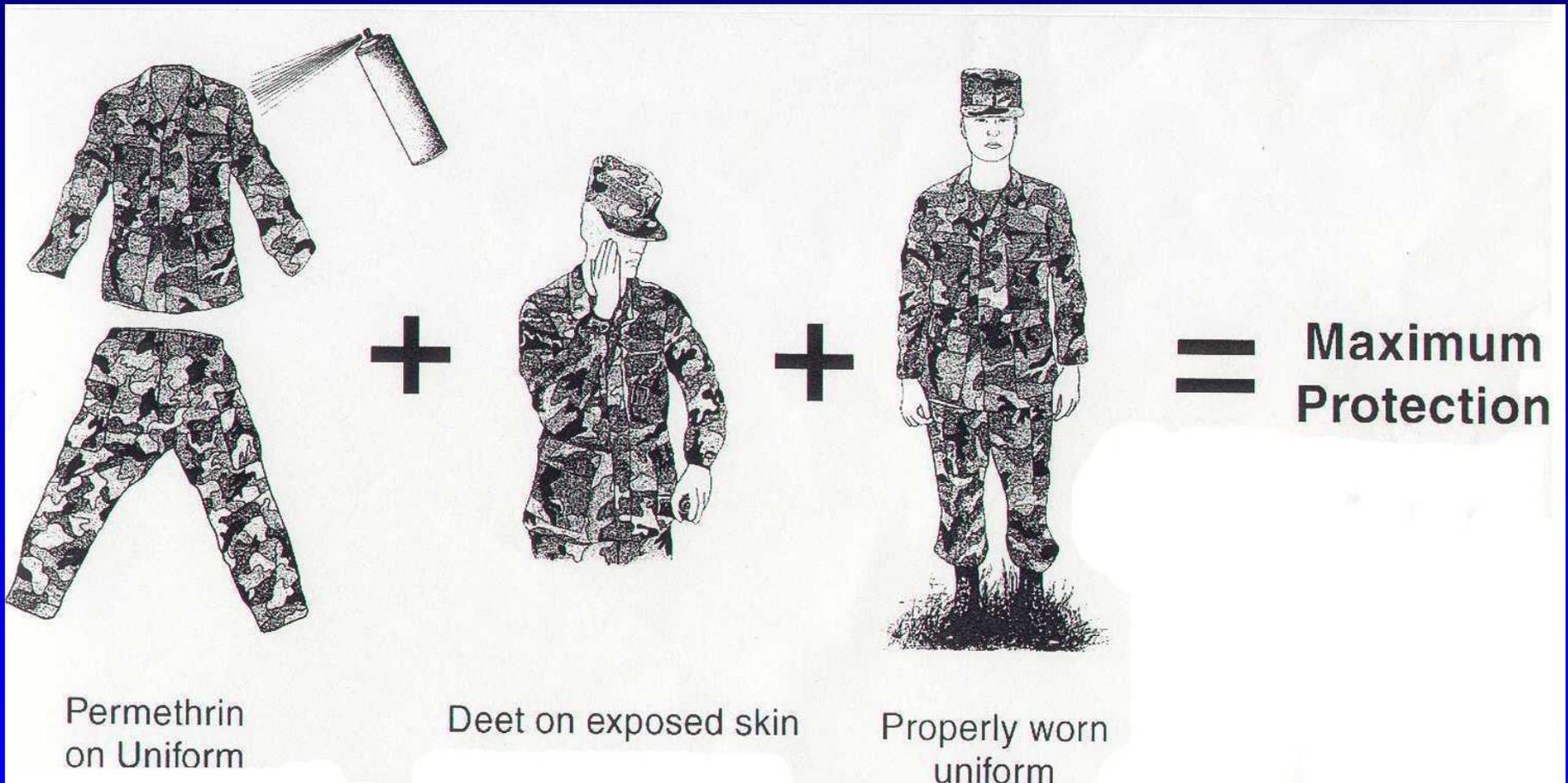


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# DoD Insect Repellent System



NSN 6840-01-278-1336  
Permethrin Spray Can

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NSN 6840-01-284-3982  
DEET lotion

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NSN 6840-01-345-0237  
IDA Impregnation Kit

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