



Investigations on rodents in Bulgaria for human pathogens

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Introduction and Purpose

Small mammals are reservoirs of various human pathogens – borreliae, anaplasmae, hantaviruses. In rodents, these pathogens often persist during their whole life. They might be transmitted to humans by ticks (borreliae, anaplasmae) or directly through rodent excreta (hantaviruses), causing sometimes life-threatening infections. The aim of this work was to investigate infections with human pathogens in rodents trapped in different regions of Bulgaria.

Apodemus agrarius

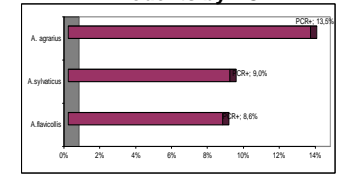


Results

Anaplasma phagocytophilum

Overall, 33 of investigated 284 rodents were infected with *Anaplasma phagocytophilum* (11,6%). Of them, 11/128 (8,6%) – *Apodemus flavicollis*
13/96 (13,5%) *A. agrarius*
1/11 (9%) – *A. sylvaticus*.

Detection of *Anaplasma phagocytophilum* in rodents by PCR



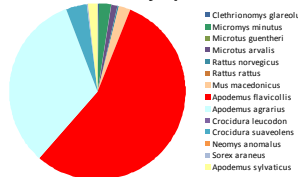
Material and Methods

A total of 284 rodents were investigated by polymerase chain reactions (PCR) for detection of flagellin gene of borreliae within *Borrelia burgdorferi* sensu lato complex (1), *ankA* gene of *Anaplasma phagocytophilum* (2) and nucleoprotein gene of hantavirus Dobrava – conventional nested RT-PCR and Real time RT-PCR with TaqMan probe (3).



Apodemus flavicollis

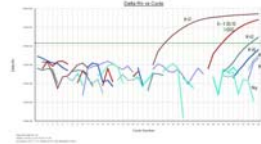
Distribution of collected rodents by species



Results

Hantaviruses

Hantavirus RNA was detected in 9 of the rodents. Only DOBV but not PUUV or SAAV was detected. Almost all infected rodents were *A. flavicollis* (8/9 PCR+rodents).

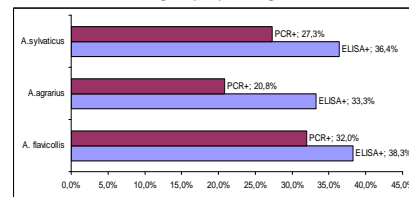


Results

Borrelia burgdorferi

- *B. burgdorferi* was detected in 64/284 (22,5%) of the investigated rodents by PCR:
- Of them, 41 samples originated from *A. flavicollis*, 20 from *A. agrarius*, and 3 from *A. sylvaticus*.
- It means: **32% (41/128) of *A. flavicollis*; 20,8% (20/96) of *A. agrarius*, and 27,3% (3/11) of *A. sylvaticus* have active borrelia infection (genome detected by PCR)**

Detection of *B. burgdorferi* in rodents by PCR and ELISA



Conclusions

- Rodents are important reservoirs of human pathogens. In this study, active infection in rodents was confirmed by detection of microorganism's genome.
- Remarkably, a high number of rodents from genus *Apodemus* were infected with borreliae.
- The high rate of detection of *A. phagocytophilum* in rodents from *A. agrarius* species suggested that this species might serve as major reservoir of human anaplasmosis in Bulgaria.
- Mainly infected with hantaviruses were *A. flavicollis* mice, known as reservoir of Dobrava hantavirus but hantavirus infections were detected also in *A. agrarius* mice.
- Medical authorities should be aware of the risk for humans.

References

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- 3.Kramski M, Meisel H, Klempa B, Kruger D, Pauli G, Nitsche A. Detection and typing of human pathogenic hantaviruses by RealTime Reverse Transcription-PCR and pyrosequencing. Clin Chem 2007, 53(11):1899-1905.