Bunyaviridae

- ~350 viruses

- **Vectors (reservoirs)**
  - **Arthropodes** (mosquitoes, ticks, phlebotomus - **arbo**)
  - Rodents (**robo**viruses – **ro**dent **bo**rne)

Bunyaviridae

5 genera, ~350 types

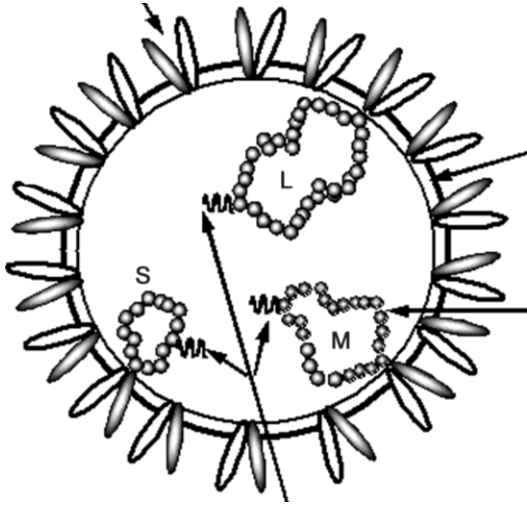
Genus	Viruses	Vector	Host	Human illness
Bunyavirus 161 v.	LCV,TAH, CVO	Mosquitoes, ticks	Small mammals, birds	Fevers with or without rash, LaCrosse encephalitis
Phlebovirus 36 v.	SF viruses RVFV	Phlebotomus , mosquitoes	Human? Sheep, Cattle	Papatacci fever, Rift Valley fever
Nairovirus 33 v.	C-CHG	ticks	Small mammals, birds, cattle	Crime Congo hemorrhagic fever
Hantavirus 30 v.	HTNV, PUUV,SEOV DOBV, SAARV, SNV, ANDV…	**Ø**	Rodents	Hemorrhagic fever with renal syndrome, hantavirus pulmonary syndrome
Tospovirus			Plant viruses	

+ ungrouped viruses

Bunyaviridae

- Spherical, pleomorph
- 80-120 nm
- Enveloped
- **Nucleocapsid with spiral symmetry**
- No M (matrix) protein in envelope

Segmented genome



- 3 molecules od ss (-) RNA
- RNA noninfectious
- 2 envelope glycoproteins
- 1 nucleocapsid protein
- virus transcriptase (RNA polymerase)

Genus *Phlebovirus*

- Viruses transmitted by phlebotomus (SFNV, SFSV, TOSV, … 39 viruses)
- Viruses transmitted by mosquitoes –Rift Valley fever kompleks (5 virusa)
- Viruses transmitted by ticks– Uukuniemi virus group (12 viruses)

Sandfly fever

- Cause – at least 7 immunologically different phleboviruses:
  - Naples (SFNV),
  - Sicilian (SFSV),
  - Toscana virus (TOSV)
  - Punta Toro, Alenquer, Chagres, Candiru
- Natural reservoir - human

- Vector (and reservoir) - *Phlebotomus* spp. (transovarial transmission)

- In Croatia major vector *Phlebotomus papatasii*

Skin papulas after Phlebotomus bite

Sandfly fever (three days fever)

- **Incubation 2-6 days**
- **Viremia-24 hours before and 2 days after onset of illness**
- **Sudden onset with fever (~40°C)- frontal GI symptoms, seldom aseptic meningitis.**
- **U djece bolest ima blaži tijek.**
- **Duration 2-4 days.**

Toscana virus

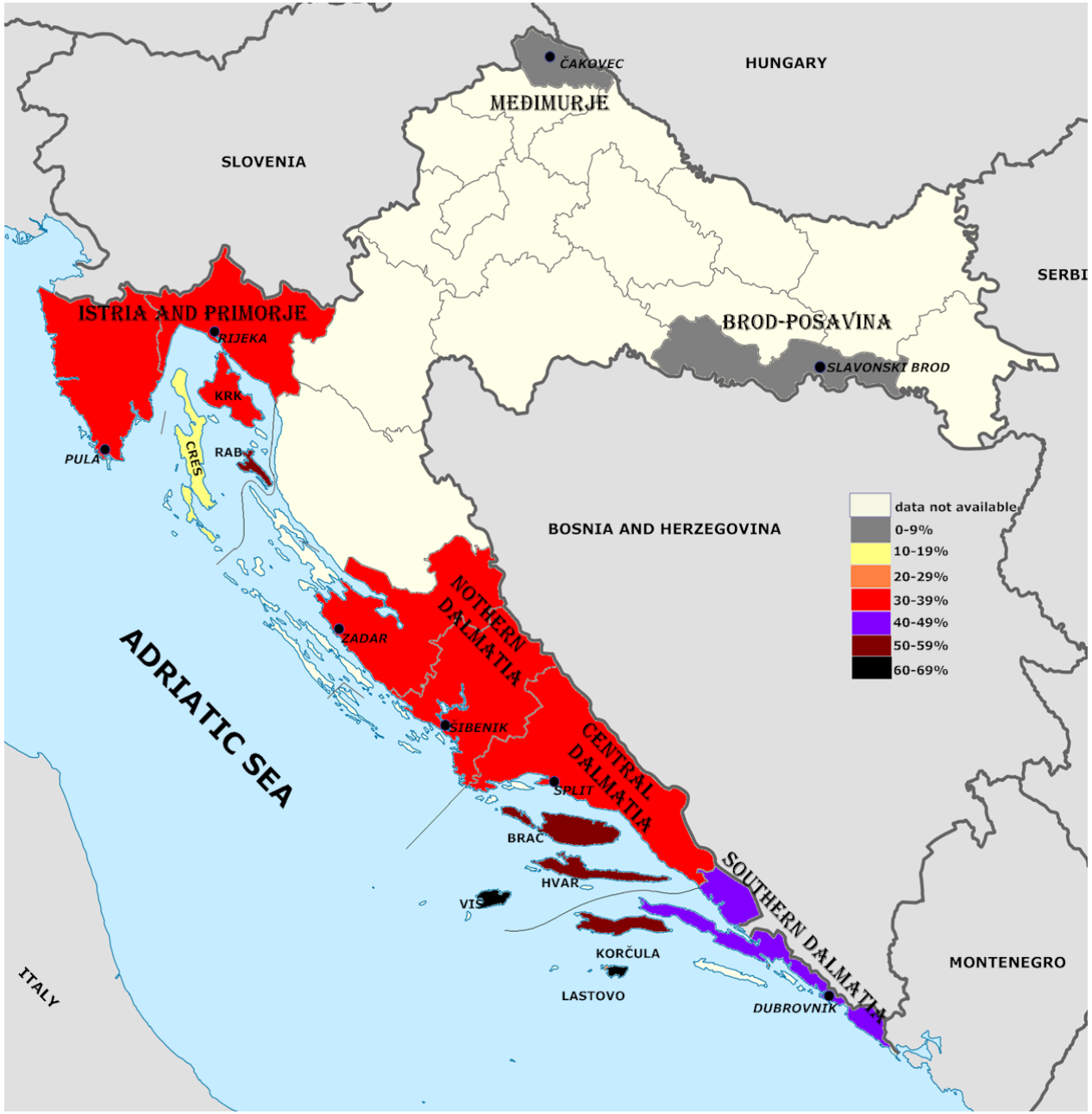
Febrilne summer diseases

Aseptic meningitis

DG: serum- ELISA - IgM i IgG

Liquor –RT-PCR

Punda-Polić V, et al. Evidence of an autochthonous Toscana virus strain in Croatia. J Clin Virol 2012; 55: 4-7.



Punda-Polić V, et al. Prevalence of Toscana virus antibodies in residents of Croatia. Clin Microbiol Infect 2012;18:E200-E203.

Bunyaviridae
Genus *Hantavirus*

- Enveloped viruses (22 viruses), 80-120 nm
-
- ss (-) RNA, three segments

- Glycoproteins **G1 and G2**; nucleoprotein **N**

Genus *Hantavirus*

- No transmission by arthropods
- **Rezervoir – host = small rodents**
  - Inaparent infections in rodents
- Transmission
  Aerosol od rodent excrements (saliva, urine, feces - aerosol)

Hantavirus distribution

Old World

HGBS

New World

HPS

Hantaviruses in Europe

Virus	Host	Disease	Mortality %
Puumala	*Clethrionomys glareolus*	HGBS (mild)	0,1-0,4
Dobrava	*Apodemus flavicollis*	HGBS (severe)	9-12
Saaremaa	*Apodemus agrarius*	HGBS (mild	0
Seoul	*Rattus norvegicus, R.rattus*	HGBS	

Lancet Infect.Dis. **3** (10):2003.

Hantavirusni pulmonary syndrome (HPS)

- Cilj → **endotelne stanice pluća**
- Simptomi
  - vrućica
  - akutni respiratorni distres (plućni edem i hipoksija)
  - U nekih i renalni simptomi
- Šok i kardijalne komplikacije često pridonose smrtnosti

Hantaan virus

- 1951.-1953g. - HG u trupama UN u Koreji. Smrtnost 10%
- 1976.g. – uzročnik dokazan u plućima *Apodemus agrarius coreae.*
- Uzročnik najtežeg oblika HGBS, koji se javlja u Aziji i dalekoistočnoj Rusiji.
- Godišnje epidemije s i do 200 000 oboljelih.
- Smrtnost i do 15%