Some problematic zoonotic diseases in the countries from Balkan Peninsula 2012-2014

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Zoonoses: Etiologic Classification

- ***Viral***
- Bacterial
- ***Parasitic***
- Mycotic

Routes of Transmission

- ***Direct***
  - Droplet or Aerosol
  - *Oral*
  - *Contact*
- ***Indirect***
  - Foodborne
  - Water-borne
  - Fomite
  - ***Vector-borne***
  - Environmental

Zoonoses - Life Cycle

ORTHOZOONOSES

- May be perpetuated in nature by a single vertebrate species. Requires more than one vertebrate species but no invertebrate host
- E.g. ***Rabies,*** Brucellosis, Anthrax, ***Avian Influenza***

Zoonoses - Life Cycle

- ***METAZOONOSES***
  - ***Require both vertebrates and invertebrates to complete transmission***
  - ***All arboviral infections***
    - ***West Nile virus, Lyme Borreliosis***
  - Some bacterial diseases
    - Plague, many rickettsia
  - Some parasitic diseases
    - ***Leishmaniasis,*** schistosomiasis

Zoonoses - Life Cycle

- ***Cyclozoonosis -*** a zoonotic disease that requires at least two species of vertebrates as definitive and intermediate hosts. Examples are ***hydatid disease*** (*Echinococcus granulosus*) and ***trichinosis*** (*Trichinella spirali)*
- ***Saprozoonosis-*** a zoonosis whose causative agent requires both a vertebrate host and a nonanimal reservoir or developmental site for completion of its life cycle (*tetanus*)

Risk Factors

- Companion Animal
  - Dogs & roundworm
  - Rats & Rat Bite Fever
- Occupational
  - Animal control workers, farmers, hunters, veterinarians & ***rabies***
  - Wildlife biologists & ***rabie***s, ***Avian Influenza***, hantavirus
- Foodborne
  - Raw meat & E.coli
  - Unpasteurized dairy & Listeria

Risk Factors

- Recreational Activities in Rural areas
  - Camping & ***Leishmaniasis***, ***West Nile***. Lyme disease
- Farm Settings- Poultry sector, Wildlife preserve territories – ***Avian Influenza, Rabies***
  - *Sheep & Q-fever*
  - *Cattle & Cryptosporidium*
- Travel – Africa&Asia – ***West Nile***, ***Leishmaniasis***
  - Maylasia & Nipha
  - Australia & Hendra

LEISHMANIASIS

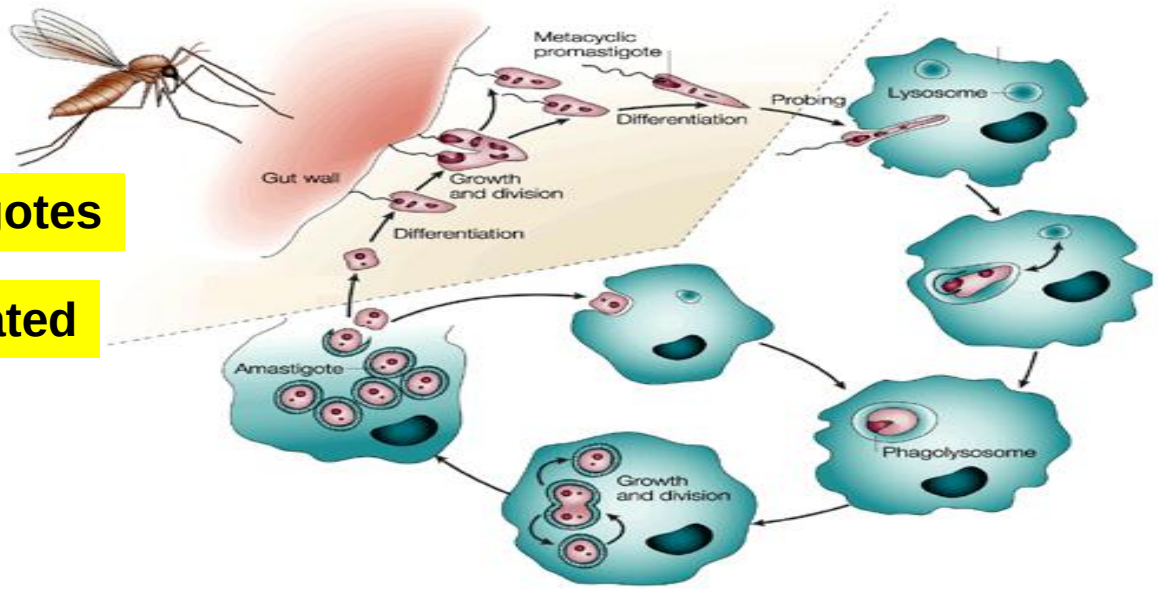
One Health Cross Boarder Meeting Zoonoses,
Bansco, 23-25 April, 2015

Life Cycle of Leishmanias

Vector

proastigotes

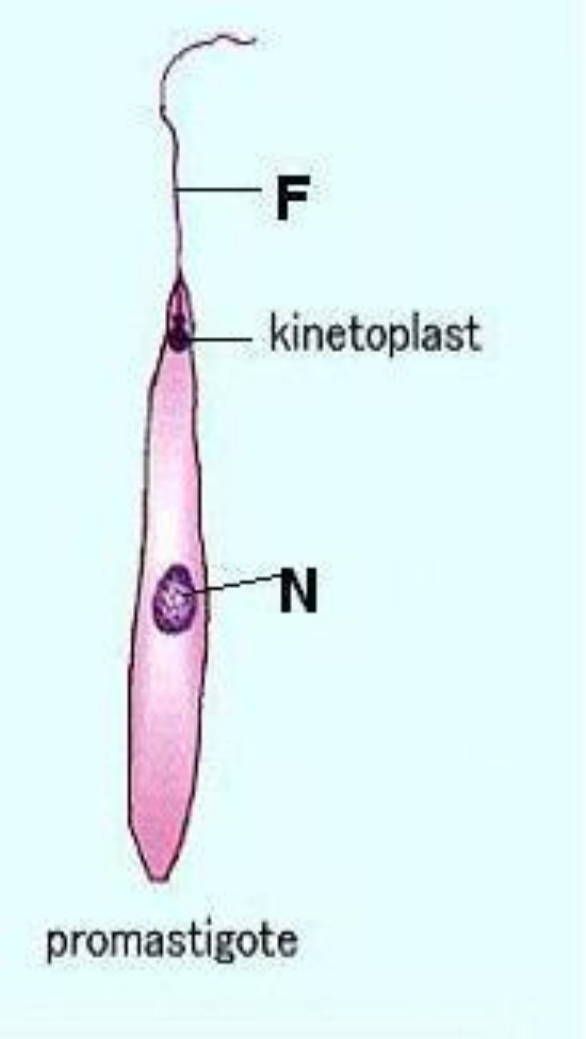
flagellated

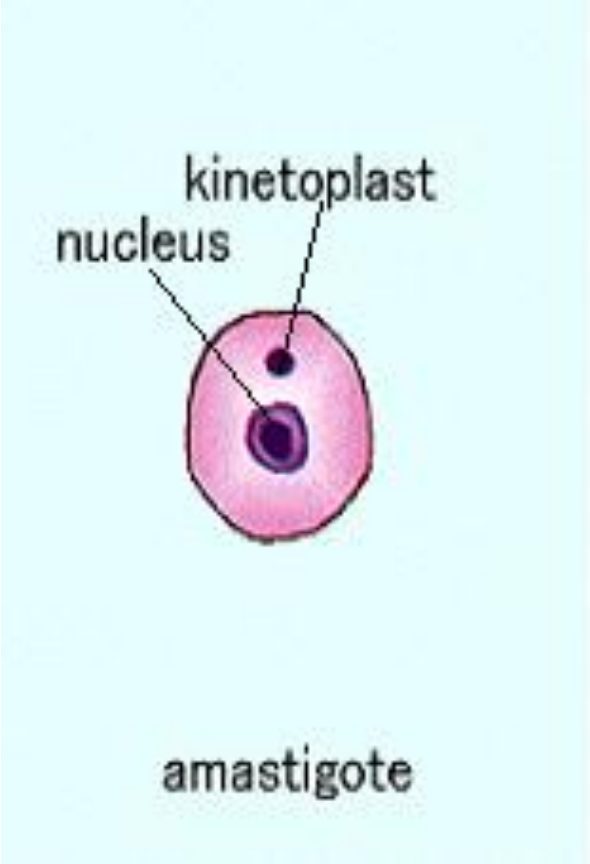


amastigotes

Two separate forms – amastigotes in macrophages and **promastigotes -** h attach to the gut wall and multiply by longitudinal binary fission. After approximately 1 week, they transform into the infective **metacyclic promastigotes** which are so numerous in the anterior gut and pharynx that they may block it.

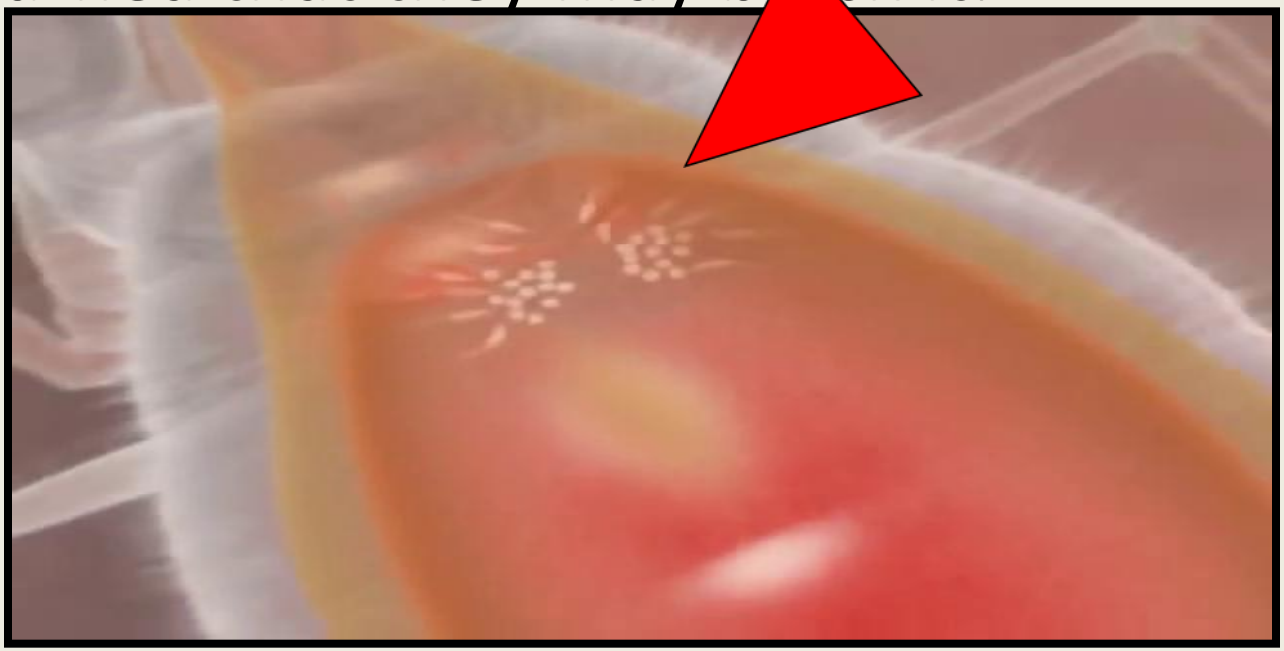
Promastigotes of Leishmania



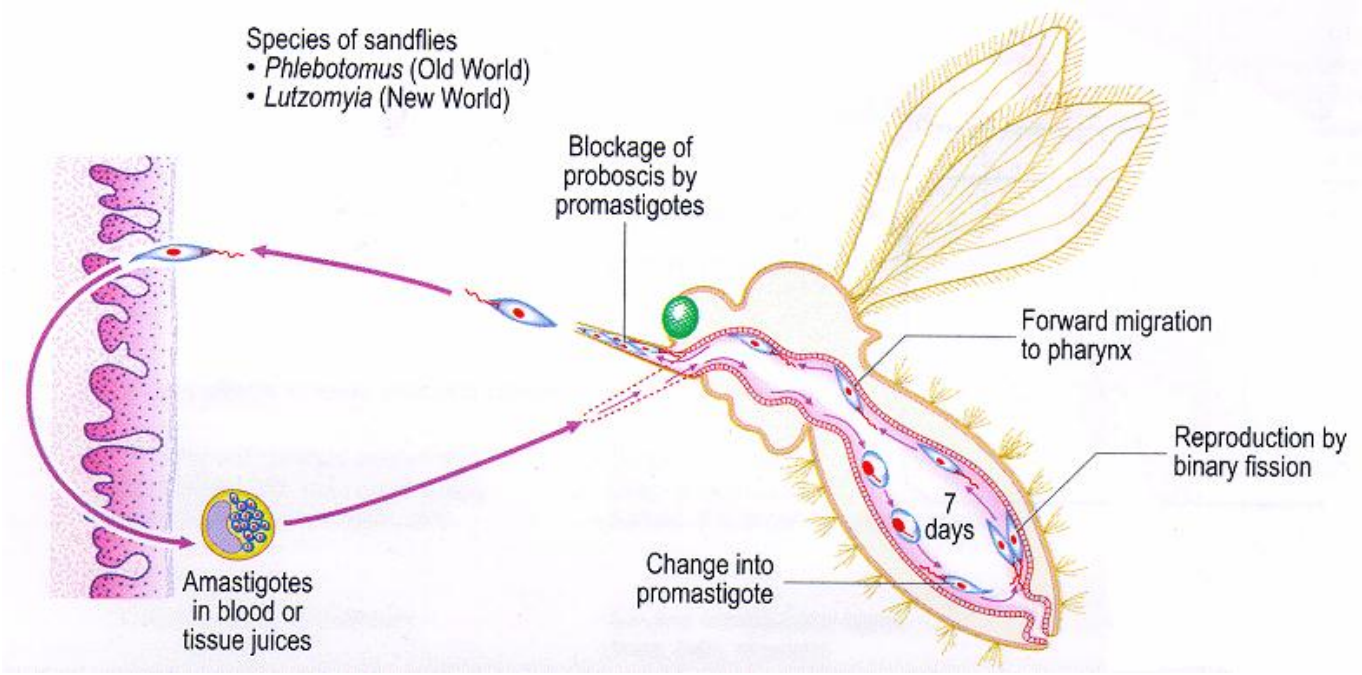


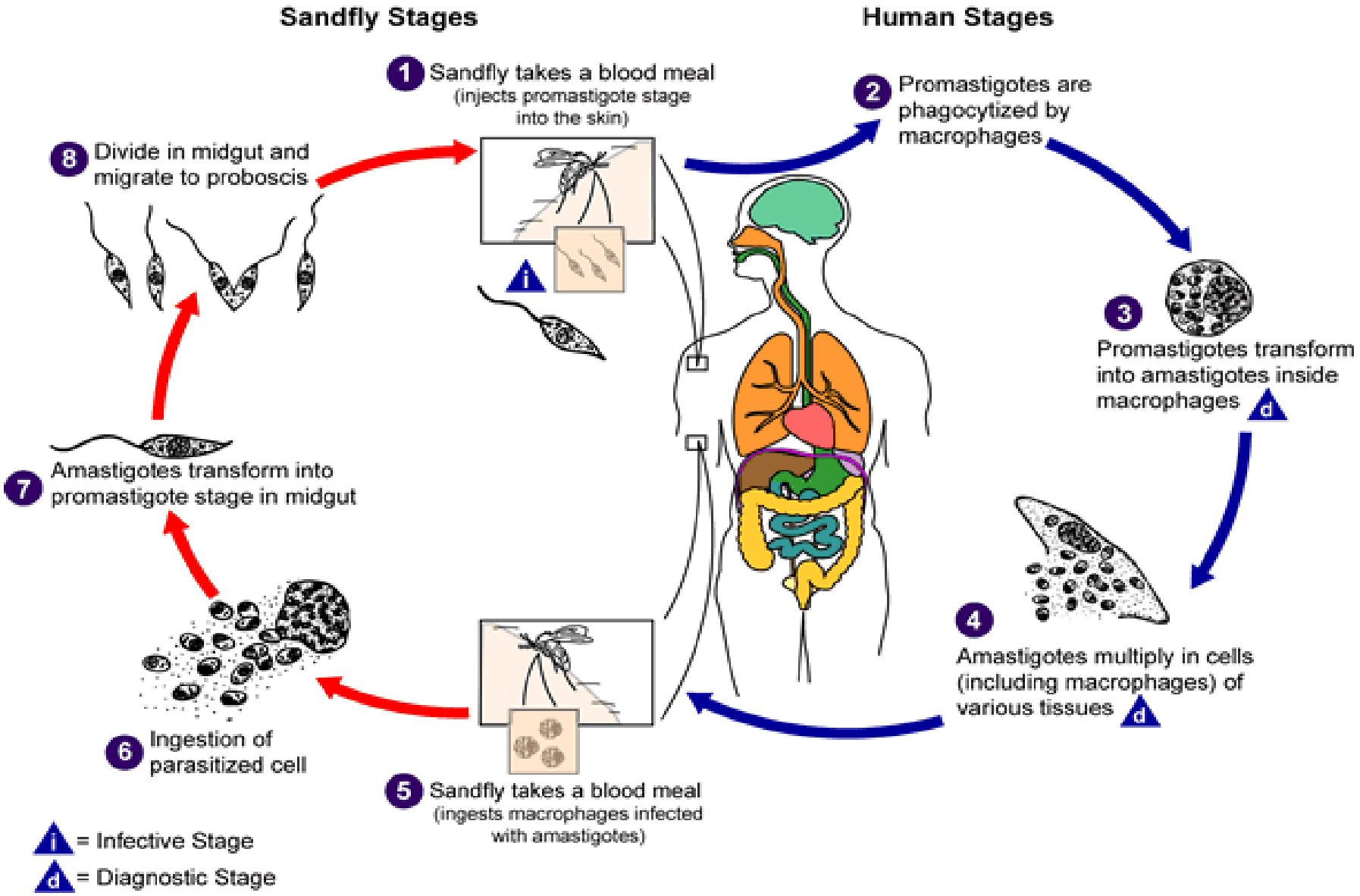
Amastigote of Leishmania

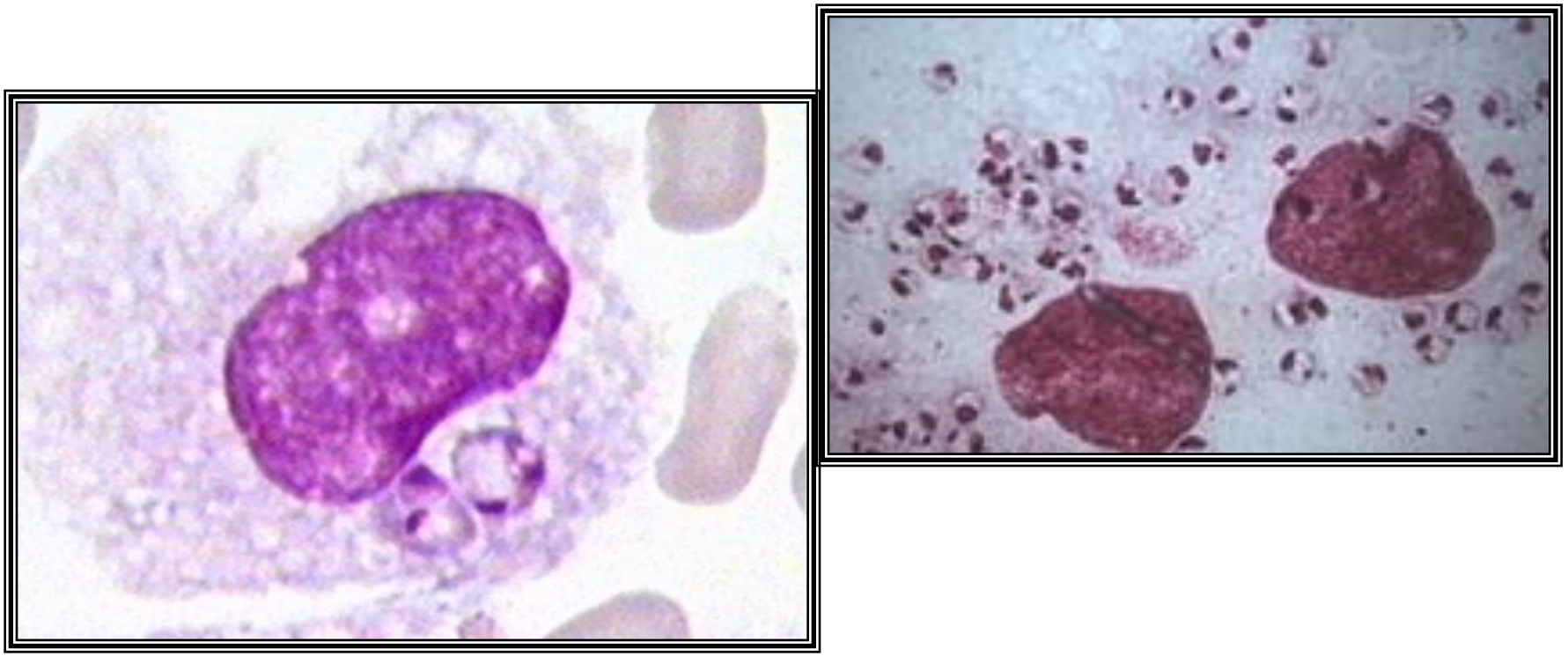
- Feeding sand flies acquire ***amastigotes*** from infected dermis and later after biological transformation in the gut from ***promastigotes*** to **metacyclic promastigotes** which are so numerous in the anterior gut and pharynx of sand-flea that they may block it.



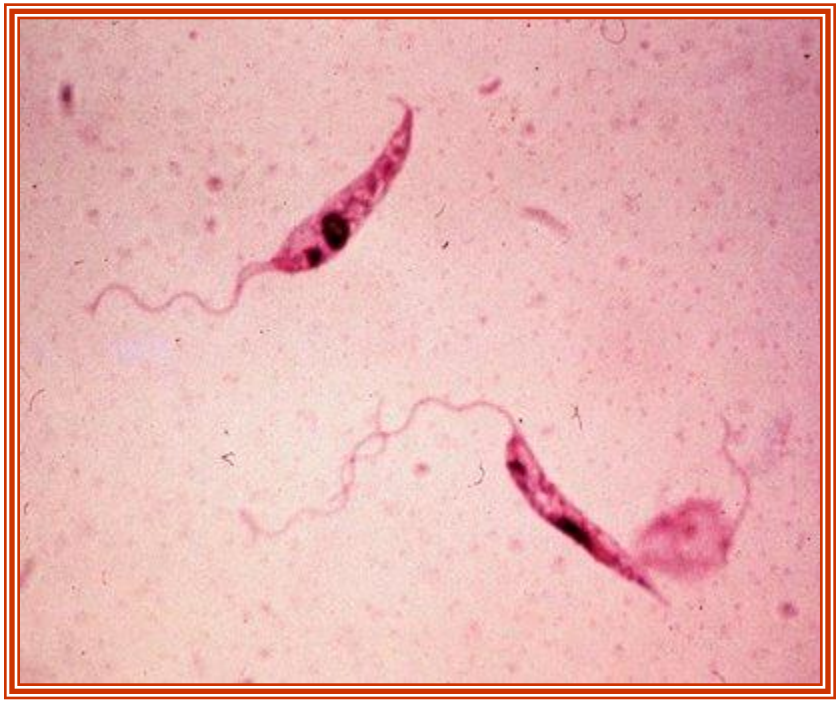
Procyclic and metacyclic transformation of Leishmania spp.




Sandfly Stages
Human Stages
1 Sandfly takes a blood meal
(injects promastigote stage
into the skin)
2 Promastigotes are
phagocytized by
macrophages
3 Promastigotes transform
into amastigotes inside
macrophages
d
4 Amastigotes multiply in cells
(including macrophages) of
various tissues
d
5 Sandfly takes a blood meal
(ingests macrophages infected
with amastigotes)
6 Ingestion of
parasitized cell
7 Amastigotes transform into
promastigote stage in midgut
8 Divide in midgut and
migrate to proboscis
i = Infective Stage
d = Diagnostic Stage



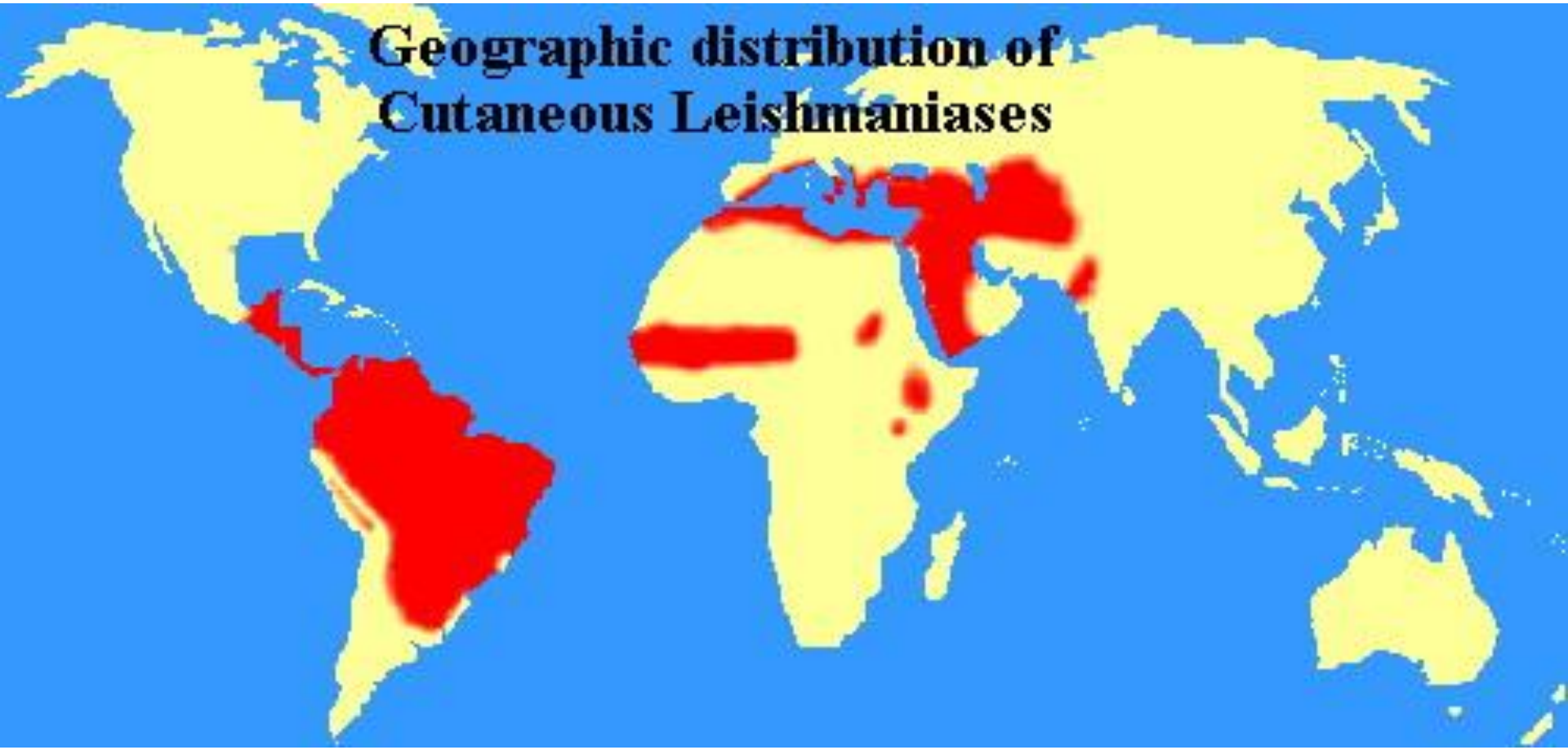
Leishmania spp. Amastigote



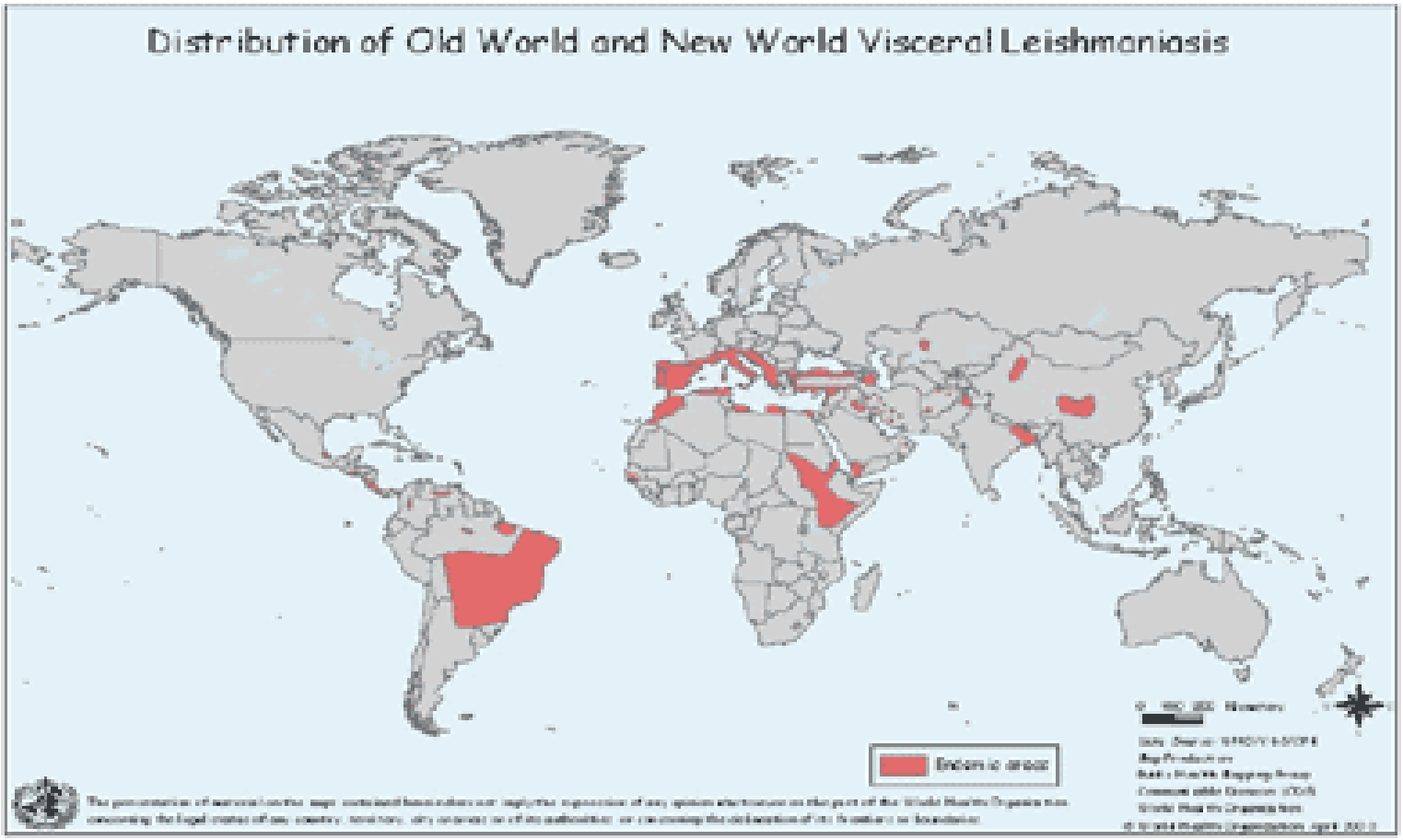
Leishmania spp. Promastigote

A variety of species and species complexes causes disease in humans

Visceral Leishmaniasis
Leishmania donovani
Leishmania infantum
Leishmania chagasi
Cutaneous Leishmaniasis
Leishmania tropica
Leishmania major
Leishmania aethiopica
Mucocutaneous Leishmaniasis
Leishmania brazieliensis
Leishmania mexicana
Leishmania amazoniensis


Geographic distribution of
Cutaneous Leishmaniases

World distribution of Visceral Leishmaniosis



Distribution of canine *L ifantum* in Europe

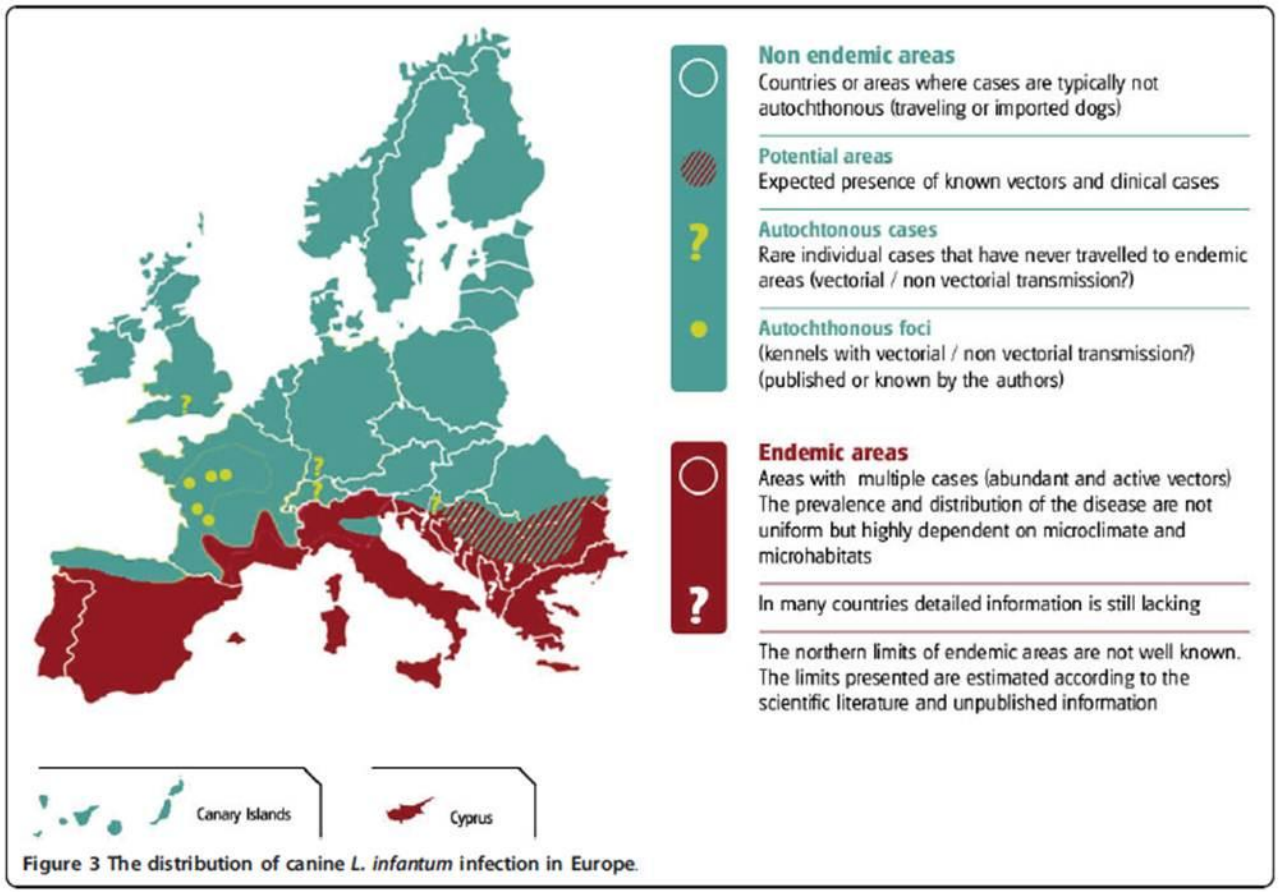


Figure 3 The distribution of canine *L. infantum* infection in Europe.

Epidemiology of Visceral Leishmaniasis

- *Causative agent is* ***L. infantum***
- ***Reservoir host****: involving canine such as Dog, Cats, Jackal, Fixes, Wolfs and other wild carnivores.*
- *The main vector is* ***Phlebotomus papatasi,*** *other vectors are* ***Phlebotomus tobbi****, P balcanicus ?????*
- ***Age distribution****: the disease occurs in children from 1 to 4 years of age.*

The life cycle of *L. infantum* in dogs with proven models of non-sand fly transmission

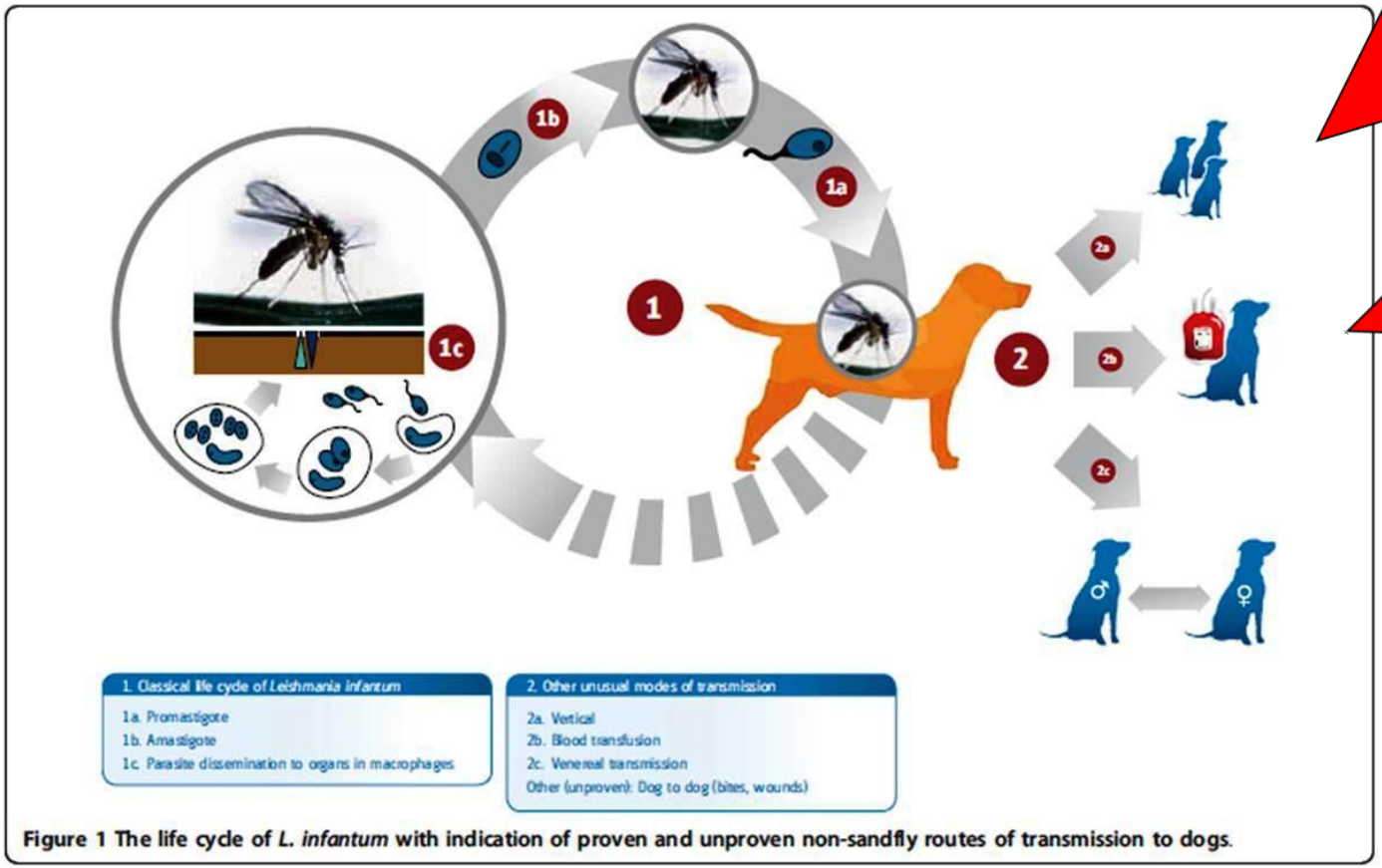


Figure 1 The life cycle of *L. infantum* with indication of proven and unproven non-sandfly routes of transmission to dogs.

Non sand fly transmission of *L infantum*

- Proven models of non-sand fly transmission of *L infantum* include infection trough transfused blood products from blood donors which are carriers of infection, vertical and veneral transmission

L infantum infection clinical symptoms in dogs

- Generalized limphadenomegaly
- Loss of body weight
- Fever
- Lethargy
- Splenomegaly
- Erosive – ulcerative dermatitis
- Non-pruritic exfoliative dermatitis with alopecia
- Lameness (erosive or non-erosive)
- Epistaxis

Visceral Leishmaniosis in dog – Heavy clinic symptoms with anorexia and alopecia

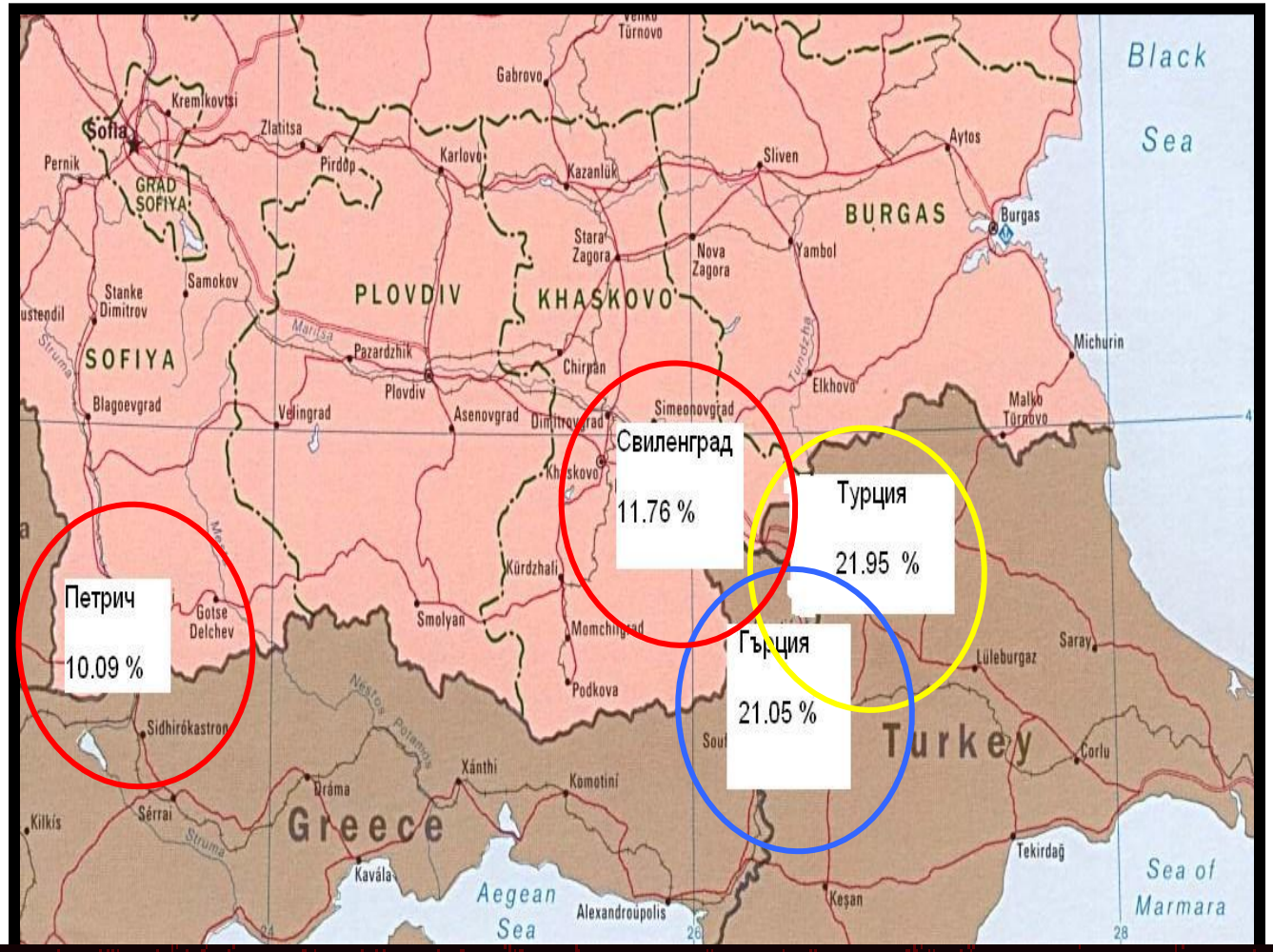
Incidence in Bulgaria

- Prof. Tzhachev for the first time determine **Visceral Leishmaniosis** in 2006 in ***Rotwweiler dog in Petrich town (South –West Bulgaria***).
- Later investigations (2007-2015) showed ***more than 100 cases of infected dogs with*** *Leishmania infantum* in different places in Bulgaria as Svilengrad, Dimitrovgrad, Stara Zagora, Sliven, Sofia, Shumen, Varna, Razgrad and others.

Dog with exfoliative dermatitis and doubled alopecia around eyes and ears

With the compliments of prof. Tzacchev – Trakian University – St. Zagora (BG)

Seroprevalence - 2007
Leishmania infantum




2006-2007

2006-2007

Petrich – 20

- January - March
- 12 new cases

Distribution of canine *L ifantum* in other surrounding countries on the Balkans and Europe

- Macedonia (FYROM)– 9 %, Cyprus - 1,7-10,0%, Albania - 12,9%, Greece - 3,7- 38,8%, Croatia - 42.85%, Bosnia and Hercegovina - 45%, Tukey - 65-76%.
- Some other ***endemic countries*** as Malta - 28,9-52%, Izrael – 3,6 - 15%, Portuguese – 18.7%, Iran - 2.6 - 21,6%, Italy - 22.1 - 30.3%, Spain - 3-35%.
- ***Non-endemic countries-*** Austria, Belgium, Germany, Switzerland, Holland, UK , Canada and USA – mainly as introduced dogs.

Public health

- ***Human visceral Leishmaniosis*** clinically appeared as ***chronic disease*** with febrile reaction, spleno-hepatomegallya, weight looss, anemia, leucopenia,epistaxis, cough, thrombocitopeya, and immunosupression.
- ***The causative agent for Europe is Leishmania infantum.***
- More than 350 billion people (by WHO data) in 88 countries are at risk from infection and more than 12 billion are already infected.

L. infatum infections in BG

- The investigations showed an increasing of the cases of *L. infantum* infections in humans and dogs in Bulgaria in a last years.
- 67 clinical cases were reordered in humans including 4 month age baby between 1988 – 2002. ***The most endemic region is Petrich town region***
- 6 clinical cases were reordered in humans in a period 2004 -2005. In 2008 the cases enlarged up to 107 with 16% lethality (by Tzachev I.)

Human L. infatum infections in BG

- In 2013 г. clinical cases and laboratory confirmed infections with *L. infantum* enlarged up to 123, and only for the first half of 2013 new confirmed cases in Bulgaria become 10.

Non sand-fly transmutation cycle

- Proven models of non-sand fly transmission of *L infantum* include infection trough transfused blood products from blood donors which are carriers of infection , vertical and veneral transmission

Conclusions:

- Distribution of *L.infantum* in Bulgaria and other Balkan countries ***may be more widespread than we previously thought.***
- Infection with *L. infantum* in dogs ***is not well known disease*** of Bulgarian practice veterinarians and ***disease is likely a significant, but underreported problem.***
- The major sand fly vector of VL in Bulgaria ***is now under investigation*** (prof. Nedelchev, oral communication) but Important to note that we have. ***not found sand flies infected with L.infantum to date***

Conclusions:

- The complexity of CanL and the wide range of its clinical manifestations, from inapparent infection to severe disease, ***make the management of CanL challenging.***
- Diagnosis is performed based on clinicopathologic manifestations and by laboratory ***confirmation of infection using mainly serological and molecular techniques (PCR***).

Conclusions:

- ***A staging system*** that divides the disease into ***four stages*** is aimed at assisting the clinician in determining the appropriate therapy, forecasting prognosis, and implementing follow-up steps required for the management of the leishmaniosis patient.
- Prevention should be ***an integrated approach*** including vaccination against *L. Infantum* withan ***effective canine vaccine*** and the application of a ***effective insecticides***

Thank you for the attention!