



# Ebola

Understanding its causes, transmission and consequences

Samuel McConkey

Department of International Health and Tropical Medicine

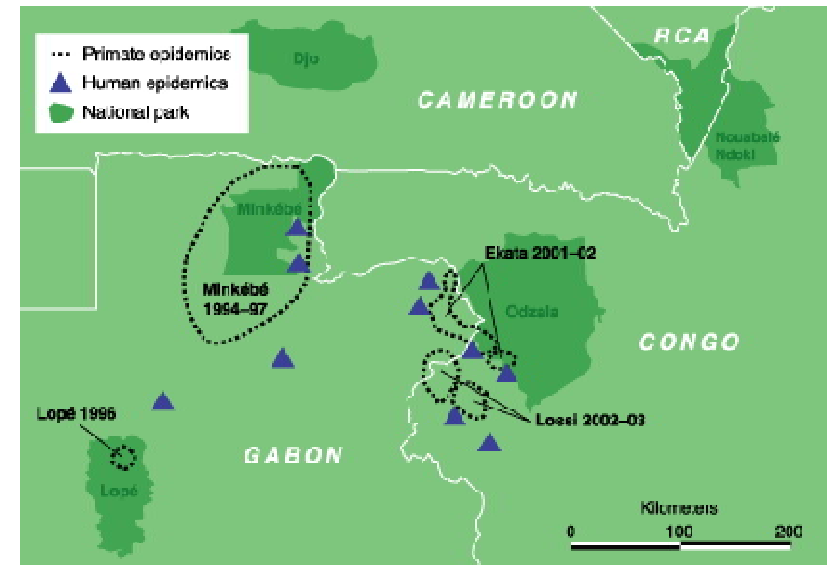
RCSI

# Overview

- History
- Causes
  - Virology
  - Reservoir
  - Social responses
- Transmission
  - Contact isolation
- Consequences
  - biology

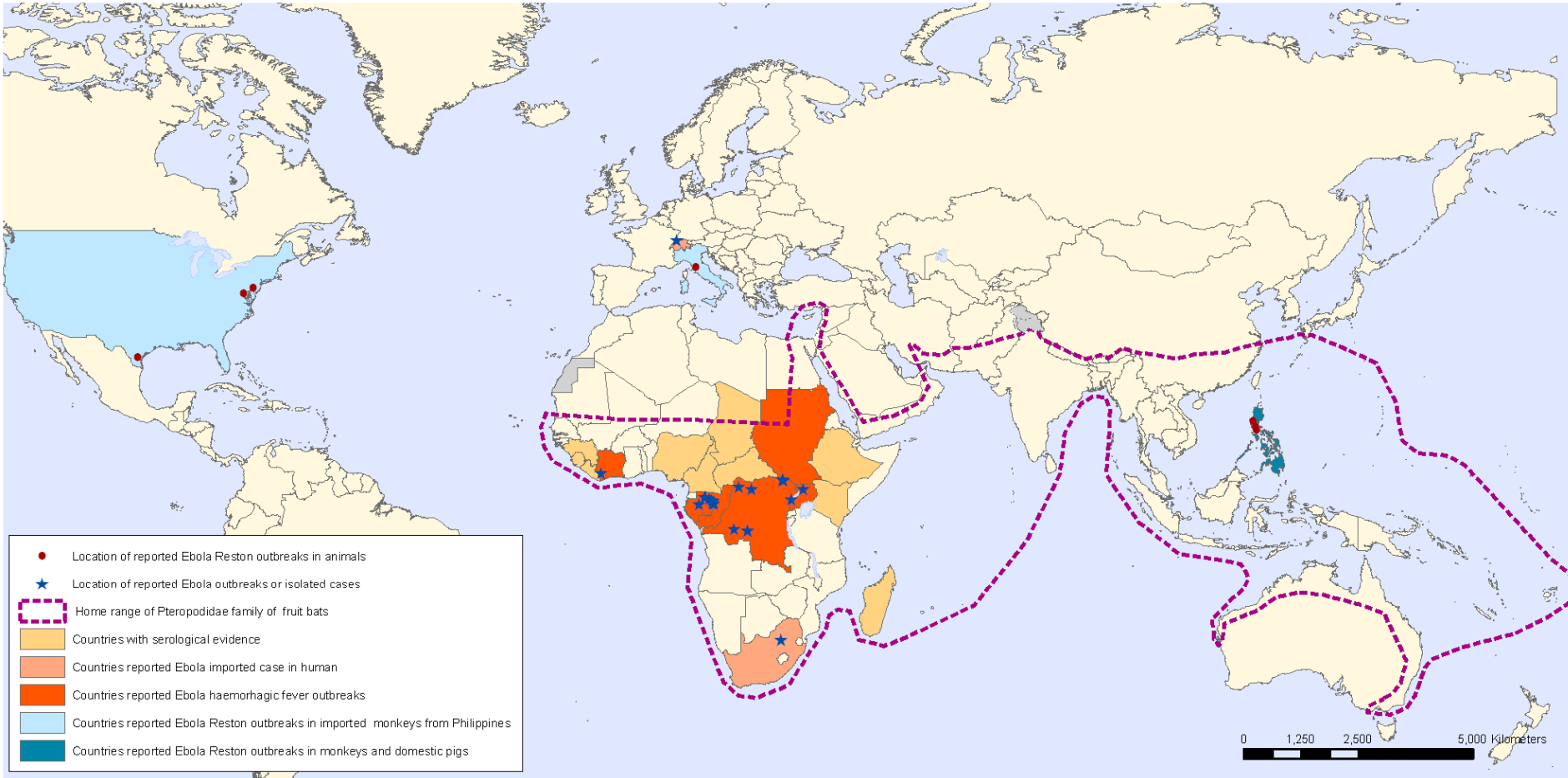
# Distribution

- Marburg, ex- Uganda 1967
- Northern Zaire 1976
- Southern Sudan 1976 -79
- Monkeys, Reston ex-Philippines 1989
- Cote d'Ivoire 1995-6
- Kikwit, DRC 1995
- Gulu, Uganda, 2000
- Gabon and Congo 2001-5 killed gorilla and chimpanzees
- Angola 2005
- Eastern Guinea 2014



Bonaface, Odzaia  
Nature

# Geographic distribution of Ebola haemorrhagic fever outbreaks and fruit bats of Pteropodidae Family



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: Global Alert and Response Department  
 World Health Organization  
 Map Production: Public Health Information and Geographic Information Systems (GIS)  
 World Health Organization

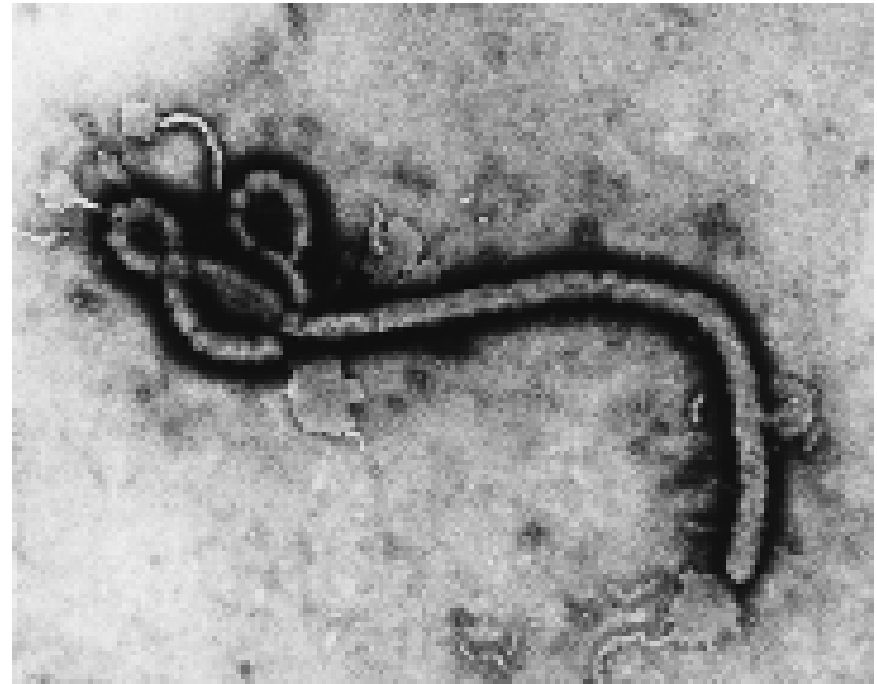


© WHO 2009. All rights reserved

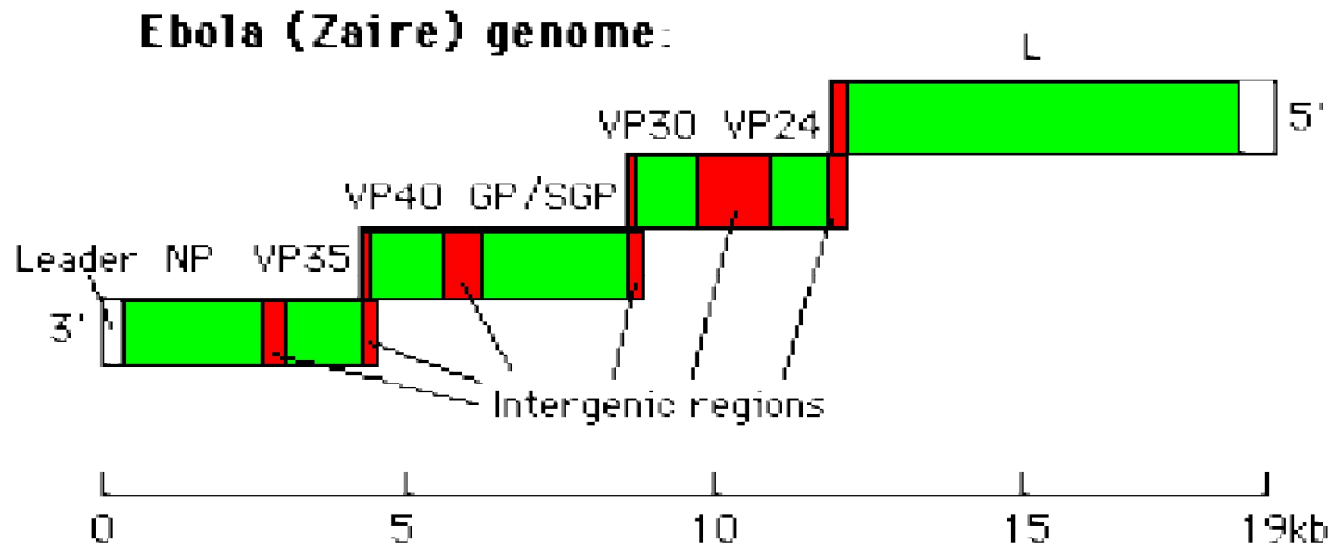
# Viral Haemorrhagic Fever

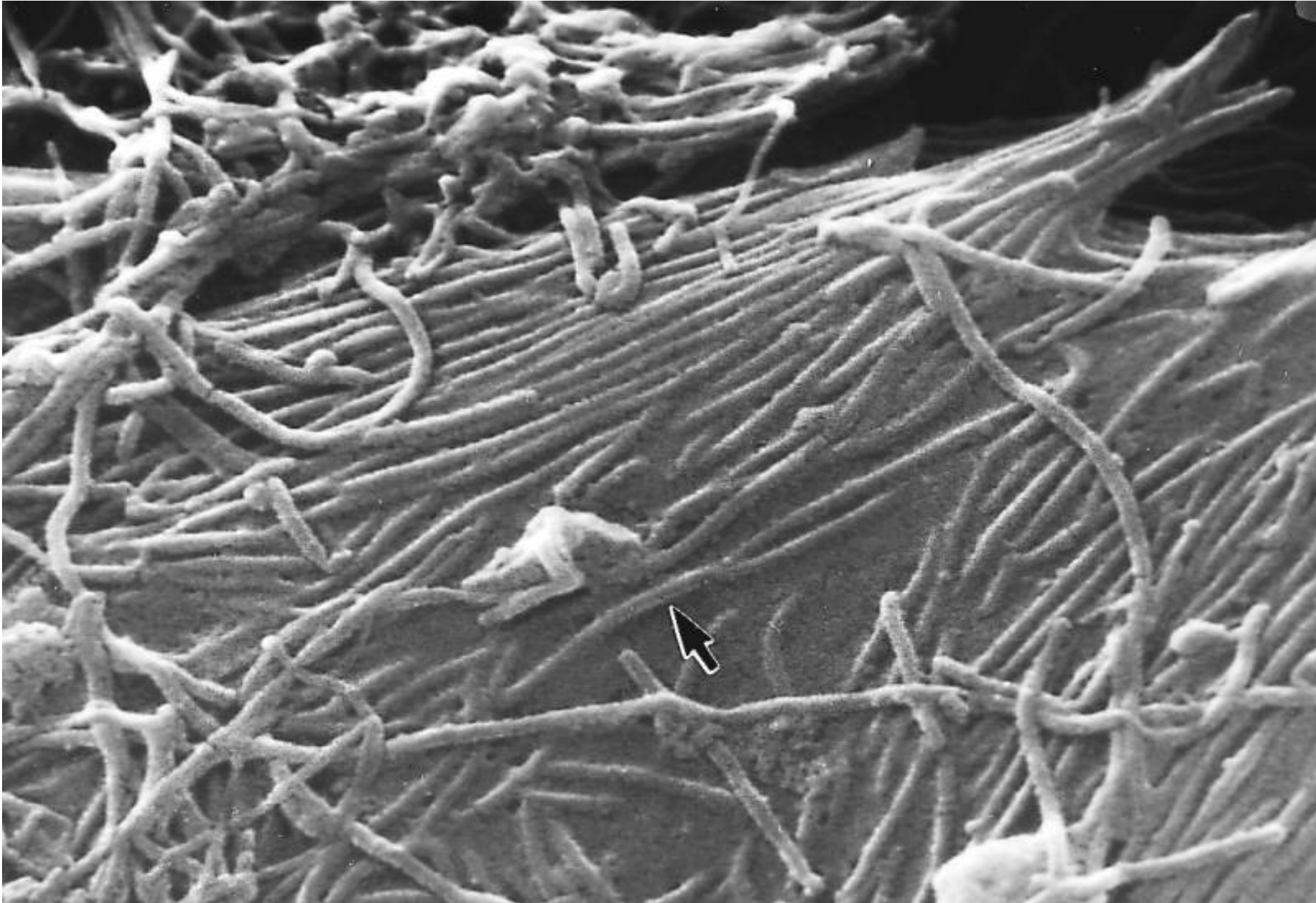
Virus	Class	Transmission	Reservoir
Lassa	ArenaV	Contact, urine	Field rat
Marburg	FiloV	Close contact	Fruit bats
Ebola	FiloV	Close contact	Fruit bats
DengueHF	FlaviV	Aedes	
SAHF	ArenaV	Contact	Rodent
Yellow F	FlaviV	Aedes	Forest primates
Others	BunyaV		

# Ebola and Marburg

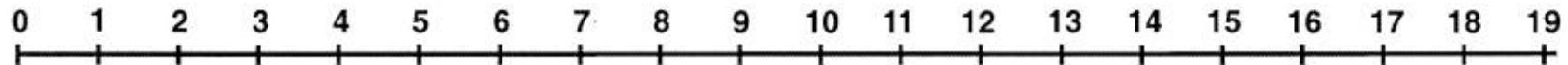
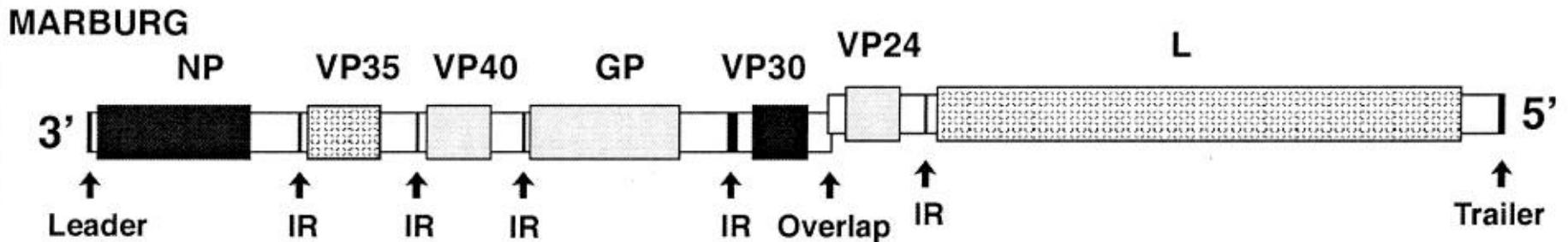
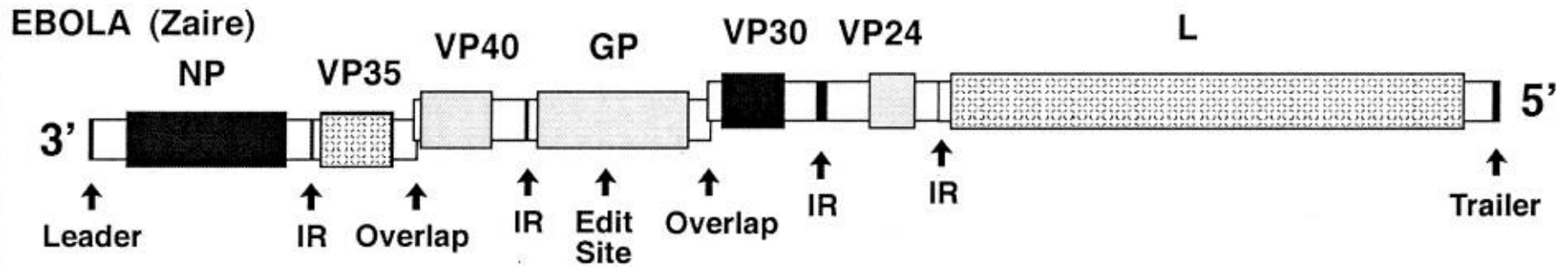
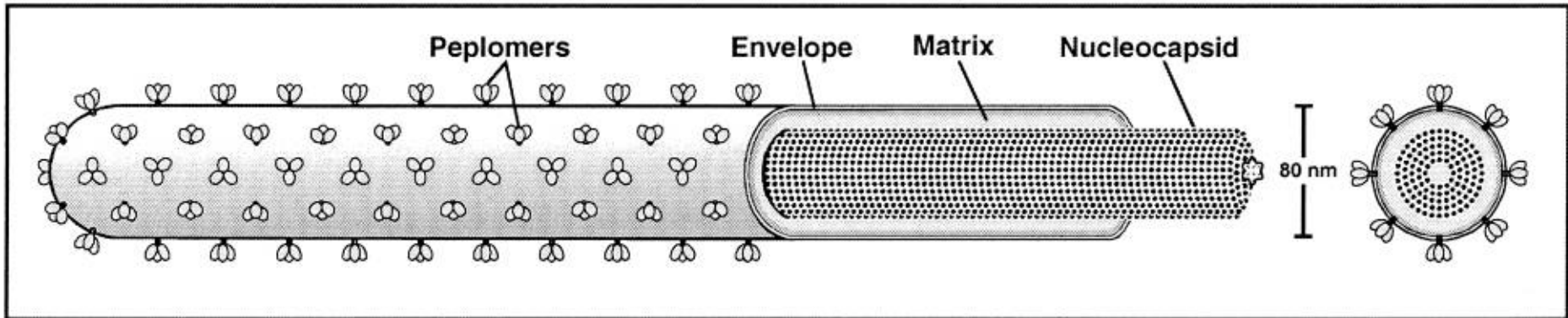


# Genome









Gene Coding Regions:



Nucleoproteins

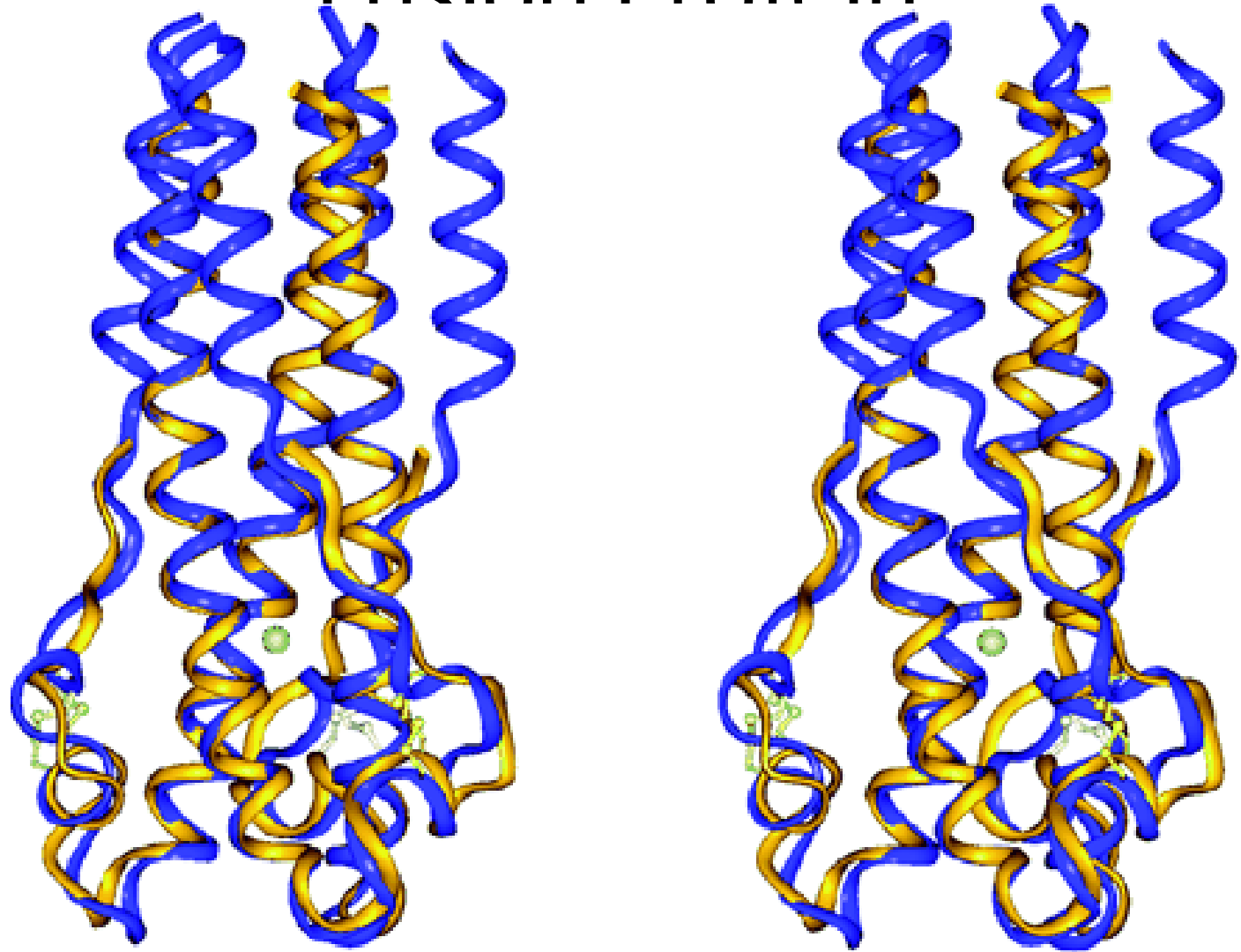


Polymerase Complex



Membrane-associated proteins

# Ficin Protein



# Marburg/Ebola presentation

Incubation period: 4 - 10 days

Fever, chills, malaise, myalgia

Prostration, anorexia, nausea, vomiting

Chest pain, dyspnoea, cough

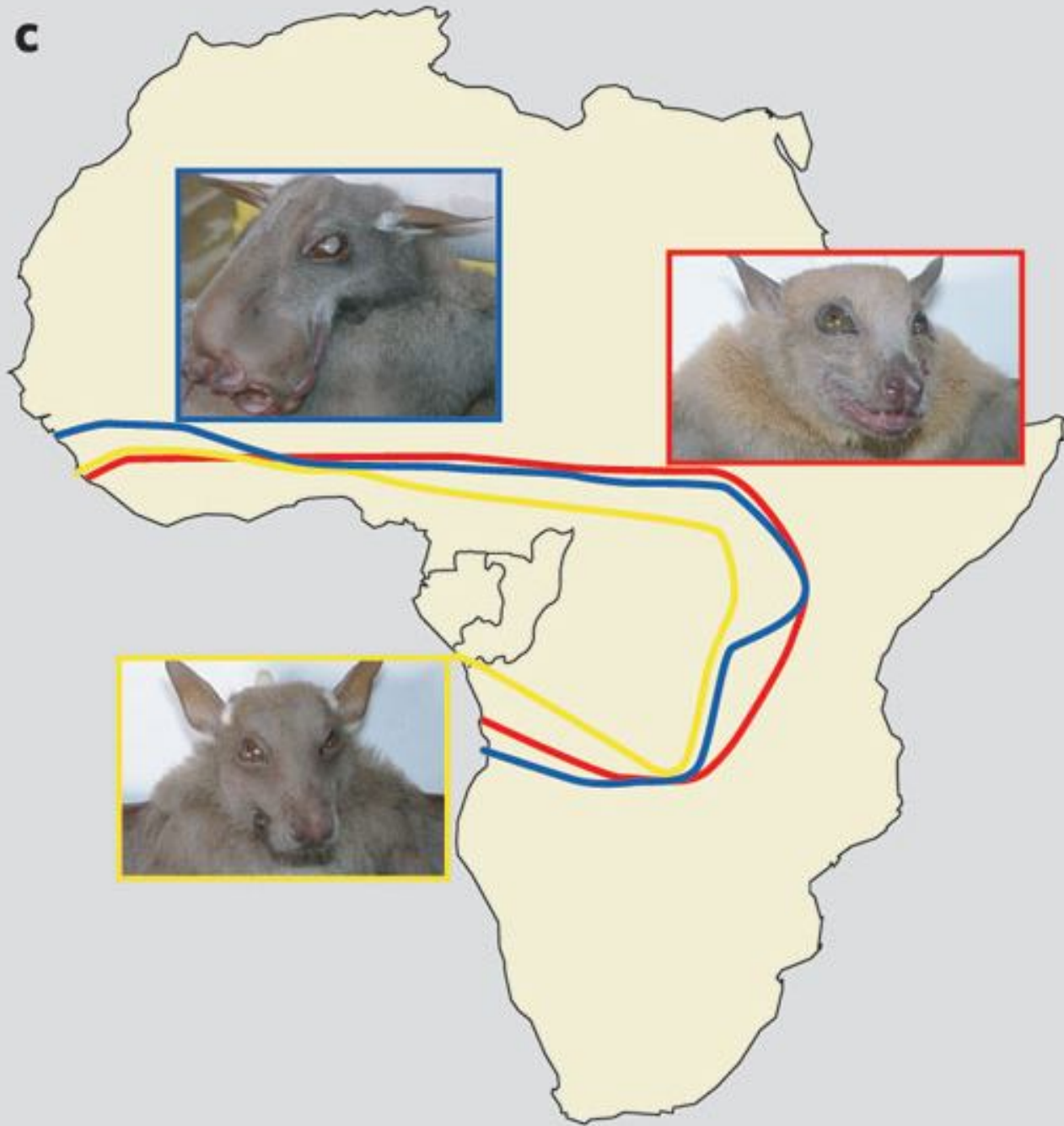
Conjunctival injection, hypotension, oedema

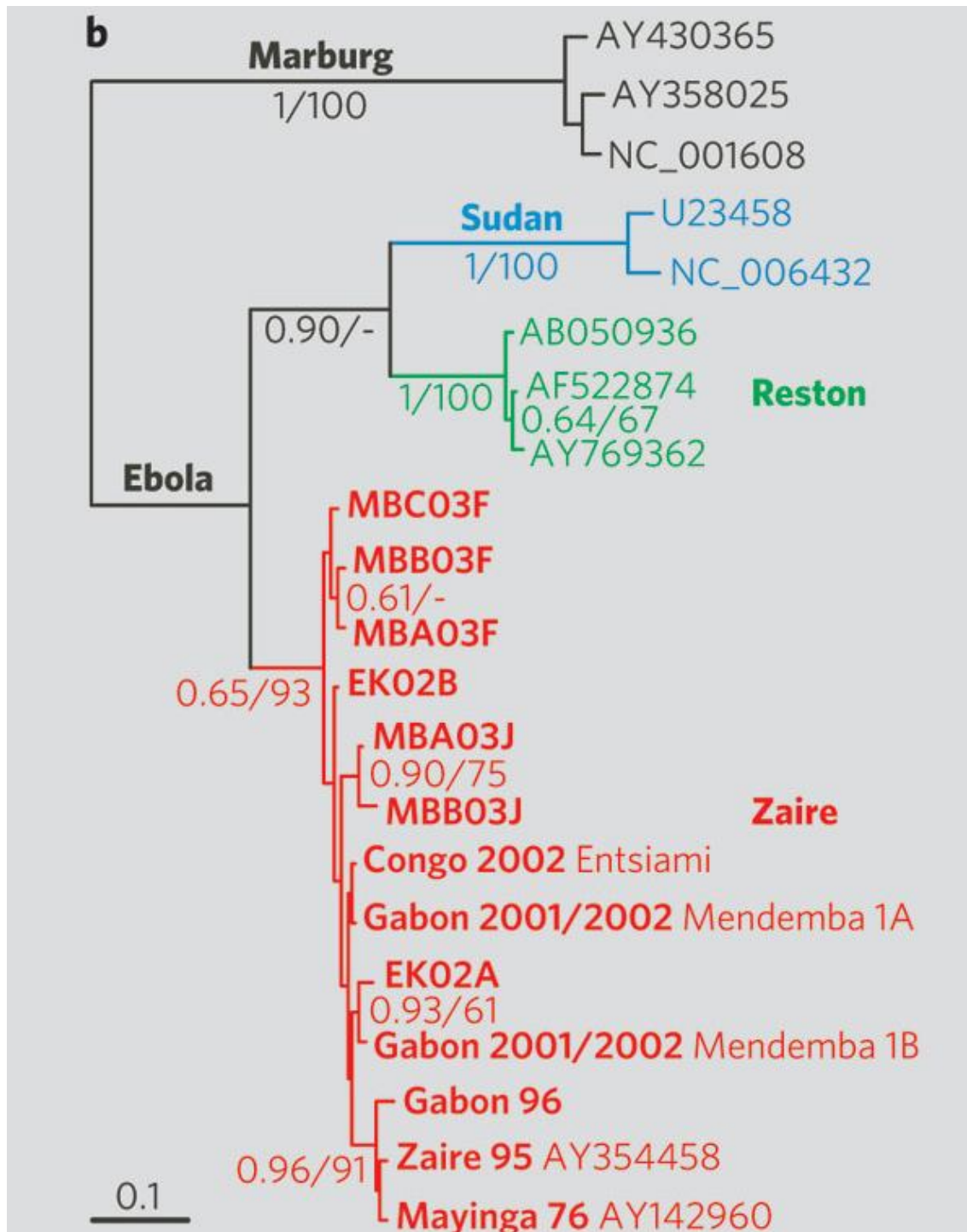
Confusion, coma

Bleeding, petechiae, ecchymosis, oozing, mucosal  
haemorrhage, visceral haemorrhage

Macropapular desquamating rash

c





# Ebola transmission

- Blood
- Saliva
- Sweat
- Urine
- Faeces
- Dead bodies
- Primates

# Control

- Barrier nursing,
- Gloves, gowns, masks, goggles
- Care with all body fluids
- Incinerate all waste
- National guidelines
- Hpsc web site



Uige, Angola 2005 WHO



# Marburg/Ebola Treatment

- Supportive care
- Ribavirin is ineffective
- Passive antibody therapy- little use
- Whole blood transfusion from survivors



# Marburg/Ebola Outcome

- Shock, convulsions, severe metabolic changes
- Coagulopathy
- Necrosis of liver, spleen, kidney and gonads
- Attacks macrophages and endothelial cells
- Direct viral pathogenesis
- 25% - 80% mortality
- Survivors have arthralgia, psychosocial change
- Transmission to health-care workers

# Internet resources

- Many for Ebola

**Fruit bats as reservoirs of Ebola virus** *Nature* **438**, 575-576 (1 December 2005) | doi:10.1038/438575a Eric M. Leroy, Brice Kumulungui, Xavier Pourrut, Pierre Rouquet, Alexandre Hassanin, Philippe Yaba, André Délicat, Janusz T. Paweska, Jean-Paul Gonzalez and Robert Swanepoel

- [www.who.int/csr/disease/marburg/en/](http://www.who.int/csr/disease/marburg/en/)
- [www.cdc.gov](http://www.cdc.gov)

# Disease

- 4 – 10 days incubation
- fever, chills, myalgia, malaise
- prostration, multi-system disorder
- nausea, vomiting, abdominal pain, diarrhoea
- chest pain, cough, short of breath
- conjunctival injection, , oedema, low BP
- headache, confusion, coma
- Petechia, bruising, oozing, bleeding diathesis, bruising easily, GI bleed, bleeding membranes.
- Rash, shock, convulsions, DIC