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Banga S., Chandelia S., Patra B.

Purpura fulminans and transient nephrotic range proteinuria: rare manifestation of leptospirosis

(2024) Pediatric Infectious Disease Journal, 43 (9), pp. e336 - e337

DOI: 10.1097/INF.0000000000004392

LANGUAGE OF ORIGINAL DOCUMENT: English

Borges A.L.D.S.B., Aymée L., Carvalho-Costa F.A., Lilenbaum W., Di Azevedo M.I.N.

Molecular epidemiology of Leptospira spp. serogroup Sejroe associated with chronic bovine leptospirosis

(2024) Veterinary Microbiology, 298, art. no. 110238

ABSTRACT: Pathogenic bacteria Leptospira spp. are commonly associated with bovine leptospirosis, characterized chiefly by chronic and subclinical reproductive disorders. Strains from the Sejroe serogroup play a significant role in these chronic genital infections known as Bovine Genital Leptospirosis (BGL), which notably impact cattle health. This study aims to deepen our understanding of BGL by investigating the genetic diversity, geographical distribution, and specific anatomical sites of infection of the causative agents. Initially, uterine fragments and cervicovaginal mucus were collected from 47 cows and subjected to PCR targeting the lipL32 gene. Positive samples in lipL32-PCR (9 samples) underwent genotyping based on the secY gene. Subsequently, sequences were aligned with GenBank entries (108 sequences) and analyzed in silico. All nine sequences from this study were identified as L. interrogans with an identity >99 % to serogroup Sejroe reference strains (Norma and L53). In the broader analysis, the most prevalent species observed was L. borgpetersenii, followed by L. interrogans and L. santarosai. The haplotype network of L. interrogans revealed that haplogroups B and C exclusively included L. interrogans strains of genital origin, while haplogroup A encompassed strains from renal sources as well. These findings underscore the significance of the L. borgpetersenii genotype Hardjobovis and L. interrogans genotype Hardjoprajitno as the predominant circulating strains and highlight the existence of distinct haplogroups of pathogenic leptospires originating from genital sources. We advocate for the use of secY as an effective genetic marker for Leptospira spp. and stress the necessity for additional research prioritizing the genital tract. The outcomes of this study contribute to the development of improved control measures for chronic cattle diseases and provide valuable guidance for future investigations.

LANGUAGE OF ORIGINAL DOCUMENT: English

Sultana M., Paul S.K., Nasreen S.A., Haque N., Hasan M.K., Islam A., Nila S.S., Jahan A., Sathi F.A., Hossain T., Ferdaus S.J., Aung M.S., Kobayashi N.

Epidemiological features of leptospirosis and identification of Leptospira wolffii as a persistently prevailing species in North–Central Bangladesh

(2024) Infectious Disease Reports, 16 (4), pp. 638 - 649

DOI: 10.3390/idr16040049

ABSTRACT: Leptospirosis is considered to be the most widespread, yet neglected, re-emerging zoonotic disease caused by infection with a pathogenic species of the genus Leptospira. Although this disease is prevalent in Bangladesh, the recent epidemiological status has not yet been well documented. In this study, we aimed to determine the prevalence of leptospirosis among febrile patients using different diagnostic methods and to characterize the epidemiological features and species of Leptospira in Mymensingh, north–

central Bangladesh. Among the blood samples of 186 patients with suspected leptospirosis who met the inclusion criteria, including having a fever for more than 5 days (November 2021–June 2022), 88 samples (47%) were Leptospira-positive according to IgM LAT, IgM ELISA, or nested PCR (positivity rates: 38%, 37%, and 42%, respectively). Nested PCR showed a significantly higher positivity rate (54%) in patients with a short fever (5–10 day) than the other methods did, with lower rates among those with a longer fever. Leptospirosis cases were more common in males (68%), those 16–45 years of age (70%), residents of rural areas (81%), and farmers (41%). In addition to a fever, myalgia and jaundice were found in more than 70% of the patients, while variable symptoms were observed. The 16S rRNA sequencing analysis revealed that the Leptospira species in all the 22 samples tested were L. wolffii, belonging to the pathogenic subclade P2. This study showed the recent epidemiological features of leptospirosis in Bangladesh, indicating the presumptive predominance of L. wolffii since 2019.
LANGUAGE OF ORIGINAL DOCUMENT: English

Talukder H., Muñoz-Zanzi C., Salgado M., Berg S., Yang A.

Identifying the drivers related to animal reservoirs, environment, and socio-demography of human leptospirosis in different community types of southern chile: an application of machine learning algorithm in one health perspective

(2024) Pathogens, 13 (8), art. no. 687
ABSTRACT: Leptospirosis is a zoonosis with global public health impact, particularly in poor socio-economic settings in tropical regions. Transmitted through urine-contaminated water or soil from rodents, dogs, and livestock, leptospirosis causes over a million clinical cases annually. Risk factors include outdoor activities, livestock production, and substandard housing that foster high densities of animal reservoirs. This One Health study in southern Chile examined Leptospira serological evidence of exposure in people from urban slums, semi-rural settings, and farm settings, using the Extreme Gradient Boosting algorithm to identify key influencing factors. In urban slums, age, shrub terrain, distance to Leptospira-positive households, and neighborhood housing density were contributing factors. Human exposure in semi-rural communities was linked to environmental factors (trees, shrubs, and lower vegetation terrain) and animal variables (Leptospira-positive dogs and rodents and proximity to Leptospira-positive households). On farms, dog counts, animal Leptospira prevalence, and proximity to Leptospira-contaminated water samples were significant drivers. The study underscores that disease dynamics vary across landscapes, with distinct drivers in each community setting. This case study demonstrates how the integration of machine learning with comprehensive cross-sectional epidemiological and geospatial data provides valuable insights into leptospirosis eco-epidemiology. These insights are crucial for informing targeted public health strategies and generating hypotheses for future research.
LANGUAGE OF ORIGINAL DOCUMENT: English

Petakh P., Poliak M., Kohutych A., Oksenych V., Kamyshnyi O.

Impact of antibiotic and steroid therapy on leptospirosis outcomes: a retrospective cohort study in Transcarpathia, Ukraine

(2024) Biomedicines, 12 (8), art. no. 1685
DOI: 10.3390/biomedicines12081685

ABSTRACT: Leptospirosis presents a significant health challenge in the Transcarpathian region of Ukraine, with higher incidence rates and mortality compared to national averages. We conducted a retrospective cohort study to investigate the effects of antibiotic and steroid treatments on outcomes in leptospirosis patients. Our analysis of clinical and laboratory data from a single center revealed that dexamethasone showed significant effects on various clinical variables, as did investigated antibiotics. Notable differences in clinical and laboratory outcomes were observed, particularly in direct bilirubin levels, which were significantly higher in non-survivors. ROC analysis demonstrated high sensitivity and specificity of direct bilirubin as a predictor of mortality. These findings highlight the importance of targeted treatment strategies and the potential of specific laboratory markers in improving leptospirosis management.
LANGUAGE OF ORIGINAL DOCUMENT: English

Ravishankar V., Karunanidhi M., Sridhar N., Lourdu S.R.M.D.

Elucidating sequence and structural variations present in rnase p rna ribozyme for the taxonomy of Leptospira spp.

(2024) Current Applied Science and Technology, 24 (5), art. no. e0259544
DOI: 10.55003/cast.2024.259544
ABSTRACT: RNase P RNA (RPR) gene responsible for transcribing tRNA processing ribozyme is an essential single-copy gene present in the genome of all organisms and has been proven to be a reliable genetic marker for the differentiation of species. In the present study, phylogenetic analysis was performed by exploiting sequence and structural variations present in the RPRs to determine the taxa of unidentified leptospires. RPR gene-based phylogeny revealed that serovars of Leptospira borgpetersenii could be bifurcated into distinct subgroups A and B. The saprophytic leptospiral strains were classified into three groups namely saprophytic group I, saprophytic group II and saprophytic group III. The presumed taxonomic positions of leptospiral strains Hampton, LT 2116, M4, 18R, Pond 2020, ZV016, ICFT and L. alexanderi were investigated for the phylogeny using both RPR and secY genes. The strains of L. alexanderi branched out as a separate clade between strains of L. santarosai and L. borgpetersenii. Furthermore, a simple restriction digestion assay was performed for the RPR gene-based differentiation of leptospires. PCR amplification and subsequent restriction digestion of the RPR gene amplified helped to distinguish Leptospira sp. The present research contributes to our understanding of leptospiral taxonomy and provides a valuable tool for species identification in diagnostic applications.
LANGUAGE OF ORIGINAL DOCUMENT: English

Damiano D.K., Azevedo B.O.P., Fernandes G.S.C., Teixeira A.F., Gonçalves V.M., Nascimento A.L.T.O., Lopes A.P.Y.

The toxin of VapBC-1 Toxin-Antitoxin Module from Leptospira interrogans is a ribonuclease that does not arrest bacterial growth but affects cell viability

(2024) Microorganisms, 12 (8), art. no. 1660
DOI: 10.3390/microorganisms12081660
ABSTRACT: Bacterial ubiquitous Toxin-Antitoxin (TA) systems are considered to be important survival mechanisms during stress conditions. In regular environmental conditions, the antitoxin blocks the toxin, whereas during imbalanced conditions, the antitoxin concentration decreases, exposing the bacteria cell to a range of toxic events. The most evident consequence of this disequilibrium is cell growth arrest, which is the

reason why TAs are generally described as active in the function of bacterial growth kinetics. Virulence-associated proteins B and C (VapBC) are a family of type II TA system, in which VapC is predicted to display the toxic ribonuclease activity while VapB counteracts this activity. Previously, using in silico data, we designated four VapBC TA modules in Leptospira interrogans serovar Copenhageni, the main etiological agent of human leptospirosis in Brazil. The present study aimed to obtain the proteins and functionally characterize the VapBC-1 module. The expression of the toxin gene vapC in E. coli did not decrease the cell growth rate in broth culture, as was expected to happen within active TA modules. However, interestingly, when the expression of the toxin was compared to that of the complexed toxin and antitoxin, cell viability was strongly affected, with a decrease of three orders of magnitude in colony forming unity (CFU). The assumption of the affinity between the toxin and the antitoxin was confirmed in vivo through the observation of their co-purification from cultivation of E. coli co-expressing vapB-vapC genes. RNAse activity assays showed that VapC-1 cleaves MS2 RNA and ribosomal RNA from L. interrogans. Our results indicate that the VapBC-1 module is a potentially functional TA system acting on targets that involve specific functions. It is very important to emphasize that the common attribution of the functionality of TA modules cannot be defined based merely on their ability to inhibit bacterial growth in a liquid medium.
LANGUAGE OF ORIGINAL DOCUMENT: English

Silva-Ramos C.R., Matiz-González J.M., Gil-Mora J., Martínez Díaz H.-C., Faccini-Martínez Á.A., Cuervo C., Melby P.C., Aguilar P.V., Cabada M.M., Rodas J.D., Hidalgo M.

Molecular characterization of Leptospira species among patients with acute undifferentiated febrile illness from the Municipality of Villeta, Colombia

(2024) Tropical Medicine and Infectious Disease, 9 (8), art. no. 168
DOI: 10.3390/tropicalmed9080168
ABSTRACT: Leptospira is a bacterial genus that includes several pathogenic species related to leptospirosis. In Colombia, leptospirosis is a mandatorily reported disease, widely distributed across the country. In the Villeta municipality, leptospirosis has been identified as an important cause of febrile illness; however, to date, no studies have been performed to identify the circulating species. A genus-specific qualitative qPCR was performed on DNA extracted from febrile patients' acute-phase whole-blood samples targeting a fragment of the rrs gene. Positive qPCR samples were further amplified for the adk, icdA, LipL32, LipL41, rrs, and secY genes through conventional PCR for sequencing. All high-quality obtained sequences were further assessed through concatenated phylogenetic analysis. A total of 25% (14/56) of febrile patients' acute blood samples were positive for Leptospira spp. High-quality sequences were obtained for only five genes, and analysis through concatenated phylogeny identified that all sequences clustered within the P1/pathogenic clade; some of them formed a robustly supported clade with Leptospira santarosai, and others were closely related with other Leptospira species but exhibited considerable genetic divergence. We describe the presence of pathogenic Leptospira species among febrile patients from the Villeta municipality and identify L. santarosai and other Leptospira species as causative agents of leptospirosis in the region.
LANGUAGE OF ORIGINAL DOCUMENT: English

Ramsay L., Eberhardt C., Schoster A.

Acute leptospirosis in horses: a retrospective study of 11 cases (2015-2023)

(2024) Journal of Veterinary Internal Medicine

DOI: 10.1111/jvim.17184

ABSTRACT: Background: Reports of leptospirosis in horses are limited. Objectives: To describe the clinical and diagnostic findings of acute systemic leptospirosis in horses. Animals: Eleven client-owned horses presented to an equine hospital because of acute onset of disease between 2015 and 2023. Methods: Retrospective case series. Horses diagnosed with leptospirosis by 1 or more of urine PCR, serologic microscopic agglutination test (MAT), and histopathology. Results: Common clinical signs included lethargy (10), anorexia (10), fever (9), tachypnea (9), abnormal lung sounds (9), and epistaxis (6). Acute kidney injury was present in all cases. Evidence of pulmonary hemorrhage and liver disease was found in 8 (73%) and 6 (55%) horses, respectively. In 6 (55%) horses, kidneys, lungs, and liver were affected. Urine quantitative polymerase chain reaction for detection of pathogenic Leptospira spp. was positive in 6 (55%) cases. On serology Leptospira interrogans serovar Australis, Autumnalis, and Bratislava accounted for 86% of all titers ≥1 : 800. Overall case fatality rate was 4/11 (36%). Main findings on necropsy were tubular necrosis, interstitial nephritis, hemorrhage in the alveoli, pulmonary edema, periportal hepatitis and necrosis, cholestasis, and cholangitis. Conclusions and Clinical Importance: Leptospirosis should be considered as a differential diagnosis in horses with evidence of acute systemic inflammation and acute renal injury, epistaxis, or hepatic disease. For increased likelihood of identifying positive cases, both MAT serology and urine PCR should be performed.

LANGUAGE OF ORIGINAL DOCUMENT: English

Dwisiswanarum B., Umniyati S.R., Qaimumanazalla H., Wiratama B.S., Ramadona A.L.

Relationship of environmental factors with leptospirosis incidence in Southeast Asia

(2024) Kemas, 19 (4), pp. 616 - 622

DOI: 10.15294/kemas.v19i4.45761

ABSTRACT: Southeast Asia is a leptospirosis endemic with the highest estimated incidence of cases. This type of research is a systematic review using the PRISMA. These search results found 2.322 research articles and only thirteen articles that matched the research criteria. Two articles discussed the relationship between sewer conditions and the incidence of leptospirosis, one article discussed the relationship between the presence of trash bins and the incidence of leptospirosis, nine articles discussed the presence of rats and the incidence of leptospirosis, and one article discussed standing water and the incidence of leptospirosis. There is a relationship between the presence of trash bins, the presence of rats, and standing water and the incidence of leptospirosis in Indonesia, Thailand, and Malaysia and there is no relationship between sewer conditions in Thailand and Indonesia.

LANGUAGE OF ORIGINAL DOCUMENT: English

Fish-Low C.-Y., Than L.T.L., Ling K.-H., Sekawi Z.

The potential of eight plasma proteins as biomarkers in redefining leptospirosis diagnosis

(2024) Journal of Proteome Research

DOI: 10.1021/acs.jproteome.4c00376

ABSTRACT: Leptospirosis, a notifiable endemic disease in Malaysia, has higher mortality rates than regional dengue fever. Diverse clinical symptoms and limited diagnostic methods complicate leptospirosis diagnosis. The demand for accurate biomarker-based diagnostics is increasing. This study investigated the plasma proteome of leptospirosis patients with leptospiraemia and seroconversion compared with dengue patients

and healthy subjects using isobaric tags for relative and absolute quantitation (iTRAQ)-mass spectrometry (MS). The iTRAQ analysis identified a total of 450 proteins, which were refined to a list of 290 proteins through a series of exclusion criteria. Differential expression in the plasma proteome of leptospirosis patients compared to the control groups identified 11 proteins, which are apolipoprotein A-II (APOA2), C-reactive protein (CRP), fermitin family homolog 3 (FERMT3), leucine-rich alpha-2-glycoprotein 1 (LRG1), lipopolysaccharide-binding protein (LBP), myosin-9 (MYH9), platelet basic protein (PPBP), platelet factor 4 (PF4), profilin-1 (PFN1), serum amyloid A-1 protein (SAA1), and thrombospondin-1 (THBS1). Following a study on a verification cohort, a panel of eight plasma protein biomarkers was identified for potential leptospirosis diagnosis: CRP, LRG1, LBP, MYH9, PPBP, PF4, SAA1, and THBS1. In conclusion, a panel of eight protein biomarkers offers a promising approach for leptospirosis diagnosis, addressing the limitations of the “one disease, one biomarker” concept.
LANGUAGE OF ORIGINAL DOCUMENT: English

Golab N., Khaki P., Tebianian M., Esmaelizad M., Harzandi N.

Recombinant outer membrane protein Lipl41 from Leptospira interrogans robust immune responses in mice model

(2024) Iranian Journal of Microbiology, 16 (4), pp. 545 - 551

DOI: 10.18502/ijm.v16i4.16314

ABSTRACT: Background and Objectives: Leptospirosis is an infectious zoonotic disease that can result in severe complications. It is widespread, especially in hot and humid climates such as the northern region of Iran. The immune responses to leptospirosis are multifaceted. Lipl41 is an outer membrane protein that is expressed during infection and is highly conserved among pathogenic species. This makes it a good candidate for diagnosis and induction of specific immune responses. The aim of the present study was to evaluate immune responses against recombinant Lipl41 in mice. Materials and Methods: After immunizing of different groups of mice with recombinant Lipl41 (rLipl41), the levels of specific antibodies and cytokine profiles interferon-gamma/ interleukin-4 (IFN-γ/IL-4) were measured. Results: The results revealed that rLipl41 showed a significant increase in antibody levels compared with the control groups (P< 0.05). Although the level of IL-4 in the groups that received Lipl41 was similar to that in the other control groups, the IFN-γ levels showed a significant increase (P<0.05). Conclusion: It has been concluded that recombinant Lipl41 protein could strongly stimulate specific immune responses and be considered a potential candidate for vaccine development and diagnostic research.
LANGUAGE OF ORIGINAL DOCUMENT: English

Perera M., Hemachandra I., Howard-Jones A.R., Fong W., Sintchenko V., Varadhan H., Naqvi S.

Leptospirosis ventriculoperitoneal shunt infection

(2024) Pathology

DOI: 10.1016/j.pathol.2024.05.007

LANGUAGE OF ORIGINAL DOCUMENT: English

Popova A.Yu., Penkovskaya N.A., Zinich L.S., Kovalenko I.S., Sitnikova A.L., Bednarskaya E.V., Proskurnin R.V., Tikhonov S.N.

Results of epizootiological survey of the territories of the Republic of Crimea and Sevastopol in 2015–2022 [Результаты эпизоотологического мониторинга территорий Республики Крым и города Севастополя за 2015–2022 гг]

(2024) Public Health and Life Environment, 32 (7), pp. 7 - 15

DOI: 10.35627/2219-5238/2024-32-7-7-15

ABSTRACT: Introduction: Systematic studies of endemic zoonotic diseases on the Crimean Peninsula resumed in 2015 after a long break. Objective: To specify boundaries and determine epizootiological activity of the natural foci of infectious diseases in the Crimea and to update the list of possible reservoir hosts and vectors based on the results of field studies conducted in 2015–2022. Materials and methods: Counting and trapping of small mammals, ixodid ticks and mosquitoes, collecting of pellets of birds of prey, sampling of water and other zoological and entomological materials were carried out in the Crimea in the years 2015 to 2022. Results and discussion: According to the results of epidemiological and epizootiological monitoring of the Crimean Peninsula, the samples tested positive for tularemia were collected on the territory of 14 administrative entities, leptospirosis – 21, hantaviruses – 12, tick-borne encephalitis – 2, Crimean-Congo hemorrhagic fever – 7, Lyme borreliosis – 21, West Nile fever – 3, Q fever – 2, Marseilles fever – 6, monocytic ehrlichiosis – 1, and granulocytic anaplasmosis – 8 entities. A new hantavirus was identified in the Leninsky district. Positive findings of markers of the Crimean-Congo hemorrhagic fever virus were registered not only in the main vector, but also in other species of ixodid ticks. True boundaries of the natural foci of Lyme borreliosis in the Crimea were much wider and ran through both forest and steppe zones. A stable reproducing population of epidemiologically significant Ae. albopictus mosquitoes was found on the southern coast of Crimea. Conclusions: Based on the findings, we specified the boundaries and confirmed the activity of natural foci of infectious diseases during the study period, updated sources of infections, reservoir hosts and vectors, and compiled the List of enzootic (endemic) territories of the Crimea, on which circulation of infectious agents common to humans and animals was found based on the results of field material studies in 2015–2022, all facilitating managerial decisions on prevention of natural focal infections.

LANGUAGE OF ORIGINAL DOCUMENT: Russian

Surdel M.C., Coburn J.

Leptospiral adhesins: from identification to future perspectives

(2024) Frontiers in Microbiology, 15, art. no. 1458655

DOI: 10.3389/fmicb.2024.1458655

ABSTRACT: Leptospirosis is a significant zoonosis worldwide, with disease severity ranging from a mild non-specific illness to multi-organ dysfunction and hemorrhage. The disease is caused by pathogenic bacteria of the genus Leptospira, which are classified into pathogenic and saprophytic clades. Bacterial binding to host molecules and cells, coordinated by adhesin proteins, is an important step in pathogenesis. While many leptospiral adhesins have been identified, the vast majority have not been characterized in vivo. Herein, we present an overview of the current methodologies and successes in identifying adhesins in Leptospira, including known biological roles in vivo. We will also identify and discuss potential areas for future research.

LANGUAGE OF ORIGINAL DOCUMENT: English

Forero-Ríos M.P., Salcedo-Miranda D.F., Puentes-M. F.E., Alejandro Dussán D., Martínez-Ramírez M.

Biliary obstructive syndrome as an atypical manifestation of Weil's disease: a case series [Síndrome biliar obstructivo como manifestación atípica de la enfermedad de Weil: una serie de casos]

(2024) Revista Colombiana de Gastroenterologia, 39 (1), pp. 112 - 116

DOI: 10.22516/25007440.1080

ABSTRACT: Leptospirosis is a systemic zoonotic infection transmitted through the skin, mucous membranes, or ingestion of water contaminated with pathogenic spirochetes of the genus Leptospira in infected mammals and rodents. It appears with nonspecific symptoms of acute onset associated with abdominal pain, subconjunctival hemorrhage, and jaundice, which usually has complete resolution in the majority of patients. However, in a lower percentage, it can progress, causing severe systemic complications, with a high risk of mortality mainly due to acute kidney failure, liver dysfunction associated with jaundice, and hemorrhages, called Weil syndrome or icterohemorrhagic fever. We present a series of cases of patients with biliary obstruction as the primary manifestation of severe leptospirosis.

LANGUAGE OF ORIGINAL DOCUMENT: English

Alikhani A., Alinasab Z., Feyzi N., Talarposhti M.A., Majidi H.

Investigating the findings of chest x-ray and CT Scan in leptospirosis with or without pulmonary manifestations and its treatment in Razi Qaemshahr Hospital

(2024) Journal of Mazandaran University of Medical Sciences, 34 (235), pp. 113 - 119

ABSTRACT: Background and purpose: Leptospirosis is a common disease between humans and animals, the source of which is rodents, canines, etc., the disease is transmitted by scratching the skin and getting it contaminated with water contaminated with animal urinary waste and is currently an endemic disease in neighboring northern provinces of Iran. The purpose of this study was to investigate the findings of chest X-ray and lung CT scans in leptospirosis with or without pulmonary symptoms. Materials and methods: The current descriptive and retrospective research examined the findings of chest X-ray and CT scan of the lungs in patients with leptospirosis with or without pulmonary manifestations in Razi Ghaemshahr Hospital. In this study, 49 hospitalized patients were randomly selected from the records of leptospirosis patients in Razi Ghaemshahr Hospital during the spring and summer of 2017 from an information form based on clinical epidemiological characteristics and risk factors for leptospirosis patients using the mentioned characteristics. The disease was prepared in the infectious reference books and articles published in Farsi and English about this disease, and help was taken from a radiologist colleague to interpret the findings of the chest X-ray and CT scan of the lungs. After recording in SPSS 16 software, the data were analyzed through a Q_Q graph and skewness index. The clinical and epidemiological findings of leptospirosis were considered as inclusion criteria in the study, and the absence of serological tests to confirm leptospirosis was considered as exclusion criteria. Results: Among 49 hospitalized patients with leptospirosis, 11 patients had abnormal radiological findings and 38 patients had normal X-rays. Among 11 patients with abnormal radiological findings, 6 patients had respiratory symptoms, which included 54.54% cough and 18.18% bloody sputum. Among 38 patients with normal radiography, 11 patients had pulmonary symptoms, which included 29.94% cough and 2.63% bloody sputum. The amount of cough was significantly higher. Abnormal findings in chest X-ray, alveolar infiltration, ground glass opacity, and consolidation were the most frequent in the CT scan of the lung. Conclusion: Considering the significant percentage of normal chest radiographs in patients suffering from rice field fever with pulmonary symptoms, it is essential to perform a CT scan of the chest and decide on more effective

therapeutic interventions. Therefore, it is considerable that usually changes in the chest CT scan in the severe form of the disease that causes vasculitis and alveolar bleeding appear before the appearance of severe symptoms such as bloody sputum and make a decision to start more effective drugs in the patient's treatment plan. As a result, pulmonary involvement in patients with leptospirosis is of special importance and it should be given special attention due to the endemicity of leptospirosis in the province, considering the associated complications and high mortality and the possibility of its occurrence even in patients who do not have respiratory complaints at the time of presentation. It is suggested to conduct more extensive research based on the population in this field.
LANGUAGE OF ORIGINAL DOCUMENT: Persian

Neis L.Z., Kuhn R., Cruz J.C., Rosa T.D., Rodrigues R.O., Bertagnolli A.C., Loiko M.R., Reck J., Mayer F.Q.
Assessing leptospirosis and toxoplasmosis seropositivity in wild boars (Sus scrofa): implications for public and animal health in Southern Brazil
(2024) Comparative Immunology, Microbiology and Infectious Diseases, 113, art. no. 102231
DOI: 10.1016/j.cimid.2024.102231
ABSTRACT: Leptospirosis and toxoplasmosis are re-emerging zoonosis caused by infection with pathogenic spirochaetes of Leptospira and the protozoa Toxoplasma gondii, respectively. Wild boars (Sus scrofa), an exotic invasive species in Brazil, could play a role in the diseases' epidemiological cycles, but this issue is still unexplored. This study aimed to evaluate the Leptospira spp. and T. gondii seropositivity in wild boars in Rio Grande do Sul state, south Brazil. Of evaluated animals, 16% (13/80) and 85% (52/61) had antibodies to T. gondii and Leptospira spp., respectively. Sex, weight, age, hunt location and season of hunt were evaluated by their association with seropositivity for both pathogens, but none of them had statistical significance. This study revealed that wild boars should be considered as a potential source of Leptospira spp. and T. gondii dissemination for humans and animal species in shared environments in Rio Grande do Sul state.
LANGUAGE OF ORIGINAL DOCUMENT: English

Gaspar J.P., Takahashi M.B., Teixeira A.F., Nascimento A.L.T.O.
In silico analysis and functional characterization of a leucine-rich repeat protein of Leptospira interrogans
(2024) International Journal of Medical Microbiology, 316, art. no. 151633
DOI: 10.1016/j.ijmm.2024.151633
ABSTRACT: Pathogenic spirochetes of the genus Leptospira are the causative agent of leptospirosis, a widely disseminated zoonosis that affects humans and animals. The ability of leptospires to quickly cross host barriers causing infection is not yet fully understood. Thus, understanding the mechanisms of pathogenicity is important to combat leptospiral infection. Outer membrane proteins are interesting targets to study as they are able to interact with host molecules. Proteins containing leucine-rich repeat (LRR) domains are characterized by the presence of multiple regions containing leucine residues and they have putative functions related to host-pathogen interactions. Hence, the present study aimed to clone and express the recombinant protein encoded by the LIC11098 gene, an LRR protein of L. interrogans serovar Copenhageni. In silico analyses predicted that the target protein is conserved among pathogenic strains of Leptospira, having a signal peptide and multiple LRR domains. The DNA sequence encoding the LRR protein was cloned in frame into the pAE vector, expressed without mutations in Escherichia coli and purified by His-tag chromatography. Circular dichroism

(CD) spectrum showed that the recombinant protein was predominantly composed of β-sheets. A dose-dependent interaction was observed with cellular and plasma fibronectins, laminin and the complement system component C9, suggesting a possible role of the protein encoded by LIC11098 gene at the initial stages of infection.
LANGUAGE OF ORIGINAL DOCUMENT: English

Susanti S., Sudarmono P.P., Dharmayanti N.L.P.I., Yusuf P.A.

Production and characterization of immunoglobulin G anti-rLipL32 antibody as a biomarker for the diagnosis of leptospirosis

(2024) Veterinary World, 17 (4), pp. 871 - 879
DOI: 10.14202/vetworld.2024.871-879
ABSTRACT: Background and Aim: Microscopic agglutination test (MAT) for the diagnosis of leptospirosis requires live cultures and is serovar-specific, while polymerase chain reaction (PCR) requires expensive equipment and sample preparation. The rLipL32 protein is conserved and can be used for the production of immunoglobulin G (IgG) anti-rLipL32 antibody, which can be used as a biomarker for leptospirosis diagnosis. This study aimed to produce and characterize an IgG anti-rLipL32 antibody as a biomarker for leptospirosis diagnosis. Materials and Methods: Escherichia coli rLipL32 was cultured and analyzed by PCR and sequencing. Cultures were used for rLipL32 protein expression and purification and the rLipL32 protein was analyzed by sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE). The rLipL32 protein was used to produce anti-rLipL32 serum and was analyzed by enzyme-linked immunosorbent assay (ELISA). Serum was purified to obtain IgG anti-rLipL32 antibody and characterized by SDS-PAGE and western blotting. Results: PCR was able to amplify the LipL32 gene from E. coli rLipL32, and sequencing analysis showed 99.19% similarity with pathogenic Leptospira. SDS-PAGE analysis showed a 32-kDa band. ELISA results showed an increase in OD in antirLipL32 serum compared to preimmune serum. Western blotting results showed that the IgG anti-rLipL32 antibody was able to bind and cross-reacts with pathogenic Leptospira serovar but not with E. coli or Staphylococcus aureus. Conclusion: IgG anti-rLipL32 antibody has high specificity and sensitivity against Leptospira pathogens. These findings suggest that IgG anti-rLipL32 antibody is a promising biomarker for the diagnosis of leptospirosis.
LANGUAGE OF ORIGINAL DOCUMENT: English

Yao W., Yang Z., Wang L., Wu Z., Hu W.

Identification and functional exploration of phosphodiesterase encoding gene LA_RS06960 in Leptospira interrogans

(2024) Chinese Journal of Microbiology and Immunology, 44 (8), pp. 672 - 679
DOI: 10.3760/cma.j.cn112309-20230808-00033
ABSTRACT: Objective To identify the phosphodiesterase (PDE) activity of the gene product encoded by LA_RS06960 of Leptospira interrogans (L. interrogans), and analyze whether dinucleotides that can be degraded by PDE can activate macrophages to express innate immune factors. Methods The LA_RS06960 gene in L.interrogans strain 56601 was amplified by PCR, and the prokaryotic expression system was constructed for the protein expression. The expressed rPDE was purified by Ni-NTA affinity chromatography. High performance liquid chromatography (HPLC) was used to measure the degration of c-di-AMP or 5′-pApA to AMP by rPDE. Real-time fluorescent quantitative RT-PCR (qRT-PCR) was used to detect the changes in

the expression of target genes in Leptospira or THP-1 cells associated with innate immune factors during infection. qRT-PCR and ELISA were used to detect the changes in the expression and secretion level of the innate immune factors in macrophages treated with bacterial dinucleotide. Results The prokaryotic expression system for LA_RS06960 gene of L. interrogans was constracted successfully, and the purified rPDE could degrate 5′-pApA and c-di-AMP into AMP in vitro. The mRNA level of leptospiral LA_RS06960 gene was significantly down-regulated, while IFN-β, TNF-α, IL-6 and IL-1β encoding genes of macrophages were significantly up-regulated during infection. The mRNA level or the secretion level of IFN-β and IL-6 of macrophages were increased after treated with the bacterial dinucleotide substrate of PDE. Conclusions PDE encoded by LA_RS06960 gene has phosphodiesterase activity, and the bacterial dinucleotide substrate of the PDE could activate the innate immune response of macrophages.
LANGUAGE OF ORIGINAL DOCUMENT: Chinese

Schulz É.T., Costa E.A.D., Lansarin T.D., von Laer A.E., França R.T.

Anti-Leptospira spp. antibody test in noncaptive reptiles from urban and peri-urban areas in Brazil's extreme South [Pesquisa de anticorpos anti-Leptospira spp. em répteis de vida livre de áreas urbanas e periurbanas do extremo sul do Brasil]

(2025) Ciencia Rural, 55 (1), art. no. e20240067
DOI: 10.1590/0103-8478cr20240067
ABSTRACT: The state of Rio Grande do Sul has a great diversity of reptile species distributed throughout its territory. Due to human actions, such as habitat fragmentation, these animals have been frequently observed in urban and peri-urban environments. This facilitates the spread of pathogens between animals and humans, posing a unique health risk, as many diseases are considered zoonoses. Leptospirosis is among the most common zoonoses in the world and is caused by pathogenic species of bacteria of the genus Leptospira. The role of reptiles in the cycle of this disease is yet unknown. However, serological studies have demonstrated positivity for antibodies against Leptospira spp. in tortoises and snakes, which may indicate that these animals act in maintaining the pathogen in the environment. This observed the presence of anti-Leptospira antibodies in rescued reptiles taken to the Center for Rehabilitation of Wild Fauna and Screening Center for Wild Animals at the Universidade Federal de Pelotas (NURFS-CETAS/UFPEL). Samples were collected from 55 animals (39 Trachemys dorbigni; 3 Philodryas patagoniensis; 3 Caiman latirostris; 3 Salvator merianae; 2 Acanthochelys spixii; 2 Phrynops hilarii; 2 Hydromedusa tectifera; 1 Philodryas aestiva) from August 2022 to December 2023 and tested for 12 reference serovars. Two animals demonstrated positivity, one for the pathogenic serovar Pyrogenes and the other for the pathogenic serovar Canicola. This result reflected the importance of different species besides mammals as potential reservoirs and responsible for maintaining leptospirosis in the environment.
LANGUAGE OF ORIGINAL DOCUMENT: English

Bettin E.B., Grassmann A.A., Dellagostin O.A., Gogarten J.P., Caimano M.J.

Leptospira interrogans encodes a canonical BamA and three novel noNterm Omp85 outer membrane protein paralogs

(2024) Scientific Reports, 14 (1), art. no. 19958
DOI: 10.1038/s41598-024-67772-6

ABSTRACT: The Omp85 family of outer membrane proteins are ubiquitously distributed among diderm bacteria and play essential roles in outer membrane (OM) biogenesis. The majority of Omp85 orthologs are bipartite and consist of a conserved OM-embedded 16-stranded beta-barrel and variable periplasmic functional domains. Here, we demonstrate that Leptospira interrogans encodes four distinct Omp85 proteins. The presumptive leptospiral BamA, LIC11623, contains a noncanonical POTRA4 periplasmic domain that is conserved across Leptospiraceae. The remaining three leptospiral Omp85 proteins, LIC12252, LIC12254 and LIC12258, contain conserved beta-barrels but lack periplasmic domains. Two of the three 'noNterm' Omp85-like proteins were upregulated by leptospires in urine from infected mice compared to in vitro and/or following cultivation within rat peritoneal cavities. Mice infected with a L. interrogans lic11254 transposon mutant shed tenfold fewer leptospires in their urine compared to mice infected with the wild-type parent. Analyses of pathogenic and saprophytic Leptospira spp. identified five groups of noNterm Omp85 paralogs, including one pathogen- and two saprophyte-specific groups. Expanding our analysis beyond Leptospira spp., we identified additional noNterm Omp85 orthologs in bacteria isolated from diverse environments, suggesting a potential role for these previously unrecognized noNterm Omp85 proteins in physiological adaptation to harsh conditions.
LANGUAGE OF ORIGINAL DOCUMENT: English

Montenegro-Idrogo J.J., Bonilla-Aldana D.K., Rodríguez-Morales A.J.

Risk of human leptospirosis in Colombia: spatiotemporal analysis and related hydroclimatic factors

(2024) Transactions of the Royal Society of Tropical Medicine and Hygiene, 118 (9), pp. 605 - 615
DOI: 10.1093/trstmh/trae013

ABSTRACT: Background: Leptospirosis is an endemic zoonosis in tropical areas that is mainly related to rural activities; nevertheless, human leptospirosis (HL) outbreaks differ among regions. In Colombia, HL notifications are mandatory. Our objective was to determine the spatiotemporal distribution of HL in Colombia during 2007-2018 and its relationship with the main hydroclimatic variables. Methods: We determined the estimated incidence and lethality of HL according to department and year. The Bayesian spatiotemporal analysis of an autoregressive model (STAR) model included HL cases and hydroclimatic factors (average temperature, rainfall and relative humidity) for quarterly periods. Results: During the study period, 10 586 HL cases were registered (estimated incidence: 1.75 cases x 105) and 243 deaths by HL (lethality 2.3%). The STAR model found association of HL risk with temperature (RR:6.80; 95% CI 3.57 to 12.48) and space. Quindío and three other Amazonian departments (Guainía, Guaviare and Putumayo) had a positive relationship with a significant number of HL cases, adjusted for quarterly precipitation and humidity. Conclusion: Spatial analysis showed a high risk of HL in departments of the western Andean Colombian regions. By contrast, in the spatiotemporal model, a higher HL risk was associated with temperature and departments of the North Colombian Amazon regions and Quindío in the Colombian Andean region.
LANGUAGE OF ORIGINAL DOCUMENT: English

Eikenbary B., Devaraju P., Chakkravarthi A., Sihag K.K., Nathan T., Thangaraj G., Srinivasan L., Kumar A.

A molecular survey of zoonotic pathogens of public health importance in rodents/shrews and their ectoparasites trapped in Puducherry, India

(2024) Transactions of the Royal Society of Tropical Medicine and Hygiene, 118 (9), pp. 616 - 624
DOI: 10.1093/trstmh/trae033

ABSTRACT: Background: Globally, India has a high zoonotic disease burden and lacks surveillance data in humans and animals. Rodents are known reservoirs for many zoonotic diseases and their synanthropic behavior poses a great public health threat. Methods: In this study, trapped rodents/shrews from randomly selected villages within Puducherry, India, and their ectoparasites were screened for zoonotic pathogens, namely, Orientia tsutsugamushi, other pathogenic rickettsiae, Leptospira spp., Cryptosporidium spp., Coxiella burnetii and methicillin-resistant Staphylococcus aureus (MRSA) using conventional PCR. A total of 58 rodents/shrews were trapped from 11 villages. The species trapped were Suncus murinus (49/58, 84.48%), Rattus rattus (8/58, 13.79%) and Rattus norvegicus (1/58, 1.72%). All ectoparasites collected were identified as mites and its infestation rate was 46.55% (27/58). Results: Real-time PCR targeting the 47 kDa gene of O. tsutsugamushi revealed positivity in one rodent and one shrew (3.45%) and two mite pools (7.41%). Conventional PCR targeting the 56 kDa gene revealed positivity in one shrew and two mite pools and the phylogenetic analysis of all three amplicons indicated the circulation of the Gilliam-related serotype. MRSA was detected in the alimentary tract of a shrew (1/32, 3.13%). Leptospira spp., Rickettsia, Cryptosporidium spp. and Co. burnetii tested negative. Conclusions: The detection of zoonotic pathogens within reservoir hosts and vectors poses a risk of transmission to humans. This study signifies the need for zoonotic pathogen surveillance in synanthropic rodents/shrews.
LANGUAGE OF ORIGINAL DOCUMENT: English

Andrade-Silveira E., Ortega-Pacheco A., Jiménez-Coello M., Cárdenas-Marrufo M.

Review of leptospirosis in dogs from Mexico: epidemiology, diagnosis, prevention, and treatment

(2024) Veterinary World, 17 (6), pp. 1356 - 1361
DOI: 10.14202/vetworld.2024.1356-1361
ABSTRACT: Leptospirosis, classified by the World Health Organization as an emerging and neglected disease, is caused by the zoonotic pathogen Leptospira interrogans. This review aims to outline the Mexican epidemic of L. interrogans in dogs, including diagnosis and prevention methods. This review article searched articles from the publishers Wiley, Springer, PubMed, Redalyc, SciElo, and Elsevier. Among the 200 Mexican articles concerning Leptospira epidemiology, diagnosis, treatment, and vaccination, those that failed to meet the set inclusion criteria were excluded. The worldwide study of L. interrogans has focused on this bacterium. In Mexico, up-to-date information on canine prevalence, diagnosis, and vaccine use is scarce. Flow cytometrically detected Salmonella serovars differ from those in current vaccines, emphasizing the importance of broadening vaccine serovar coverage.
LANGUAGE OF ORIGINAL DOCUMENT: English

Tagawa C.W., Rogahn M., Waxenbaum J.

For patients at high risk of leptospirosis, are available prophylaxis options preferable to no prophylaxis for preventing leptospirosis infection?

(2024) Evidence-Based Practice, 27 (9), pp. 20 - 21
DOI: 10.1097/EBP.0000000000002112
LANGUAGE OF ORIGINAL DOCUMENT: English

Jones F.K., Medina A.G., Ryff K.R., Irizarry-Ramos J., Wong J.M., O'Neill E., Rodríguez I.A., Cardona I., Hernández L., Hernandez-Romieu A.C., Phillips M.T., Johansson M.A., Bayleyegn T., Atherstone C., DeBord K.R., Negrón M.E., Galloway R., Adams L.E., Marzán-Rodríguez M.

Leptospirosis Outbreak in aftermath of hurricane Fiona — Puerto Rico, 2022

(2024) Morbidity and Mortality Weekly Report, 73 (35), pp. 763 - 768

DOI: 10.15585/mmwr.mm7335a2

ABSTRACT: Leptospirosis, an acute bacterial zoonotic disease, is endemic in Puerto Rico. Infection in approximately 10%–15% of patients with clinical disease progresses to severe, potentially fatal illness. Increased incidence has been associated with flooding in endemic areas around the world. In 2022, Hurricane Fiona, a Category 1 hurricane, made landfall and inundated Puerto Rico with heavy rainfall and severe flooding, increasing the risk for a leptospirosis outbreak. In response, the Puerto Rico Department of Health (PRDH) changed guidelines to make leptospirosis cases reportable within 24 hours, centralized the case investigation management system, and provided training and messaging to health care providers. To evaluate changes in risk for leptospirosis after Hurricane Fiona to that before the storm, the increase in cases was quantified, and patient characteristics and geographic distribution were compared. During the 15 weeks after Hurricane Fiona, 156 patients experienced signs and symptoms of leptospirosis and had a specimen with a positive laboratory result reported to PRDH. The mean weekly number of cases during this period was 10.4, which is 3.6 as high as the weekly number of cases during the previous 37 weeks (2.9). After Hurricane Fiona, the proportion of cases indicating exposure to potentially contaminated water increased from 11% to 35%, and the number of persons receiving testing increased; these factors likely led to the resulting overall surge in reported cases. Robust surveillance combined with outreach to health care providers after flooding events can improve leptospirosis case identification, inform clinicians considering early initiation of treatment, and guide public messaging to avoid wading, swimming, or any contact with potentially contaminated floodwaters. © 2024 Department of Health and Human Services.

LANGUAGE OF ORIGINAL DOCUMENT: English

Durán-Galea A., Cristóbal-Verdejo J.I., Macías-García B., Nicolás-Barceló P., Barrera-Chacón R., Ruiz-Tapia P., Zaragoza-Bayle M.C., Duque-Carrasco F.J.

Determination of neutrophil-to-lymphocyte ratio, platelet-to-lymphocyte ratio and systemic immune-inflammation index in dogs with leptospirosis

(2024) Veterinary Research Communications

DOI: 10.1007/s11259-024-10469-y

ABSTRACT: Leptospirosis is a globally distributed zoonosis with multisystemic involvement in canine species, capable of causing a pulmonary hemorrhagic syndrome (LPHS) in the most severe cases. In humans, the neutrophil to lymphocyte ratio (NLR), platelets to lymphocytes (PLR) and systemic immune-inflammation index (SII) have been described as predictors of morbidity and mortality in various pathologies, but no such studies have been developed for canine leptospirosis. Hence, we aimed to assess the usefulness of NLR, PLR and SII in dogs affected with leptospirosis, focusing on those that died or survived after hospitalization, whether or not they developed LPHS. The leptospirosis group was composed by 36 dogs while the control group consisted of 32 healthy dogs. The NLR, associated with inflammation, demonstrated a threefold or greater increase in all leptospirosis groups compared to the control group (median 2.44 ± 1.66) (developing or not LPHS). Dogs that died (median 67.78 ± 158.67), developed LHPS (median 85.17 ± 143.77), or both developed LHPS and

died (median 67.78 ± 155,14) had a lower PLR in comparison to the control group (median 101,82 ± 53,75) and the rest of groups, but no statistically significant differences were observed (p > 0.05). The SII was higher in leptospirosis-affected dogs that survived (median 1356,92 ± 2726,29) and statistically significant differences were observed in those who did not develop LPHS (median 1770,41 ± 2630,77; p < 0.05) compared to the control group (median 555,21 ± 313,26). Our data shows that NLR may be used as inflammation indicator, while more studies are needed for PLR and SII in canine leptospirosis.
LANGUAGE OF ORIGINAL DOCUMENT: English

Makarova A., Ekðteina I., Sperga M., Elsberga E., Klimoviès T., Zeltiòa I.

Acute liver and kidney failure as the presentation of leptospirosis: case report of a rare differential diagnosis in case of jaundice

(2024) Proceedings of the Latvian Academy of Sciences, Section B: Natural, Exact, and Applied Sciences, 78 (4), pp. 323 - 327
DOI: 10.2478/prolas-2024-0045
ABSTRACT: Leptospirosis is a widespread and potentially fatal zoonosis that is endemic in many tropical regions. It is the most common zoonotic infection in the world, but a rare disease in Latvia. The clinical manifestations and the severity of leptospirosis are highly variable. This case report describes a 64-year-old male without comorbidities, who was admitted to Rîga East University Hospital in the Gastroenterology Department due to expressed jaundice, weakness, and acute kidney injury. The initial inpatient clinical diagnosis was initially acute alcoholic hepatitis, as the patient had consumed alcohol a month before hospitalisation. The clinical and laboratory picture of the patient was dominated by significant hyperbilirubinemia, a relatively small increase in liver transaminases, preserved synthetic liver function, acute kidney failure in the polyuria phase, and severe thrombocytopenia. During hospitalisation, the study of anamnesis and the results of laboratory tests gave grounds for suspecting the diagnosis of leptospirosis, which was subsequently serologically confirmed. Routine laboratory tests are not specific for diagnosing leptospirosis. Diagnosis is made on the basis of the doctor’s request and clinical examination, as well as on the basis of blood and urine culture and serological tests. Early initiation of antibiotic therapy plays an important role in controlling infection and reducing mortality.
LANGUAGE OF ORIGINAL DOCUMENT: English

Moreno T., Ramírez R., Azócar-Aedo L.

Seroprevalence of pathogenic Leptospira, infecting serogroups and antibody titers detected in horses from los Lagos region, southern Chile

(2024) Chilean Journal of Agricultural and Animal Sciences, 40 (2), pp. 341 - 352
DOI: 10.29393/CHJAAS40-29SCTA30029
ABSTRACT: Leptospirosis is a neglected bacterial zoonotic disease with worldwide distribution. In horses (Equus caballus), it can be an asymptomatic pathology or cause reproductive problems, abortions, or recurrent uveitis. The present study determined the seroprevalence of pathogenic Leptospira, serogroups causing serological reactions and antibody titers in horses from Los Lagos Region in southern Chile. A total of 51 serum samples were analyzed using the Microscopic Agglutination Test with a panel of eight Leptospira serogroups. Animals with titres equal or higher than 1:100 were considered as serological reactors. A seropositivity of 68.6% (IC 95%=61.5-75.7) (35/51) was determined. Tarassovi was the most frequently

detected serogroup (71.4%), followed by Grippotyphosa (8.6%), Autumnalis (5.7%), and Sejroe (2.9%), while coagglutinations between serogroups were also noted (11.4%). Antibody titers ranged between 1:100 and 1:1600 and the most frequent levels were 1:200 (31.4%) and 1:400 (34.3%). A higher seropositivity was observed in males (71.4%) and the male-female ratio among seropositive animals was 25:10. It is concluded that pathogenic Leptospira is present in horses from Los Lagos regions in southern Chile with a high seroprevalence and exposure. An increase of awareness regarding leptospirosis is needed by owners and those people who work and have contact with these animals, due to the zoonotic potential and the probable consequences of the infection. More studies are required to determine other demographic characteristics of seropositive animals and to elucidate the role that horses may play as possible sentinels of exposure to Leptospira at local and country levels.
LANGUAGE OF ORIGINAL DOCUMENT: Spanish

Verde R.S., Di Azevedo M.I.N., Dias D., Tavares De Freitas T.P., Carvalho-Costa F.A., Bonvicino C., Lilenbaum W., D'Andrea P.S., Medeiros L.S.

Bat-associated pathogenic Leptospira spp. from forest fragments in Southwestern Brazilian Amazonia

(2024) Transboundary and Emerging Diseases, 2024, art. no. 6633866
DOI: 10.1155/2024/6633866
ABSTRACT: Bats are known as potential carriers of different pathogens; these animals have been identified worldwide as an important reservoir of different species of Leptospira. Therefore, there has been an increasing interest in studying leptospirosis in neotropical bats in the Amazon. This region is a fertile ground for zoonotic diseases, given the intense process of deforestation, urbanization, opening of new agricultural frontiers, predatory hunting, effects of climate change, and loss of biodiversity. Based on this, the aim of the present study was to investigate the frequency of infection associated with the genetic characterization of pathogenic Leptospira spp. in bats inhabiting diverse landscapes in the southwestern region of the Amazon. To conduct the study, mist nets were installed to capture bats. Kidney samples were submitted to LipL32-polymerase chain reaction and secY gene sequencing. Our results showed that 21% of neotropical evaluated bats in Southwestern Amazon were infected with Leptospira spp. Positive animals were found in rural, urban, periurban, and control areas. Sanguinivores had the highest frequency of positives, followed by insectivores and frugivorous bats. The species of L. interrogans and a potential new Leptospira species were identified. The frequency of Leptospira in bats was not influenced by landscape type, suggesting these pathogens may not be affected by landscape changes. The findings suggest that bats may serve as potential reservoirs of Leptospira in diverse landscapes. The presence of Leptospira in bats appears to be independent of the type of land use, implying that these pathogens may not be affected by small-scale changes in the environment.
LANGUAGE OF ORIGINAL DOCUMENT: English

Sun Q., Liu Y., Han Y., Liu W., Cao X., Li B., Wang X.

Rodent ecology and etiological investigation in China: results from vector biology surveillance Shandong Province, China, 2012-2022

(2024) China CDC Weekly, 6 (36), pp. 911 - 917
DOI: 10.46234/ccdcw2024.193
ABSTRACT: Introduction: Rodents are hosts of a wide range of zoonotic disease pathogens which threaten human health. However, comprehensive investigations of rodent ecology and etiology in Shandong are

lacking. Thus, we aimed to analyze rodent ecology and infection with relevant pathogens in Shandong Province, China. Methods: Rodent survey data collected from 2012 to 2022 in Shandong Province were used in this study. Rodents captured from 2020 to 2022 were identified to species and tested for pathogens. Results: From 2012 to 2022, 4,145 rodents were captured, with an average capture rate of 0.70%. High capture rates were observed in rural residential areas and other habitats, such as farmland and forestland. Rattus norvegicus (R. norvegicus) was the dominant species, followed by Mus musculus (M. musculus). The regions with the highest capture rates of R. norvegicus were Dongying (0.82%) and Heze (0.63%), while M. musculus was more prevalent in Dongying (0.81%) and Weihai (0.56%). Rodent capture rates were highest between March and September. The positive detection rates of Hantavirus (HV), Leptospira interrogans (L. interrogans), Rickettsia typhi (R. typhi), Anaplasma phagocytophilum (A. phagocytophilum), and Francisella tularensis (F. tularensis) in rodents were 2.58%, 1.10%, 0.94%, 0.16%, and 0.19%, respectively. Conclusions: The rodent capture rate in human habitation environments has trended downward in Shandong Province, with R. norvegicus and M. musculus being the dominant species. Rodent infection risk from HV, L. interrogans, and R. typhi showed seasonal variation. Strengthening rodent surveillance and maintaining a low capture rate of host animals could be pivotal for preventing and controlling relevant rodent-borne diseases in high-risk areas. Rodents are among the most speciose mammals in the world, closely interacting with the human ecosystem (1). Rodents are well-known reservoirs and hosts for numerous infectious diseases (e.g., hemorrhagic fever with renal syndrome (HFRS), leptospirosis, scrub typhus, and plague) and play an important role in their transmission and spread (2). With the risks of global warming, changes in the ecological environment, increased trade, and population mobility, rodents and their infectious diseases present a serious threat to public health in China (3–4). Since the discovery of HFRS cases in Shandong Province in 1962, its incidence has long been among the highest in the country (5). We analyzed the trends of rodent species, densities, seasonal fluctuation, and pathogen infection in Shandong Province to shed light on providing early warning and relevant rodent and rodent-borne disease control measures.
LANGUAGE OF ORIGINAL DOCUMENT: English

Fernandes L.G.V., Hamond C., Tibbs-Cortes B.W., Putz E.J., Olsen S.C., Palmer M.V., Nally J.E.

CRISPR-prime editing, a versatile genetic tool to create specific mutations with a single nucleotide resolution in Leptospira

(2024) mBio, 15 (9)
DOI: 10.1128/mbio.01516-24
ABSTRACT: Leptospirosis, caused by pathogenic bacteria from the genus Leptospira, is a global zoonosis responsible for more than one million human cases and 60,000 deaths annually. The disease also affects many domestic animal species. Historically, genetic manipulation of Leptospira has been difficult to perform, resulting in limited knowledge on pathogenic mechanisms of disease and the identification of virulence factors. The application of CRISPR/Cas9 and its variations have helped fill these gaps but the generation of knockout mutants remains challenging because double-strand breaks (DSBs) inflicted by Cas9 nuclease are lethal to Leptospira cells. The novel CRISPR prime editing (PE) strategy is the first precise genome-editing technology that allows deletions, insertions, and base substitutions without introducing DSBs. This revolutionary technique utilizes a nickase Cas9 that cleaves a single strand of DNA, coupled with an engineered reverse transcriptase and a modified single-guide RNA (termed prime editing guide RNA) containing an extended 3′ end with the desired edits. We demonstrate the application of CRISPR-PE in both saprophytic and pathogenic Leptospira

from multiple species and serovars by introducing deletions or insertions into target DNA with a remarkable precision of just one nucleotide. Additionally, we demonstrate the ability to genetically manipulate Leptospira borgpetersenii, a prevalent pathogenic species of humans, domestic cattle, and wildlife animals. Rapid plasmid loss by mutated strains in liquid culture allows for the generation of knockout strains without selective markers, which can be readily used to elucidate virulence factors and develop optimized bacterin and/or live vaccines against leptospirosis.
LANGUAGE OF ORIGINAL DOCUMENT: English

Orhan Ö., Elci H.

Epidemiology, clinical and laboratory findings of pediatric leptospirosis in Southeastern Turkey

(2024) Iranian Journal of Pediatrics, 34 (3), art. no. e142968
DOI: 10.5812/ijp-142968
ABSTRACT: Background: Leptospirosis is a significant zoonotic infection caused by Leptospira spirochetes, which are distributed globally. Infection typically occurs through exposure to water or soil contaminated by the urine of mammals, including dogs, cattle, pigs, or rodents. Objectives: The objective of this study was to elucidate the epidemiological, clinical, and laboratory characteristics of leptospirosis cases in Turkey. Methods: In a retrospective review, we analyzed the clinical and laboratory data of all individuals under 18 years diagnosed with leptospirosis at a secondary care center in Southeast Turkey from the beginning of 2020 to the end of 2022. Results: Over the two-year period, 36 confirmed cases of leptospirosis in individuals under 18 were identified. All patients had been engaged in activities at wells in cornfields, assisting their families with irrigation or related to well operations. Of these patients, 3 (8%) resided in urban areas, while 33 (92%) lived in rural settings. None required intensive care, and there were no fatalities reported. The most common symptoms at presentation were fatigue (83%), fever (75%), and nausea/vomiting (75%). Laboratory tests revealed that all patients had positive C-reactive protein (CRP) levels, with a significant portion (61%) showing highly positive results (CRP > 100). Conclusions: In conclusion, leptospirosis should be considered by clinicians when evaluating patients, especially those with risk factors like occupational exposure. Prompt testing for the disease is advisable under these circumstances.
LANGUAGE OF ORIGINAL DOCUMENT: English

Murillo D.F.B., Negrão Watanabe T.T., Costa M.T.D.S., Nakazato L., Pescador C.A.

Bovine abortion caused by leptospirosis

(2024) Veterinary Record Case Reports
DOI: 10.1002/vrc2.997
ABSTRACT: A 3-year-old, 255 kg, mixed breed beef cow has an abortion at the last trimester of gestation, approximately 8 months. The cow was from a 1200-hectare farm, with 1200 animals. The farm owner reported a total of 13 abortions between June and September 2022, all of them in the last trimester of gestation. Additional serological screening for Leptospira was performed in 40 cows from the herd by microscopic agglutination test with seropositive animals to serovars Icterohaemorrhagiae. Gross postmortem examination yielded icterus, pleural and peritoneal effusions. Histopathological findings were lymphoplasmacytic interstitial pneumonia and nephritis, with intraluminal spirochetes within the renal tubules, hepatic necrosis, and cholestasis. PCR on a fresh tissue pool was positive for Leptospira spp. (LipL32). Leptospirosis is a zoonotic disease, caused by the infection of the bacterial spirochetes belonging to the genus Leptospira spp. Serovars

Pomona and Icterohaemorrhagiae cause acute systemic leptospirosis in cattle after incidental infections due to poor husbandry conditions and cause abortion loss in cattle in occasional outbreaks.
LANGUAGE OF ORIGINAL DOCUMENT: English

Panigrahi M.K., Bal S.K., Tripathy T.P., Moorthy A., Mohanty S.K., Mahapatra A., Bhuniya S.
Leptospirosis and melioidosis coinfection presenting as acute respiratory distress syndrome and osteomyelitis: case report and systematic review
(2024) Journal of Infection in Developing Countries, 18 (8), pp. 1301 - 1307
DOI: 10.3855/jidc.18546
ABSTRACT: Introduction: Both leptospirosis and melioidosis are common in tropical and temperate climates and can be acquired by exposure to contaminated water and soil. However, concomitant leptospirosis and melioidosis infection is rarely described in the literature. We report here a case of leptospirosis-melioidosis coinfection and systematically review the literature. Case presentation: A 42-year-old male presented with fever associated with chills and rigor, dull aching pain in the right thigh, myalgia, progressive breathlessness, and dry cough for 10 days. At presentation, he was tachypneic and had tachycardia, and oxygen saturation was 46% in room air. Chest radiography and computed tomography scan showed interstitial involvement. Magnetic resonance imaging for thigh pain revealed right femur osteomyelitis. Leptospira serology was positive, and blood culture grew Burkholderia pseudomallei, confirming the diagnosis of melioidosis. Thus, a diagnosis of presumptive leptospirosis based on modified Faine's criteria and systemic melioidosis was made. He received doxycycline and intravenous meropenem and improved. Results: We performed a systematic review to understand the spectrum of leptospirosis-melioidosis coinfection. We identified only nine cases of coinfection described in the literature. Only one patient had septic arthritis, and our case is the only one presenting with osteomyelitis. Serology diagnosed leptospirosis, whereas melioidosis was confirmed by blood culture in most patients. The majority of coinfected patients developed some complications, and six patients died. Conclusions: Leptospirosis-melioidosis coinfection is rarely reported in the literature. Physicians should maintain a high index suspicion of leptospirosis-melioidosis coinfection in patients presenting with acute febrile illness following exposure to soil or freshwater, particularly in tropical and endemic regions.
LANGUAGE OF ORIGINAL DOCUMENT: English

Hecktheuer A.S., Santos C.M., Ferreira F.A., Barbosa A.S., Isaac L., Marques M.V., Mazzon R.R.
The Leptospira interrogans proteome's response to zinc highlights the potential involvement of this metal in translational-machinery and virulence
(2024) BioMetals
DOI: 10.1007/s10534-024-00634-w
ABSTRACT: Leptospires, as motile Gram-negative bacteria, employ sophisticated strategies for efficient invasion and dissemination within their hosts. In response, hosts counteract pathogens through nutritional immunity, a concept involving the deprivation of essential metals such as zinc. Zinc, pivotal in modulating pathogen-host interactions, influences proteins structural, catalytic, and regulatory functions. A comprehensive understanding of how leptospires regulate intracellular zinc availability is crucial for deciphering their survival mechanisms. This study explores the proteomic profile of Leptospira interrogans sv. Copenhageni str. 10A cultivated in Ellinghausen-McCullough-Johnson-Harris medium supplemented with the zinc chelator TPA or ZnCl2. Among the 2161 proteins identified, 488 were subjected to scrutiny, revealing 102 less abundant and

81 more abundant in response to TPA. Of these 488 proteins, 164 were exclusive to the presence of TPA and 141 were exclusive to the zinc-enriched conditions. Differentially expressed proteins were classified into clusters of orthologous groups (COGs) with a distribution in metabolic functions (37.8%), information storage/processing (21.08%), cellular processes/signaling (28.04%), and poorly characterized proteins (10.65%). Differentially expressed proteins are putatively involved in processes like 1-carbon compound metabolism, folate biosynthesis, and amino acid/nucleotide synthesis. Zinc availability significantly impacted key processes putatively related to leptospires' interactions with their host, such as motility, biofilm formation, and immune escape. Under conditions of higher zinc concentration, ribosomal proteins, chaperones and components of transport systems were observed, highlighting interactions between regulatory networks responsive to zinc and iron in L. interrogans. This study not only revealed hypothetical proteins potentially related to zinc homeostasis, but also identified possible virulence mechanisms and pathogen-host adaptation strategies influenced by the availability of this metal. There is an urgent need, based on these data, for further in-depth studies aimed at detailing the role of zinc in these pathways and mechanisms, which may ultimately determine more effective therapeutic approaches to combat Leptospira infections.
LANGUAGE OF ORIGINAL DOCUMENT: English

Hutu I., Boldura O.M., Luca I., Pasca S.A., Dragoescu A.A., Gros R.V., Lungu B.C., Călugăriță A., Baltă C., Mircu C., Stancu A.C.

Diagnostic pathways of Leptospira spp. in dogs with kidney injury

(2024) Pathogens, 13 (9), art. no. 792

DOI: 10.3390/pathogens13090792

ABSTRACT: Pathogenic Leptospira spp. causes leptospirosis in animals and humans globally, leading to systemic infections that can impact vital organs in affected animals. The purpose of this study was to evaluate kidney injury and to perform a retrospective analysis of leptospirosis infection in follow-up dog samples. The retrospective study collected epidemiological information obtained through paraclinical exams, immunohistochemistry (IHC), and molecular biology (qPCR) of cases from the Faculty of Veterinary Medicine from Timisoara between September 2016 and May 2023. No correlations were found between Leptospira infection and breed ($p = 0.714$), gender or castration status ($p = 0.890$), and anatomic pathology exam results ($p = 0.608$). Significant associations were found in cases with high levels of azotemia ($p = 0.000$) and immunological status (vaccinated vs. unvaccinated, $p = 0.000$), with the leptospirosis risk in unvaccinated animals calculated at OR = 85.500 (95%CI, 6.82–1071.26, $p = 0.000$). Retrospectively, leptospirosis was diagnosed in 27/65 cases (42%) using the IHC method, while the qPCR assay detected 29/65 cases (45%). This study demonstrates that qPCR is a robust and specific method for postmortem diagnosis of Leptospira spp. infection in dogs, offering higher specificity and reliability compared to traditional IHC methods, which showed 94.74% specificity in our study.
LANGUAGE OF ORIGINAL DOCUMENT: English

Sato Y., Tsurui-Sato K., Uchima Y., Udui C.-A., Lorin O., Rengulbai K., Toma C., Suzuki R.

A systematic survey of environmental DNA in Palau's lakes and waterfalls reveals an increase in Leptospira levels after flooding

(2024) One Health, 19, art. no. 100898

DOI: 10.1016/j.onehlt.2024.100898

ABSTRACT: Objective: Leptospirosis is an important bacterial zoonosis which is widespread in tropical and subtropical islands and influences human and animal health which has secondary economic effects. Although leptospirosis is endemic in Palau, an Oceanian Pacific Island country, few systematic surveys of potential risk factors for Leptospira infection, such as weather and host animals, have been conducted in the natural environment. We used environmental DNA metabarcoding to assess the distribution, species diversity, and abundance of pathogenic Leptospira in this endemic region to investigate the potential environmental risks. Methods: Forty-two paired water samples, representing fine and rainy weather conditions, were collected from four representative waterfalls and lakes on Babeldaob Island, the largest island in Palau. High-throughput sequencing analysis was conducted for polymerase chain reaction products of leptospiral 16S rRNA and vertebrate animal mitochondrial 12S rRNA genes. Results: We revealed greater Leptospira diversity and abundance in samples collected after continuous rain, particularly in the presence of flooding, compared with samples collected under typhoon, monsoon, or fine weather conditions. From same samples, six mammalian species including cats (Felis catus), mice (Mus musculus), Yap flying fox (Pteropus yapensis), rats (Rattus spp.), and pigs (Sus scrofa) were repeatedly detected. These may be candidates of host animals of Leptospira in Palau; however, their detection was not clearly correlated with that of Leptospira. Conclusion: We repeatedly detected several species of pathogenic Leptospira from water samples of a wide region of Babeldaob Island. We confirmed that Leptospira contamination in freshwater environments increased under rainy conditions, particularly in the presence of flooding. This information could be used to improve public health control measures in this region.
LANGUAGE OF ORIGINAL DOCUMENT: English

Chenna D., Shastry S., Singson S., Balasubramanian R., Bhatia A.

Unveiling Leptospira antibody seroprevalence among voluntary blood donors: insights from a single-center observational study

(2024) Journal of Applied Hematology, 15 (3), pp. 228 - 232
DOI: 10.4103/joah.joah_38_24

ABSTRACT: Abstract: BACKGROUND: Leptospirosis is among transfusion transmissible infections but is not screened routinely among blood donors and is endemic in Southern India. The presence of carrier state and the donors being asymptomatic may lead to transfusion transmission in the absence of screening. We aimed to study the prevalence of leptospirosis among blood donors and to assess the need to implement screening strategies for its detection. METHODS: A prospective observational study was conducted among blood donors using Purposive sampling to select donors for the study. The samples collected for routine transfusion transmissible infections screening were used to screen for Ig M antibodies to leptospira infection by Enzyme linked immunosorbent assay (ELISA) method. Samples that were reactive twice were true positive. These donors were contacted telephonically to enquire if they developed any symptoms of the infection. RESULTS: A total of 3576 came for blood donation during the study period of which 124 participated in the study. Among the 124 donors screened, a total of seven samples (5.64%) samples were found to be reactive for IgM Leptospira antibodies. The mean age of the donors that were found to be reactive was 27.5 years (SD: 3.15, Range: 20-45 years) with a male to female ratio of 6:1. All these donors were asymptomatic before or after seven days and 2 weeks of blood donation. CONCLUSION: Approximately six out of 100 donors screened were positive for IgM antibodies of Leptospira without any symptoms. As there is a risk of transmission via blood transfusion, regular screening may be needed at least in areas of high prevalence.

LANGUAGE OF ORIGINAL DOCUMENT: English

Mousavi T., Kazeminejad A., Alikhani A., Mahmoodi S.M.

Prevalence of cutaneous manifestations in patients with leptospirosis admitted to razi hospital in Ghaemshahr from 2014 to 2020

(2024) Journal of Mazandaran University of Medical Sciences, 34 (236), pp. 113 - 119

ABSTRACT: Background and purpose: Leptospirosis is an acute febrile illness that affects the whole range of symptoms, the symptoms can be a mild form of the flu-like illness to more severe symptoms such as jaundice, bleeding, kidney failure, and death. In this disease, the skin lesions are usually in the form of macular, maculopapular, urticaria, and petechiae. Due to the variety of symptoms of this disease, to add to our knowledge in this field, we designed a study to evaluate the skin symptoms of this disease in patients admitted with this diagnosis. Materials and methods: This cross-sectional study was conducted from the beginning of 2014 to the end of 2020. The studied population was all hospitalized patients with leptospirosis whose disease was proven through serological tests. Checklist information includes age, sex, occupation, clinical signs, the first sign of disease onset, skin symptoms including any skin lesion including papules, macules, petechiae, purpura, haemorrhagic rashes, etc. at the beginning of the disease is manifested, and also how it has changed in the course of treatment and also what lesions are valuable to us at the end of treatment. All patient information is recorded on a special form. Data analysis was performed by SPSS software version 20. Results: 800 people (652 (81.50%) men and 148 (18.50%) women) were examined in this study. The average age of the studied patients was 48.55 ± 16.23 years with a minimum age of 15 and a maximum age of 87 years. The chi-square test was used to check the relationship between skin symptoms and patients' gender and age. the result showed that 150 patients had jaundice (62.76%), which was significantly more frequent than other skin symptoms (P<0.001). This test showed that skin symptoms were significantly higher in women than men (38.51 vs 27.91) (P=0.013). The result, however, showed that there is no significant relationship between the presence of skin symptoms and age (P=0.054). Bonferroni's post hoc test showed that the frequency of jaundice (79.59% vs. 58.42%) and the frequency of ecchymosis in women (16.33% vs. 2.11%) were significantly higher (P<0.05). Also, this test showed that all types of skin symptoms are significantly related to age classification (P<0.001). Also, in the examination of the types of skin symptoms, it has been shown that the highest frequency was related to the symptoms of massage on the fingers (55.56%) (P= 0.637). Conclusion: In this study, it was shown that most patients present with fever, chills, and myalgia and the rate of skin lesions in these patients is low and most skin lesions occur in the female population. Among skin lesions, jaundice was the most common. Headaches, nausea and vomiting, and myalgia were also more common in hospitalized patients for non-skin symptoms. The frequency of jaundice in women, the frequency of ecchymosis in women, and the frequency of other skin symptoms were higher in men.

LANGUAGE OF ORIGINAL DOCUMENT: Persian

Vassalakis J.A., Yamashita D.H.S., Midon L.M., Cogliati B., Heinemann M.B., Amamura T.A., Isaac L.

Murine C3 of the complement system affects infection by Leptospira interrogans

(2024) Microbes and Infection, art. no. 105413

DOI: 10.1016/j.micinf.2024.105413

ABSTRACT: Leptospirosis is an infectious neglected disease estimated to affect more than one million people worldwide each year. The Complement System plays a vital role in eliminating infectious agents. However, its

precise role in leptospirosis remains to be fully understood. We investigated the importance of C3 in L. interrogans serovar Kennewicki strain Pomona Fromm (LPF) infection. Lack of C3 leads to decreased leukocyte number, impaired inflammatory response and failure to eliminate bacteria during the early stages of infection, which may cause interstitial nephritis later. These findings could be explained, at least in part, by the lower presence of local opsonins. Furthermore, antibody production against Leptospira was compromised in the absence of C3, highlighting the importance of CR2 in B lymphocyte proliferation and the adjuvant role of C3d in humoral immunity. Leptospires can be eliminated through the urine, and according to our study, the lack of C3 delays the elimination of LPF through urine during the early stages of the infection. These results strongly suggest the crucial role of C3 protein in orchestrating an appropriate inflammatory response against LPF infection and in effectively eliminating the bacteria from the body during the acute phase of leptospirosis.
LANGUAGE OF ORIGINAL DOCUMENT: English

Araújo H.G., Aquino V.V.F., Pedrosa L.F.A., Alves C.J., Silva M.L.C.R., Vilela V.L.R., Araújo Júnior J.P., Malossi C.D., Santos C.S.A.B., Azevedo S.S.

Evidence and implications of pigs as genital carriers of Leptospira spp. in the Caatinga biome [Evidência e implicações de suínos como carreadores genitais de Leptospira spp. no bioma Caatinga]

(2024) Pesquisa Veterinaria Brasileira, 44, art. no. e07482
DOI: 10.1590/1678-5150-PVB-7482

ABSTRACT: The Caatinga biome is unique to Brazil, with unfavourable environmental characteristics for the survival of Leptospira spp. However, recent studies have shown high positivity at PCR (polymerase chain reaction) in small ruminants. There are no Leptospira spp. studies based on sample calculation in pigs in the Caatinga. The aim of this study was to assess the importance of pigs in the spread of leptospirosis in the Caatinga biome. Overall, 200 biological samples (urine, blood, vaginal fluid, and tissues of reproductive and urinary tracts) were collected from 40 slaughtered sows, and MAT (microscopic agglutination test) and PCR tests were carried out to detect anti-Leptospira spp. antibodies and the agent's DNA, respectively. The serological analysis showed a positivity rate of 5% (2/40), and the PCR identified Leptospira spp. DNA in 62.5% (25/40) of the animals. Only 2.5% (1/40) of the animals were positive for both techniques. The detected serogroups were Australis (50%) and Bataviae (50%), with antibody titres of 25 and 50. Leptospira spp. DNA was detected in 40% (16/40) of the reproductive tract samples, 32.5% (13/40) of the urinary tract, 32.5% (13/40) of the vaginal fluid and 30% (12/40) of the urine. There was no agreement (Kappa <0) between PCR samples from the genital tract vs. urinary tract or serological results. Genetic sequencing of one urine and one urinary tract tissue sample revealed 99% identity with L. borgpetersenii. The results indicate that leptospirosis is a concern in pigs in the context of Caatinga, with a high prevalence of infection detected by different diagnostic methods. The molecular analysis revealed a considerable proportion of infected animals. The findings emphasize the importance of a multifaceted approach in the diagnosis of leptospirosis in pigs, with a focus on the use of genital tract samples for the diagnosis of leptospirosis in this animal species, providing valuable insights for the control and prevention of this disease in both animals and the zoonotic context. Finally, the detection of leptospires in the genital tract indicates a possibility of male-female transmission in the venereal context.
LANGUAGE OF ORIGINAL DOCUMENT: English

Tolchkov V., Hodzhev Y., Tsafarova B., Nenova R., Mikov O., Simov N., Slavov G., Nedyalkov N., Langurov M., Bekchiev R., Stoev P., Nikolova M., Panaiotov S.

Human pathogens among bats

(2024) Problems of Infectious and Parasitic Diseases, 52 (2), pp. 32 - 38

DOI: 10.58395/51hccc30

ABSTRACT: Bats are known to inhabit both caves and open space areas. Bulgaria is among the European countries with the highest number of bat species. The species found in the country are distributed over a wide area. They range from the Pyrenees and the British Isles to the Pacific region and the Far East. Many bat species are carriers of potential human pathogens. Bats play an important role in agriculture and act as a biological pest crop control agent. Bulgarian bat ecosystem comprises temperate climate and a wide range of abiotic factors, including humidity, darkness, sunlight, and temperature variations. The metabolism of bats and their body temperature vary significantly between the period of activity and the hibernation. Fluctuations in body temperature can potentially impact host microbiome biodiversity. Temperature variations may induce a high level of microbial mutagenesis. Additionally, the existence in large, mixed-species colonies, together with a relatively long individual lifespan (4 – 16 years) and extensive travel distances, enhances the likelihood of encountering multiple pathogens in a single host organism. This, in turn, facilitates genetic variations and re-combinations among those microbial pathogens, thereby raising their potential to breach species barriers. In this review, we summarized and analyzed the available scientific information concerning the potential microbial human pathogens associated with bats, alongside with our preliminary data on the biodiversity of bats blood microbiome. Future research should focus on bats as both pathogens carriers and dynamic models for predicting emerging and re-emerging zoonotic diseases.

LANGUAGE OF ORIGINAL DOCUMENT: English

Chen C., He Z., Zhao J., Zhu X., Li J., Wu X., Chen Z., Chen H., Jia G.

Zoonotic outbreak risk prediction with long short-term memory models: a case study with schistosomiasis, echinococcosis, and leptospirosis

(2024) BMC Infectious Diseases, 24 (1), art. no. 1062

DOI: 10.1186/s12879-024-09892-y

ABSTRACT: Background: Zoonotic infections, characterized with huge pathogen diversity, wide affecting area and great society harm, have become a major global public health problem. Early and accurate prediction of their outbreaks is crucial for disease control. The aim of this study was to develop zoonotic diseases risk predictive models based on time-series incidence data and three zoonotic diseases in mainland China were employed as cases. Methods: The incidence data for schistosomiasis, echinococcosis, and leptospirosis were downloaded from the Scientific Data Centre of the National Ministry of Health of China, and were processed by interpolation, dynamic curve reconstruction and time series decomposition. Data were decomposed into three distinct components: the trend component, the seasonal component, and the residual component. The trend component was used as input to construct the Long Short-Term Memory (LSTM) prediction model, while the seasonal component was used in the comparison of the periods and amplitudes. Finaly, the accuracy of the hybrid LSTM prediction model was comprehensive evaluated. Results: This study employed trend series of incidence numbers and incidence rates of three zoonotic diseases for modeling. The prediction results of the model showed that the predicted incidence number and incidence rate were very close to the real incidence data. Model evaluation revealed that the prediction error of the hybrid LSTM model was smaller than that of

the single LSTM. Thus, these results demonstrate that using trending sequences as input sequences for the model leads to better-fitting predictive models. Conclusions: Our study successfully developed LSTM hybrid models for disease outbreak risk prediction using three zoonotic diseases as case studies. We demonstrate that the LSTM, when combined with time series decomposition, delivers more accurate results compared to conventional LSTM models using the raw data series. Disease outbreak trends can be predicted more accurately using hybrid models.
LANGUAGE OF ORIGINAL DOCUMENT: English

Uribe-Restrepo P., Perez-Garcia J., Arboleda M., Munoz-Zanzi C., Agudelo-Florez P.
Clinical presentation of human leptospirosis in febrile patients: Urabá, Colombia
(2024) PLoS neglected tropical diseases, 18 (9), pp. e0012449
DOI: 10.1371/journal.pntd.0012449
ABSTRACT: BACKGROUND: Leptospirosis is responsible for various clinical syndromes, classically linked with fever and acute kidney injury. METHODOLOGY/PRINCIPAL FINDINGS: A prospective multicenter observational study was conducted in six health institutions in the region of Urabá, Colombia. Enrollment was based on leptospirosis-compatible clinical syndrome and a positive preliminary serological test, with PCR used to confirm the disease. Clinical data were collected using a standard questionnaire at enrollment, complemented with a review of clinical records. A total of 100 patients were enrolled, 37% (95% CI 27.0-46.9%) had a positive PCR result confirming acute leptospirosis. The most frequent symptoms in patients with a positive PCR test were headache (91.9%; 34/37), chills and sweating (80.6%; 29/37), nausea (75%; 27/37), dizziness (74.3%; 26/37), vomiting (61.1%; 22/37), congestion (56.8%; 21/37), and conjunctival suffusion (51.4%; 19/37). The frequency of clinical signs classically described in leptospirosis was low: jaundice (8.3%; 3/36) and anuria/oliguria (21.6%; 8/37). An increased neutrophile percentage was reported in 60.6% (20/33) of patients. The presence of complications was 21.6% (8/37), with pulmonary complications being the most frequent (75.0% 6/8). One confirmed case died resulting in a fatality of 2.7% (95% CI 0.5-13.8). CONCLUSIONS/SIGNIFICANCE: Leptospirosis should be considered within the differential diagnoses of an undifferentiated acute febrile syndrome. Leptospirosis presents diagnostic challenges due to limitations in both clinical and laboratory diagnosis thus it is important to improve understanding of disease presentation and identify signs and symptoms that might help differentiate it from other causes of febrile illness.
LANGUAGE OF ORIGINAL DOCUMENT: English

Carvajal L., Ciuoderis K., Pérez L., Osorio J.E., Hernández-Ortiz J.P.
Multiplex PCR assays developed for neglected pathogen detection in undifferentiated acute febrile illness cases in tropical regions
(2024) Memorias do Instituto Oswaldo Cruz, 119
DOI: 10.1590/0074-02760240053
ABSTRACT: Undifferentiated acute febrile illness (UAFI) cause by several pathogens poses a diagnostic challenge due to the similarity on the clinical manifestations across these diseases. Precise pathogen detection is vital for appropriate medical intervention, early treatment, and timely outbreak alerts regarding emerging pathogens. In tropical regions, UAFI is predominantly linked to a wide range of viral, bacterial, and parasitic infections. Hence, confirmatory laboratory tests are essential for specific pathogen identification. Our primary goal was to develop two real-time multiplex PCR assays for simultaneous detection of six neglected pathogens

(Leptospira spp., Rickettsia spp., Borrelia spp., Anaplasma spp., Brucella spp., and Bartonella spp.), known for causing UAFI in tropical regions. We rigorously assessed assays parameters including: linearity, efficiency, sensitivity, and reproducibility in both singleplex and multiplex formats. Our results demonstrated that these multiplex assays are reliable and sensitive methods. They showed good performance with low intra-and inter-variability (<10%) and consistently high efficiencies (>90%). Moreover, these assays also offer the alternative of streamlining work, reducing processing costs, and minimizing sample volume use. In conclusion, we present two dependable, user-friendly, rapid, and costeffective methods for simultaneously detecting six neglected bacteria, as a significant laboratory tool in resource-limited tropical settings.
LANGUAGE OF ORIGINAL DOCUMENT: English

Tadić M., Konjević D., Perko V.M., Štritof Z., Zečević I., Benvin I., Milas Z., Turk N., Bujanić M., Hađina S., Habuš J.

The occurrence of Leptospira spp. serogroup Pomona infections in wild boars [Seroepidemiološko istraživanje leptospiroze prouzročene serogrupom Pomona u divljih svinja]

(2025) Veterinarska Stanica, 56 (2), pp. 225 - 233
DOI: 10.46419/vs.56.2.8
ABSTRACT: Leptospirosis is a worldwide zoonosis caused by different pathogenic serovars of the genus Leptospira, with very complex aetiology and epidemiology. Recent publications suggest that wild boar (Sus scrofa) has an important role in the epizootiology of leptospirosis, representing a potential source of infection. Wild boar populations in urban environments are increasing, posing not only agricultural and ecosystem concerns, but also a public health concern. The aim of this study was to assess the prevalence, temporal patterns and risk factors of Pomona infection in wild boars from areas with pronounced human activity. A total of 159 wild boar serum samples were collected within a health monitoring project in Medvednica Nature Park over a period of six hunting seasons (2012–2016; 2018) and 25.2% samples tested positive. Seropositivity against seven different serogroups was observed, with the highest number of positive reactions to the serogroup Pomona. Annual variation in Pomona reactivity was also detected, and positive reactions were five times more common in females than in males. In most of studies, adults had a higher seroprevalence than younger categories; however, in this study, seroprevalence against Pomona was higher in piglets and subadults. The results indicate that wild boar has the potential of maintaining serovars from the serogroup Pomona in certain natural foci. Due to the expansion of wild boar populations and their intrusion into urban areas, they should be considered a potentially important source of infection for humans and domestic animals.
LANGUAGE OF ORIGINAL DOCUMENT: English

Aras M.S.M., Nawawi M.R.M., Aripin M.K., Zohedi F.N., Bahar M.B., Harun M.H., Abdullah L.

Smart Airboat System for Water Circulation and Water Quality Monitoring

(2024) Lecture Notes in Electrical Engineering, 1184 LNEE, pp. 95 - 105
DOI: 10.1007/978-981-97-2027-9_9
ABSTRACT: The lakes of UTeM, namely Cemerlang, Terbilang, and Gemilang, have long been cherished as beautiful and vibrant bodies of water, providing a serene environment for various recreational activities. However, the outbreak of leptospirosis in the region has caused a significant threat to public health and safety. As a result, these once-thriving lakes have been shut down during the MCO, depriving the UTeM community of the opportunity to engage in wonderful activities such as kayaking and boating. Therefore, introducing an

innovative Smart Airboat equipped with advanced water quality detection technology can revolutionize the way we monitor and maintain the safety of the lakes. This device would provide real-time and accurate assessments of the water quality, including the presence of leptospirosis bacteria, thus enabling prompt action and prevention measures. The resulting product is a Smart Airboat, innovatively constructed with a base of durable PVC material. The boat's locomotion is powered by a DC motor, a propeller to generate water flow, and a servo motor to control direction. This combination ensures reliable functionality and durability even in a challenging water environment. The prototype has proven to be efficient in carrying out its functions. The project exhibits the application of mechatronics system design and engineering principles to devise a practical, innovative, and sustainable solution for monitoring and improving water quality in real-time.
LANGUAGE OF ORIGINAL DOCUMENT: English

Pineda S., Martínez Garro J.M., Salazar Flórez J.E., Agudelo-Pérez S., Monroy F.P., Peláez Sánchez R.G.
Detection of genes related to antibiotic resistance in Leptospira
(2024) Tropical Medicine and Infectious Disease, 9 (9), art. no. 203
DOI: 10.3390/tropicalmed9090203
ABSTRACT: Leptospirosis is a disease caused by the bacteria of the Leptospira genus, which can usually be acquired by humans through contact with urine from infected animals; it is also possible for this urine to contaminate soils and bodies of water. The disease can have deadly consequences in some extreme cases. Fortunately, until now, patients with leptospirosis have responded adequately to treatment with doxycycline and azithromycin, and no cases of antibiotic resistance have been reported. However, with the extensive use of such medications, more bacteria, such as Staphylococci and Enterococci, are becoming resistant. The purpose of this study is to determine the presence of genes related to antibiotic resistance in the Leptospira genus using bioinformatic tools, which have not been undertaken in the past. Whole genomes from the 69 described Leptospira species were downloaded from NCBI's GeneBank and analyzed using CARD (The Comprehensive Antibiotic Resistant Database) and RAST (Rapid Annotations using Subsystem Technology). After a detailed genomic search, 12 genes associated with four mechanisms were found: resistance to beta-lactamases, vancomycin, aminoglycoside adenylyltransferases, as well as multiple drug efflux pumps. Some of these genes are highly polymorphic among different species, and some of them are present in multiple copies in the same species. In conclusion, this study provides evidence of the presence of genes related to antibiotic resistance in the genomes of some species of the genus Leptospira, and it is the starting point for future experimental evaluation to determine whether these genes are transcriptionally active in some species and serovars.
LANGUAGE OF ORIGINAL DOCUMENT: English

Aymée L., Dos Santos Baptista Borges A.L., de Souza G.N., Lilenbaum W.
Is microscopic agglutination test a reliable method for diagnosing the bovine genital leptospirosis syndrome?
(2024) Veterinary Research Communications
DOI: 10.1007/s11259-024-10560-4
ABSTRACT: Bovine Genital Leptospirosis (BGL) is a chronic reproductive syndrome characterized by genital infection by Leptospira spp. An accurate diagnosis of BGL is crucial to implementing proper control measures in field conditions. This study aimed to evaluate the reliability of serology by Microscopic Agglutination Test

(MAT) for diagnosing leptospirosis in subfertile cows with genital infection. Of three herds, 93 non-pregnant cows with reproductive failures were submitted to the blood sampling (serology by MAT) and genital samples (lipL32-PCR). A total of 62/93 (66.6%) cows presented seroreactive to cutoff 100, while 45/93 (48.4%) cows were positive to cutoff 200, mainly against the Sejroe serogroup. In PCR analysis, 55/93 (59.1%) were positive. MAT results were compared with PCR (considered the standard), and test parameters and Cohen's kappa (ƙ) were calculated for the cut-offs 100 and 200. A ROC curve was performed for each cut-off of titers 100 to 1,600. The sensitivity and specificity of MAT100 were calculated at 66.6% and 33.3%, while for MAT200 the sensitivity was estimated as 35% and specificity as 54.5%. The accuracy of MAT was poor, being 54.8% in MAT100 and 42% in MAT200. Furthermore, the area under the curve of ROC analysis was low for all titers, and the correlation was poor for MAT100 and MAT200 (ƙ < 0). The results demonstrated that MAT is a limited technique to diagnose bovine genital carriers individually, and if only MAT is applied, genital carriers may pass undetected, impairing the control programs.
LANGUAGE OF ORIGINAL DOCUMENT: English

Leano D.R., Danguilan R., Arakama M.-H., Apelin V., Alamillo P.P., Chua E.

Efficacy of adjunct hemoperfusion compared to standard medical therapy on 28-day mortality in leptospirosis patients with renal failure and shock: a single-center randomized controlled trial

(2024) Tropical Medicine and Infectious Disease, 9 (9), art. no. 206

DOI: 10.3390/tropicalmed9090206

ABSTRACT: Hemoperfusion is a novel adjunct therapy that targets the dysregulated inflammatory events in severe sepsis. Previous studies have reported conflicting results on its efficacy and safety. This study was designed to assess the efficacy and safety of hemoperfusion among leptospirosis patients in septic shock and renal failure in terms of improvement in 28-day mortality, SOFA score, level of inflammatory markers, hemodynamics, and renal and pulmonary function. A total of 37 severe leptospirosis patients were enrolled and randomized into either standard medical therapy (SMT) alone, n = 20, or with hemoperfusion (HP), n = 17. Vital signs, urine output, vasopressor dose, PaO2/FiO2 (P/F) ratio, and biochemical parameters of patients from each treatment arm were compared. The hemoperfusion group showed a 36.84% (p = 0.017) risk reduction in 28-day mortality. Levels of procalcitonin, IL6, and lactate significantly decreased from baseline to day 7 in both groups. Statistically significant improvements in serum creatinine (p = 0.04) and PF ratio (p = 0.045) were observed in the hemoperfusion cohort. Intention-to-treat and per-protocol approaches showed that hemoperfusion increased the survival rate and decreased the mortality risk. This benefit for survival persisted even when patients were also receiving extracorporeal membrane oxygenation (ECMO), showing that hemoperfusion's benefits are independent of ECMO use. Hemoperfusion is a safe and effective adjunct therapy for managing severe sepsis. It promotes earlier renal and pulmonary function recovery and improves the survival of septic shock patients.
LANGUAGE OF ORIGINAL DOCUMENT: English

Soni N., Eyre M.T., Souza F.N., Diggle P.J., Ko A.I., Begon M., Pickup R., Childs J.E., Khalil H., Carvalho-Pereira T.S.A., Pertile A.C., Carvalho M., Oliveira D.D., Nery N., Jr., Giorgi E., Costa F.

Disentangling the influence of reservoir abundance and pathogen shedding on zoonotic spillover of the Leptospira agent in urban informal settlements

(2024) Frontiers in Public Health, 12, art. no. 1447592

DOI: 10.3389/fpubh.2024.1447592

ABSTRACT: Rats are major reservoirs for pathogenic Leptospira, the bacteria causing leptospirosis, particularly in urban informal settlements. However, the impact of variation in rat abundance and pathogen shedding rates on spillover transmission to humans remains unclear. This study aimed to investigate how spatial variation in reservoir abundance and pathogen pressure affect Leptospira spillover transmission to humans in a Brazilian urban informal settlement. A longitudinal eco-epidemiological study was conducted from 2013 to 2014 to characterize the spatial distribution of rat abundance and Leptospira shedding rates in rats and determine the association with human infection risk in a cohort of 2,206 community residents. Tracking plates and live-trapping were used to measure rat abundance and quantify rat shedding status and load. In parallel, four sequential biannual serosurveys were used to identify human Leptospira infections. To evaluate the role of shedding on human risk, we built three statistical models for: (1) the relative abundance of rats, (2) the shedding rate by individual rats, and (3) human Leptospira infection, in which “total shedding”, obtained by multiplying the predictions from those two models, was used as a risk factor. We found that Leptospira shedding was associated with older and sexually mature rats and varied spatially and temporally—higher at valley bottoms and with seasonal rainfall (December to March). The point estimate for “total shedding” by rat populations was positive, i.e., Leptospira infection risk increased with total shedding, but the association was not significant [odds ratio (OR) = 1.1; 95% confidence interval (CI): 0.9, 1.4]. This positive trend was mainly driven by rat abundance, rather than individual rat shedding (OR = 1.8; 95% CI: 0.6, 5.4 vs. OR = 1.0; 95% CI: 0.7, 1.4]. Infection risk was higher in areas with more vegetative land cover (OR = 2.4; 95% CI: 1.2, 4.8), and when floodwater entered the house (OR = 2.4; 95% CI: 1.6, 3.4). Our findings indicate that environmental and hydrological factors play a more significant role in Leptospira spillover than rat associated factors. Furthermore, we developed a novel approach combining several models to elucidate complex links between animal reservoir abundance, pathogen shedding and environmental factors on zoonotic spillover in humans that can be extended to other environmentally transmitted diseases.

LANGUAGE OF ORIGINAL DOCUMENT: English

Davignon G., Pietrosemoli N., Benaroudj N., Soupé-Gilbert M.-E., Cagliero J., Turc É., Picardeau M., Guentas L., Goarant C., Thibeaux R.

Leptospira interrogans biofilm transcriptome highlights adaption to starvation and general stress while maintaining virulence

(2024) npj Biofilms and Microbiomes, 10 (1), art. no. 95

DOI: 10.1038/s41522-024-00570-0

ABSTRACT: Life-threatening Leptospira interrogans navigate a dual existence: surviving in the environment and infecting mammalian hosts. Biofilm formation is presumably an important survival strategy to achieve this process. Understanding the relation between biofilm and virulence might improve our comprehension of leptospirosis epidemiology. Our study focused on elucidating Leptospira’s adaptations and regulations involved in such complex microenvironments. To determine the transcriptional profile of Leptospira in biofilm, we compared the transcriptomes in late biofilms and in exponential planktonic cultures. While genes for motility, energy production, and metabolism were downregulated, those governing general stress response, defense against metal stress, and redox homeostasis showed a significant upsurge, hinting at a tailored defensive strategy against stress. Further, despite a reduced metabolic state, biofilm disruption swiftly restored metabolic activity. Crucially, bacteria in late biofilms or resulting from biofilm disruption retained virulence in an

animal model. In summary, our study highlights Leptospira's adaptive equilibrium in biofilms: minimizing energy expenditure, potentially aiding in withstanding stresses while maintaining pathogenicity. These insights are important for explaining the survival strategies of Leptospira, revealing that a biofilm lifestyle may confer an advantage in maintaining virulence, an understanding essential for managing leptospirosis across both environmental and mammalian reservoirs.
LANGUAGE OF ORIGINAL DOCUMENT: English

Imelio J.A., Trajtenberg F., Mondino S., Zarantonelli L., Vitrenko I., Lemée L., Cokelaer T., Picardeau M., Buschiazzo A.

Signal-sensing triggers the shutdown of HemKR, regulating heme and iron metabolism in the spirochete Leptospira biflexa

(2024) PLoS ONE, 19 (9), art. no. e0311040
DOI: 10.1371/journal.pone.0311040
ABSTRACT: Heme and iron metabolic pathways are highly intertwined, both compounds being essential for key biological processes, yet becoming toxic if overabundant.Their concentrations are exquisitely regulated, including via dedicated two-component systems (TCSs) that sense signals and regulate adaptive responses.HemKR is a TCS present in both saprophytic and pathogenic Leptospira species, involved in the control of heme metabolism.However, the molecular means by which HemKR is switched on/off in a signal-dependent way, are still unknown.Moreover, a comprehensive list of HemKR-regulated genes, potentially overlapped with iron-responsive targets, is also missing.Using the saprophytic species Leptospira biflexa as a model, we now show that 5-aminolevulinic acid (ALA) triggers the shutdown of the HemKR pathway in live cells, and does so by stimulating the phosphatase activity of HemK towards phosphorylated HemR.Phospho~HemR dephosphorylation leads to differential expression of multiple genes, including of heme metabolism and transport systems.Besides the heme-biosynthetic genes hemA and the catabolic hmuO, which we had previously reported as phospho~HemR targets, we now extend the regulon identifying additional genes.Finally, we discover that HemR inactivation brings about an iron-deficit tolerant phenotype, synergistically with iron-responsive signaling systems.Future studies with pathogenic Leptospira will be able to confirm whether such tolerance to iron deprivation is conserved among Leptospira spp., in which case HemKR could play a vital role during infection where available iron is scarce.In sum, HemKR responds to abundance of porphyrin metabolites by shutting down and controlling heme homeostasis, while also contributing to integrate the regulation of heme and iron metabolism in the L.biflexa spirochete model.
LANGUAGE OF ORIGINAL DOCUMENT: English

Severo M.A., Henrique C.L., Araújo S.S., Portela R.A., Magalhães N.M.A., Rocha K.N.S., Alves C.J., Santos C.S.A.B., de Azevedo S.S.

Environmental factors associated with seroprevalence of Leptospira spp. infection in stray and shelter dogs in the Caatinga biome [Fatores ambientais associados com a soroprevalência de infecção por Leptospira spp. em cães errantes e de abrigo no bioma Caatinga]

(2025) Ciencia Rural, 55 (1), art. no. e20240101
DOI: 10.1590/0103-8478cr20240101
ABSTRACT: Leptospirosis is a zoonotic disease that must be studied on the One Health point of view. It is possible that there are particularities in the epidemiology of leptospirosis in Caatinga biome, where the

environment is often unfavorable and challenges the adaptability of Leptospira spp. Overall, 100 dogs (47 shelter and 53 stray dogs) selected based on sampling calculation were used to evaluate the Leptospira spp. seroprevalence and associated factors. The microscopic agglutination test (MAT) was applied to detect anti-Leptospira spp. antibodies (cut-off titer 50). Risk factors were identified using the robust Poisson regression analysis. Twenty-four animals (24%; 95% CI = 15.6%-32.4%) were seroreactive, antibody titers ranged from 50 to 200, and the reacting serogroups were Ballum (17%), Autumnalis (6%) and Djasiman (1%). The factors/categories associated with seropositivity were the environment where the animal stay/soil (prevalence ratio [PR] = 6.03; 95% CI for PR: 1.86-7.69; P < 0.001) and access to polluted water/yes (PR = 3.79; 95% CI for PR: 1.85-24.22; P = 0.011). The results suggested leptospirosis as a concern in the One Health context in stray and shelter dogs from the Caatinga biome despite the adverse conditions of this biome for the survive of Leptospira spp. on the environment. Moreover, despite being social and government issues, factors such as environment where the animal stay (soil) and access to polluted water must be carefully deemed and corrected to avoid the transmission of leptospires to animals and humans.
LANGUAGE OF ORIGINAL DOCUMENT: English

Parra-Barrera E.L., Bello-Piruccini S., Rodríguez K., Duarte-Valderrama C., Torres M., Undurraga E.A.
Serologically Confirmed Human Leptospirosis in Colombia, 2015-2020
(2024) The American journal of tropical medicine and hygiene, 111 (4), pp. 856 - 864
DOI: 10.4269/ajtmh.23-0654
ABSTRACT: Leptospirosis, a bacterial infection transmitted through contact with infected animals or contaminated water sources, imposes a substantial health burden in Colombia. Since 2007, the National Institute of Health (INS) has mandated the notification and confirmation of all suspected leptospirosis cases. This passive surveillance program employs the microscopic agglutination test (MAT) on serum samples to ascertain confirmed cases of leptospirosis infection. However, the absence of a robust surveillance system has hindered our comprehensive understanding of the morbidity, mortality, geographical distribution, species/serovars, and strains responsible for severe disease. Our study aimed to provide an epidemiological overview of MAT-confirmed human leptospirosis cases reported over 6 years (2015-2020) in Colombia. In addition, we offer insights into the status of leptospirosis in the country, focusing on risk factors and proposing potential improvements for diagnosis and disease management. During the 6-year surveillance period, the laboratory at the INS received 3,535 serum samples from suspected human leptospirosis cases, with 880 (25%) confirmed through MAT. The incidence of leptospirosis was calculated at 1.9 cases per 100,000 people, with a higher prevalence among men (82.1%). Furthermore, 54 (6.1%) deaths were confirmed as leptospirosis, and cases were documented across nearly all regions of Colombia. Our findings emphasize the urgent need to strengthen leptospirosis laboratory surveillance, implement effective prevention measures, and enhance diagnostic capabilities in Colombia. The analysis conducted in this study provides the groundwork for estimating the impact of leptospirosis and raises awareness of its significance in public health.
LANGUAGE OF ORIGINAL DOCUMENT: English

Barbosa L.N., LIanes A., Madesh S., Fayne B.N., Brangulis K., Linn-Peirano S.C., Rajeev S.
Enhancement of clinical signs in C3H/HeJ mice vaccinated with a highly immunogenic Leptospira methyl-accepting chemotaxis protein following challenge
(2024) PLoS neglected tropical diseases, 18 (9), pp. e0012155

DOI: 10.1371/journal.pntd.0012155

ABSTRACT: Leptospirosis is the most widespread zoonosis and a life-threatening disease in humans and animals. Licensed killed whole-cell vaccines are available for animals; however, they do not offer heterologous protection, do not induce long-term protection, or prevent renal colonization. In this study, we characterized an immunogenic Leptospira methyl-accepting chemotaxis protein (MCP) identified through a reverse vaccinology approach, predicted its structure, and tested the protective efficacy of a recombinant MCP fragment in the C3H/HeJ mice model. The predicted structure of the full-length MCP revealed an architecture typical for topology class I MCPs. A single dose of MCP vaccine elicited a significant IgG antibody response in immunized mice compared to controls ($P < 0.0001$), especially the IgG1 and IgG2a subclasses. The vaccination with MCP, despite eliciting a robust immune response, did not protect mice from disease and renal colonization. However, survival curves significantly differed between groups, and the MCP-vaccinated group developed clinical signs faster than the control group. There were differences in gross and histopathological changes between the MCP-vaccinated and control groups. The factors leading to enhanced disease process in vaccinated animals need further investigation. We speculate that anti-MCP antibodies may block the MCP signaling cascade and may limit chemotaxis, preventing Leptospira from reaching its destination, but facilitating its maintenance and replication in the blood stream. Such a phenomenon may exist in endemic areas where humans are highly exposed to Leptospira antigens, and the presence of antibodies might lead to disease enhancement. The role of this protein in Leptospira pathogenesis should be further evaluated to comprehend the lack of protection and potential exacerbation of the disease process. The absence of immune correlates of protection from Leptospira infection is still a major limitation of this field and efforts to gather this knowledge are needed.

LANGUAGE OF ORIGINAL DOCUMENT: English

Mohd Hatta H., Musa K.I., Mohd Fuzi N.M.H., Moraga P.

Spatial interaction between leptospirosis and enteric fever in Kelantan, Malaysia: a 2016-2022 notification registry analysis

(2024) Asia-Pacific Journal of Public Health

DOI: 10.1177/10105395241286118

ABSTRACT: Leptospirosis and enteric fever are prevalent tropical acute bacterial febrile illnesses in Kelantan, Malaysia, that exhibit overlapping features and shared transmission dynamics, yet their spatial relationship remains understudied. This study aimed to analyze their spatial distribution, investigating potential interactions and intersecting patterns. A total of 212 laboratory-confirmed cases of enteric fever and 1106 of leptospirosis between 2016 and 2022, were retrieved from the national e-Notifikasi registry. Point pattern analysis revealed clustering of both diseases in the northern region, but leptospirosis was predominant in the south, exhibiting higher spatial risk. Seven co-infection cases were identified in overlapping hotspot areas. Spatial dependence between the diseases was identified within 4 km distance on average, with varying patterns over time and regions. Recognizing spatial dependence has implications for accurate diagnosis, timely intervention, and tailored public health strategies. The findings underscore the need for multi-disease interventions to address shared risk factors and co-infections in similar geographical contexts.

LANGUAGE OF ORIGINAL DOCUMENT: English

Wainaina M., Wasonga J., Cook E.A.J.
57194857152; 58638892200; 56966162200
Epidemiology of human and animal leptospirosis in Kenya: a systematic review and meta-analysis of disease occurrence, serogroup diversity and risk factors
(2024) PLoS neglected tropical diseases, 18 (9), pp. e0012527
DOI: 10.1371/journal.pntd.0012527
ABSTRACT: BACKGROUND: Leptospirosis is a priority zoonotic disease in Kenya, but an in-depth review of its presence in humans, animals and the environment is lacking. Therefore, we conducted this systematic review and meta-analysis to understand the epidemiological situation to date. METHODOLOGY: We searched for literature in African journals online, AGRIS, Embase, the Leptospira WOAH reference laboratory library, ProMED-mail, PubMed, Scopus, Web of Science, and the institutional repositories of 33 academic institutions and included 66 publications on leptospirosis in Kenya which spanned from 1951 to 2022. The review was registered on the International Platform of Registered Systematic Review and Meta-analysis Protocols (INPLASY). FINDINGS: Most investigations were done in rural and urban areas in western, southern, central, and coastal areas in Kenya and the largely pastoral eastern and northern areas were under-represented. A wide host range of domestic animals and wildlife was revealed, and occupational exposure was an important risk factor for humans. The microscopic agglutination test (MAT) was the most frequent test, particularly common in studies conducted during the 1980s and 1990s. However, varying MAT panels and cut-off titres were observed. The overall seroprevalence in cattle was 28.2% (95% confidence intervals [CI]: 12.0-53.0; heterogeneity: I2 = 96.7%, τ2 = 1.4), and 11.0% in goats (95% CI: 5.4-21.2; heterogeneity: I2 = 78.8%, τ2 = 0.4). Molecular tests were seldom used to determine species and illustrate strain diversity. There was a lack of awareness of leptospirosis among farmers and health practitioners. CONCLUSION: The widespread presence of leptospires and inadequate diagnostic capacity demonstrate that leptospirosis is a common but underreported disease in Kenya. Raising awareness and boosting the country's diagnostic capacity is crucial to timely detection and disease control.
LANGUAGE OF ORIGINAL DOCUMENT: English

de Oliveira M.D., de Andrade Morais D., Lima A.M.C., de Andrade Magalhães N.M., da Costa Barnabé N.N., Pinheiro R.R., Alves F.S.F., de Azevedo S.S., Limeira C.H., Alves C.J.
Leptospirosis seroprevalence and associated risk factors in dairy goats in the Brazilian semi-arid region
(2024) Research in Veterinary Science, 180, art. no. 105431
DOI: 10.1016/j.rvsc.2024.105431
ABSTRACT: Leptospira spp. infection is a worldwide zoonosis that causes economic losses to goat rearing, mainly due to reproductive disorders. Hence, the objective of this research was to determine the seroprevalence and associated risk factors of leptospirosis in a goat milk-producing region in the states of Paraiba and Pernambuco, Northeast Brazil. The microscopic agglutination test was used as serological method and risk factor analysis was carried out using univariable and multivariable analyses. Out of the 937 animals sampled, 102 (10.9 %; 95 % CI = 8.9–12.9 %) were seropositive for Leptospira spp. and the most frequent serogroups were Ballum (41.2 %; 95 % CI = 31.6–50.7 %), Icterohaemorrhagiae (25.5 %, 95 % CI = 17–33.9 %) and Semaranga (23.5 %, 95 % CI = 15.3–31.8 %), with antibody titres ranging from 1:50 to 1:200. Thirty-four of 51 herds (66.7 %; 95 % CI = 53.7–79.6 %) had at least one seropositive animal. The risk factor identified in the multivariable two-level random effect binary logistic regression was the animal being an adult

(odds ratio = 4.2; 95 % CI = 1.93–9.13; P < 0.001). Our results provide important information on the epidemiology and risk factors associated with goat leptospirosis seroprevalence in one of the main Brazilian goat milk-producing regions. Furthermore, the need for adopting sanitary control measures, especially those involving sanitary management practices, is highlighted.
LANGUAGE OF ORIGINAL DOCUMENT: English

Aivelo T., Alburkat H., Suomalainen N., Kukowski R., Heikkinen P., Oksanen A., Huitu O., Kivistö R., Sironen T.
Potentially zoonotic pathogens and parasites in opportunistically sourced urban brown rats (Rattus norvegicus) in and around Helsinki, Finland, 2018 to 2023
(2024) Eurosurveillance, 29 (40), art. no. 40
DOI: 10.2807/1560-7917.ES.2024.29.40.2400031
ABSTRACT: Background: Brown rats (Rattus norvegicus) are synanthropic rodents with worldwide distribution, which are known to harbour many zoonotic pathogens and parasites. No systematic zoonotic surveys targeting multiple pathogens and parasites have previously been conducted in urban rats in Finland. Aim: In Helsinki, Finland, we explored the presence and prevalence in brown rats of certain pathogens and parasites (including helminths, viruses and bacteria) across potentially zoonotic taxa. Methods: We opportunistically received rat carcasses from pest management operators and citizens from 2018 to 2023. We searched for heart- or lungworms, performed rat diaphragm digestion to check for Trichinella and morphologically identified intestinal helminths. We assessed virus exposure by immunofluorescence assay or PCR, and detected bacteria by PCR (Leptospira) or culture (Campylobacter). Results: Among the rats investigated for helminths, no heart- or lungworms or Trichinella species were detected and the most common finding was the cestode Hymenolepis nana (in 9.7% of individuals sampled, 28/288). For some of the surveyed virus taxa, several rats were seropositive (orthopoxviruses, 5.2%, 11/211; arenaviruses, 2.8%, 6/211; hantaviruses 5.2%, 11/211) or tested positive by PCR (rat hepatitis E virus, 1.8%, 4/216). Campylobacter jejuni (6.6%, 17/259) and Leptospira interrogans (1.2%, 2/163) bacteria were also present in the rat population examined. Conclusions: Prevalences of potentially zoonotic pathogens and parasites in brown rats in Helsinki appeared low. This may explain low or non-existent diagnosis levels of rat-borne pathogen and parasite infections reported in people there. Nevertheless, further assessment of under-diagnosis, which cannot be excluded, would enhance understanding the risks of zoonoses.
LANGUAGE OF ORIGINAL DOCUMENT: English

Mitra S., Bavishi A., Muley A., Marathe A.
Leptospirosis with indian tick-borne typhus coinfection: a rare presentation of tropical febrile illness
(2024) Journal of Association of Physicians of India, 72 (10), pp. e25 - Ee27
DOI: 10.59556/japi.72.0694
ABSTRACT: Introduction: Leptospirosis and tick-borne typhus are zoonotic diseases, rarely reported as coinfection. More specific molecular tests are not easily accessible for diagnosis of these diseases, thus resulting in delayed diagnosis and eventually considerable morbidity and mortality. Case description: We report a case of leptospirosis with tick-borne typhus coinfection in an abattoir worker who presented with a short history of fever, myalgia, jaundice, nonoliguric renal failure, diffuse petechial rash, and altered sensorium. His lab investigations showed leukocytosis, raised C-reactive protein (CRP), elevated transaminases and creatinine, mild pleocytosis, and mildly raised proteins in cerebrospinal fluid (CSF). Serology for Leptospira

IgM was positive by enzyme-linked immunosorbent assay (ELISA). A paired Weil–Felix test (WFT) showed a fourfold increase in OX19 and OX2 titers. The patient responded well to IV antibiotic therapy and was discharged. This is the first time that leptospirosis and Indian tick-borne typhus coinfection has been reported from western India. Conclusion: Leptospirosis and Indian tick-borne typhus coinfection is a rare but important cause of tropical fever. Arduous efforts to establish a definitive diagnosis help not only in surveillance for epidemiological data of the disease entities but also in avoiding severe complications resulting from considerable delay in appropriate therapy.
LANGUAGE OF ORIGINAL DOCUMENT: English

Terayama Y., Maeda M., Hata Y., Kawasaki Y., Koizumi N.

A probable cluster of premature birth and stillbirth caused by Leptospira interrogans serogroup Hebdomadis in an integrated swine farm in Nagasaki Prefecture, Japan

(2024) The Journal of veterinary medical science, 86 (10), pp. 1040 - 1044
DOI: 10.1292/jvms.24-0215
ABSTRACT: In an integrated swine farm with 135 sows in Nagasaki Prefecture, premature births and stillbirths were observed in six sows in June and July 2023, and their etiology was investigated. Leptospiral flaB gene was detected in the kidney of one stillborn fetus and the placenta of its sow by nested PCR. Multilocus sequence typing revealed that the infecting strain was Leptospira interrogans ST118. In addition, leptospiral antigens were detected in lesions of the above tissues by immunohistochemical staining. The examined sow and several other sows in the farm had antibodies against serogroup Hebdomadis. These results suggested that L. interrogans serogroup Hebdomadis ST118 was the causative agent of premature births and stillbirths that occurred in this farm.
LANGUAGE OF ORIGINAL DOCUMENT: English

Verma K., Gopikrishnan M., Yadav A., Razack S.A., Gunasekaran K., Bharti P.K., Doss C G.P.

Unveiling allium sativum phytocompounds as new antileptospiral agents via a structural-based virtual screening approach

(2024) ChemistrySelect, 9 (38), art. no. e202402413
DOI: 10.1002/slct.202402413
ABSTRACT: Leptospirosis, a disease of zoonotic origin, is transmitted to humans via the Leptospira bacteria, which infected rats and domestic animals carry. This disease is prevalent in certain regions of South India and North-East India. As per the Leptospirosis Burden Epidemiology Group (WHO), there are approximately 873,000 reported cases and 48,600 deaths annually. Interestingly, we have identified specific targets that are vital to metabolic processes, lipid synthesis, the flagellar motor protein system, and bacterial chemotaxis. By developing new drugs that target these areas, we could significantly mitigate the risks associated with severe Leptospirosis. This study aims to create a new antileptospiral drug using data from the IMPPAT database. We performed virtual screening with Schrodinger, molecular dynamic simulation, and free energy investigation using GROMACS throughout 50 ns. The primary objective was to identify eight potential therapeutic targets in Leptospira for drug development. The screening process successfully identified promising drug candidates for the treatment of Leptospirosis, specifically IMPHY015116, IMPHY004388, IMPHY004619, IMPHY014919, IMPHY007598, and IMPHY001246. These phytochemical compounds exhibit higher binding energy than

conventional drug molecules and show stability in dynamic environments. However, additional studies are required to validate their effect on disease progression and pathogenicity through in vitro studies.
LANGUAGE OF ORIGINAL DOCUMENT: English

Kramarov S., Yevtushenko V., Seriakova I., Voronov O., Kyrytsia N., Zakordonets L.V., Shadrin V., Shatrova C., Savostikova N., Zhezhera V.

A case report of acute liver failure in a child with hepatitis a virus and Epstein-Barr virus coinfection on the background of autoimmune sclerosing cholangitis

(2024) International Medical Case Reports Journal, 17, pp. 801 - 807
DOI: 10.2147/IMCRJ.S477802

ABSTRACT: Background: Fulminant hepatitis is a rare and severe form of acute liver failure (ALF) characterized by rapid and massive destruction of liver cells and associated with a high mortality rate. Infectious factors, in particular viral hepatitis, take a prominent place in the etiology of ALF, however, the presence of chronic liver pathology can play a significant role in the disease progression and development of ALF. Case Presentation: A 2-year-old child was hospitalized on the 4th day of the disease with manifestations of jaundice and general intoxication. The examination revealed markers of active hepatitis A virus infection and Epstein-Barr virus infection. From the seventh day of the disease, the child's condition began to progressively deteriorate due to manifestations of ALF. Despite the use of immunomodulatory and replacement therapy, the disease ended fatally on the 9th day. Pathohistological examination revealed manifestations of viral necrotic hepatitis on the background of autoimmune sclerosing cholangitis. Conclusion: The case is novel as regards the occurrence of two viral hepatitis with different modes of transmission on a background of unidentified liver disease.
LANGUAGE OF ORIGINAL DOCUMENT: English

Kharwadkar S., Weinstein P., Stanhope J.

Drivers of human Leptospira infection in the Pacific Islands: a systematic review

(2024) Epidemiology and infection, 152, pp. e118
DOI: 10.1017/S0950268824001250

ABSTRACT: Leptospirosis is a bacterial zoonosis that poses an increasing global public health risk. Pacific Island communities are highly vulnerable to leptospirosis outbreaks, yet the local drivers of infection remain poorly understood. We conducted a systematic review to identify the drivers of human Leptospira infection in the Pacific Islands. There were 42 included studies from which findings were synthesized descriptively. In tropical Pacific Islands, infections were a product of sociodemographic factors such as male gender/sex, age 20 to 60 years, Indigenous ethnicity, and poverty; lifestyle factors such as swimming, gardening, and open skin wounds; and environmental factors, including seasonality, heavy rainfall, and exposure to rodents, cattle, and pigs. Possible mitigation strategies in these islands include strengthening disease reporting standards at a regional level; improving water security, rodent control, and piggery management at a community level; and information campaigns to target individual-level drivers of infection. By contrast, in New Zealand, exposures were predominantly occupational, with infections occurring in meat and farm workers. Accordingly, interventions could include adjustments to occupational practices and promoting the uptake of animal vaccinations. Given the complexity of disease transmission and future challenges posed by climate change, further action is required for leptospirosis control in the Pacific Islands.
LANGUAGE OF ORIGINAL DOCUMENT: English

Fort G.G.

Pathophysiology of specific clinical findings in leptospirosis

(2024) Ferri's Clinical Advisor 2025: 5 Books in 1, pp. 669.e15 - 669.e18
DOI: 10.1016/B978-0-443-11724-4.00583-4
LANGUAGE OF ORIGINAL DOCUMENT: English

Zuo L., Wang H., Tan Y., Wan J., Tan W., Gan Y., Xiong X., Wang J., Luo C.

Co-circulation of Hantavirus, pathogenic Leptospira spp., and Bartonella spp. in rodents in the Wanzhou section of the Three Gorges Reservoir Region, 2021-2023

(2024) Vector borne and zoonotic diseases (Larchmont, N.Y.), 24 (10), pp. 694 - 698
DOI: 10.1089/vbz.2023.0150

ABSTRACT: Background: Rodent is a reservoir of various zoonotic pathogens. Wanzhou section of the Three Gorges reservoir region (TGRR) is a superior habitat for rodents, and the situation of rodent-borne zoonotic pathogens in this region has not been surveyed in recent years. Materials and Methods: Rodents were night trapped with mousecage or mousetrap in urban and surrounding towns' indoor or outdoor areas of the Wanzhou section of the TGRR, and nucleic acid was extracted from their lung or a mixture of liver, spleen, and kidney. Commercialized qPCR kits for pathogenic Leptospira spp., Rickettsia typhi, Anaplasma phagocytophilum, Bartonella spp., Orientia tsutsugamushi, and Francisella tularensis and qRT-PCR kits for hantavirus (HV), and severe fever with thrombocytopenia syndrome virus (SFTSV) were used for the detection of associated pathogens in collected rodents. Results: From 2021 to 2023, 604 rodents belonging to 10 species were collected. HV and pathogenic L. spp. were detected positive, with infection rates of 0.66% (4/604) and 1.32% (8/604), respectively. B. spp. were detected positive with an infection rate of 4.73% (19/402) in the rodents trapped in 2022 and 2023. Other five pathogens were all detected negative. Conclusion: This study showed that the Wanzhou section of the TGRR had HV, pathogenic L. spp., and B. spp. co-circulation in rodents. Hence, more attention should be paid to the prevention and control of associated rodent-borne diseases.

LANGUAGE OF ORIGINAL DOCUMENT: English

Yeni D.K., Balevi A., Gök A.

Molecular detection of leptospirosis from genital system in mares [Kısrakların genital sisteminden leptospirosisin moleküler tespiti]

(2024) Turk Hijyen ve Deneysel Biyoloji Dergisi, 81 (3), pp. 253 - 258
DOI: 10.5505/TurkHijyen.2024.01212

ABSTRACT: Objective: Leptospirosis is a worldwide zoonotic disease and well recognized infectious disease of horses. Equine leptospirosis is to cause the birth of weak foals, neonatal deaths and abortion after pregnancy period. Studies on leptospirosis in horses are generally investigations of urine samples and serological studies. Although leptospirosis causes reproductive disorders, genital sample studies that may be a source of infection have been ignored. The aims of this study were to study the prevalance of Leptospira by PCR using vaginal swab from apparently healthy horses. Methods: A total of 92 vaginal swab samples were collected and transferred to the bacterial diagnosis laboratory of Selcuk University Veterinary Faculty. The vulva and vagina were cleaned before swab samples were taken. All samples were stored in the refrigerator at -20°C and taken to the laboratory for processing. These samples were sent to the laboratory under cold

chain conditions. DNA was extracted from suspicious samples and conventional PCR was used to detect Leptospira spp. Specific primers were selected and PCR was finalized for Leptospira spp. Results: As a result of the study, it was found that out of 92 mare's vaginal swab samples 7 (7.6%) were positive for Leptospira spp. This study is the first report from our country due to the detection of Leptospira spp DNA in asymptomatic mares. Conclusion: It revealed that the Leptospira PCR positive mare were not showing any signs and symptoms. When the results and observations were evaluated, it was thought that Leptospira PCR positive mares could play a role as a carrier in the transmission of leptospirosis. Our study is one of the rare studies on mares carrying the possible causative agent. Detection of leptospirosis by PCR can be considered as a reliable method for early detection of Leptospira shedding in asymptomatic animals. In addition, molecular studies from vaginal swab samples were observed as a rapid and definitive diagnostic option, considering the difficulty of isolation of the Leptospira agent and possible contaminations. According to the results of our study, it is recommended to reevaluate the control measures against the disease and to carry out molecular characterization and vaccination studies in risky areas.
LANGUAGE OF ORIGINAL DOCUMENT: English

Regassa A.G., Obsu L.L.
The role of asymptomatic cattle for leptospirosis dynamics in a herd with imperfect vaccination
(2024) Scientific Reports, 14 (1), art. no. 23775
DOI: 10.1038/s41598-024-72613-7
ABSTRACT: Leptospirosis is an emerging zoonotic disease with high health and economic damage. In this study, we developed a deterministic mathematical model that describes the dynamics of leptospirosis transmission within a cattle herd, incorporating asymptomatic infected and vaccinated compartments. The study examined the transmission role of asymptomatic cattle that contaminate herds without farmers' knowledge. We proved the well-posedness of the proposed model and found the basic reproduction number using the next-generation matrix. Analytically, we demonstrated that the disease-free equilibrium point is locally and globally asymptotically stable when R0 is less than unity and is otherwise unstable. Graphically, we further established the local asymptotic stability of disease-free and endemic equilibria. Sensitivity analysis showed that the contact rate with asymptomatic infected cattle, βA, is the most sensitive parameter in the stated model, followed by the recovery rate of asymptomatic infected cattle, σ, and the vaccination rate of susceptible cattle, τ. Numerical simulations revealed that a reduction in contact rate with asymptomatic infected cattle significantly reduced pathogen Leptospira transmission in the herd. In addition, fostering the recovery rate of asymptomatic infected cattle can significantly reduce new infections in the herd. Furthermore, augmenting the vaccination rate among susceptible cattle resulted in a notable decrease in disease prevalence within the herd. Findings of this study underscore the remarkable importance of targeted interventions, such as reducing contact rates with asymptomatic infected cattle, increasing recovery rates using proper treatments, and enhancing vaccination efforts to manage leptospirosis transmission in cattle herds.
LANGUAGE OF ORIGINAL DOCUMENT: English

Whittington R.J., Grant T.R., McKercher J., Suann M., Hart K., Handasyde K.A., Macgregor J., Westman M.E., Connolly J.H.
Leptospirosis in the platypus (Ornithorhynchus anatinus) in Australia: who is infecting whom?
(2024) Animals, 14 (19), art. no. 2834
DOI: 10.3390/ani14192834

ABSTRACT: The platypus (Ornithorhynchus anatinus) is an amphibious, egg-laying mammal of high conservation value that is found only in Australia. The zoonotic bacterium Leptospira interrogans serovar Hardjo was discovered in platypuses in prior studies, but little is known about its epidemiology. Samples in the Platypus Serum Bank were tested in 2023 and the results were combined with historical records. Antibodies against L. interrogans serovar Hardjo were found in 50% of 464 serum samples from 411 platypuses collected from 14 river basins in southeastern Australia between 1981 and 2012; prevalence remained high over three decades in the Shoalhaven River population. Seroprevalence increased with age, suggesting environmental exposure. Individual platypuses had persistent titres, some for six years. Seropositive females lactated, juveniles were recruited into the population, and there were no reports of clinical leptospirosis. Three necropsied platypuses were seropositive and had mild nephritis with leptospires in the renal tubules. The high seroprevalence, persistent titres, lack of disease, mild renal lesions, and renal colonisation suggest the platypus may be a maintenance host. Sympatric cattle had L. interrogans serovar Hardjo titres, but the spatial association with seropositive platypuses was statistically weak. Other mammalian wildlife species and sheep also have L. interrogans serovar Hardjo titres; therefore, a complex ecological network must be considered. A landscape-wide study is recommended to properly assess transmission pathways and confirm who is infecting whom.
LANGUAGE OF ORIGINAL DOCUMENT: English

Riabiko E.G., Grechishkina D.I., Baimova R.R., Karmokov I.A., Buts L.V., Khalilov E.S., Lyzenko I.S., Tokarevich N.K.

Assessment of the prevalence of leptospiroses and hemorrhagic fever with renal syndrome in the Leningrad Region [оценка распространенности лептоспирозов и геморрагической лихорадки с почечным синдромом в Ленинградской области]

(2024) Problemy Osobo Opasnykh Infektsii, (3), pp. 163 - 169
DOI: 10.21055/0370-1069-2024-3-163-169

ABSTRACT: The aim of the study was to determine the prevalence of leptospiroses and hemorrhagic fever with renal syndrome (HFRS) among residents of some administrative districts of the Leningrad Region. Materials and methods. 958 blood serum samples of conventionally healthy individuals living in the following territories of the Leningrad Region: Boksitogorsky, Volosovsky, Vyborgsky, Kingiseppsky, Lodeynopolsky, Luzhsky, Podporozhsky, Priozersky, Slantsevsky and Tikhvinsky districts – were analyzed by enzyme immunoassay. The retrospective epidemiological analysis of the incidence of leptospirosis and HFRS in the population of the Leningrad Region in 2011–2020 was carried out based on the data from the Rospotrebnadzor Administration and Forms No. 2 “Information on infectious and parasitic diseases”. Results and discussion. All in all, 54 cases of leptospirosis and 104 cases of HFRS were registered in the Leningrad Region in 2011–2020. The long-term average annual incidence rate (LTAAIR) for leptospirosis was 0.32. In Boksitogorsky, Vyborgsky, Lodeynopolsky, Podporozhsky and Slantsevsky districts, cases of leptospirosis were not recorded, but IgG-antibodies to Leptospira interrogans were detected in residents of those areas. The LTAAIR for HFRS was 0.63. There are no registered cases of HFRS in the Kingiseppsky, Podporozhsky, and Slantsevsky districts. IgG-antibodies to Orthohantavirus were detected in volunteers in all surveyed areas. The detection of specific antibodies in the blood sera of conventionally healthy people living in the Leningrad Region indicates contact of the population with pathogens of leptospirosis and HFRS. The lack of registered morbidity in some

areas is probably due to their hypo-diagnosis, as evidenced by the detection of antibodies to the pathogens of these infections in people living in the corresponding territories.
LANGUAGE OF ORIGINAL DOCUMENT: Russian

Beato-Benítez A., Cano-Terriza D., Gonzálvez M., Pérez-Cobo I., Martínez-Valverde R., Martínez J., Carretero A., Ferreiro-Prado A., Guerra R., Quevedo-Muñoz M.Á., García-Bocanegra I.

Serosurvey of Leptospira spp. in captive non-human primates in Spain

(2024) Preventive Veterinary Medicine, 233, art. no. 106355
DOI: 10.1016/j.prevetmed.2024.106355

ABSTRACT: Leptospirosis is a worldwide zoonotic disease caused by serovars of Leptospira spp. that can infect a wide range of wild and domestic species, highlighting non-human primates (NHPs) as one of the most susceptible taxonomic groups. The aim of the present study was to determine the seroprevalence and potential risk factors associated with exposure to Leptospira spp. in captive NHPs in Spain. Between 2007 and 2021, sera were collected from 258 NHPs in 16 zoos and wildlife rescue centers (WRCs), and tested for antibodies to Leptospira spp. using the modified microagglutination test (MAT). Anti-Leptospira spp. antibodies were detected in 73 (28.3 %) of the 258 NHPs evaluated. Seropositivity was found in 61.0 % (25/41) of the species analyzed and in 87.5 % (14/16) of the sampled centers. Sera seropositive for six different serovars of Leptospira spp. were detected, with L. Grippotyphosa being the most prevalent. Seroprevalence was found to be significantly higher in Hominidae (61.8 %; $P < 0.001$) compared to other NHP families tested. To the author's knowledge, the present study is the largest serosurvey of Leptospira spp. conducted in NHPs in Europe and also reports for the first-time exposure to Leptospira spp. in nine NHP species, expanding the host range for this zoonotic bacterium. Our results indicate high and widespread seropositivity of Leptospira spp. in NHPs kept in captivity in Spain, which may be of conservation and animal health concern. This study supports the need to include captive NHPs in monitoring programs to evaluate the exposure of these species to Leptospira spp. in captive centers.
LANGUAGE OF ORIGINAL DOCUMENT: English

García M.S., Hernández Y.M.D., Moctezuma A.D.L.P., García A.M.T., Marín J.G.P., Cortez A.D.R., Aranda I.E.C.

Relationship between chronic diseases, hair cortisol concentration and welfare of housed dairy goats

(2024) Austral Journal of Veterinary Sciences, 56 (3), art. no. e560302
DOI: 10.4206/ajvs.563.02

ABSTRACT: The aim of this study was to evaluate the relationship between seroprevalence of chronic diseases, hair cortisol concentration (HCC), and welfare of dairy goats housed throughout a productive cycle. Sixty multiparous dairy goats, over four years old, were selected. An animal welfare assessment was conducted using health indicators for goats, according to the AWIN protocol. Blood samples were also collected for haematology and determination of seroprevalence of chronic diseases, hair samples for determination of HCC, milk samples for chemical composition and somatic cell counts, and faecal samples for parasite load. Small Ruminant Lentivirus (SRLv) had a prevalence of 71.66%, Mycobacterium avium subspecies paratuberculosis (MAP) of 5%, Leptospira interrogans of 40% and Ovine Gammaherpesvirus type 2 (OvHV-2) of 50%. The percentages of goats that tested positive for one, two or three diseases were 31.67%, 50% and 11.66% respectively. Haematological alterations included hyperproteinaemia (84.94 ± 1.58 g/L) and

hyperfibrinogenaemia (6.11 ± 0.65 g/L) for those with one or two diseases, with significant differences being found (P < 0.05). The welfare indicators related to health and the number of diseases were poor body condition, poor coat, poor udder conformation, and mucosal lesions (P < 0.05). However, no significant differences were observed between HCC and the number of chronic diseases in dairy goats (P > 0.05). Higher concentrations of cortisol in hair were found at 150 days of lactation (16.65 ± 1.39 pg/mg) compared to the mating season (9.55 ± 0.04 pg/mg) (P < 0.05). No associations were found (P > 0.05) between the production, composition, and somatic cell counts in milk and cortisol concentrations and diseases. It was concluded that the presence of chronic diseases in goats did not influence hair cortisol concentrations, possibly due to an effect of adaptive tolerance to diseases, as occurs in other domestic species; however, there was an effect of the productive stage.
LANGUAGE OF ORIGINAL DOCUMENT: English

Davies H.D., Simonsen K.A.
Leptospira
(2024) Nelson Textbook of Pediatrics: Volume 1-2, pp. 1878 - 1879.e1
Book chapter
DOI: 10.1016/B978-0-323-88305-4.00266-2
LANGUAGE OF ORIGINAL DOCUMENT: English

Suwannin P., Jangpatarapongsa K., Frías I.A.M., Polpanich D., Techakasikornpanich M., Elaissari A., Errachid A.
Development of ultrasensitive genosensor targeting pathogenic Leptospira DNA detection in artificial urine
(2024) Electrochimica Acta, 507, art. no. 145145
DOI: 10.1016/j.electacta.2024.145145
ABSTRACT: In the last decades, to access the stages of leptospirosis pathogenicity, site of infection, progression, monitor disease, and after-treatment were required especially non-invasive techniques. This becomes one of the significant goals for researchers. In this study, we developed a highly sensitive DNA-based electrochemical sensor to detect pathogenic leptospires in urine samples using a gold screen-printed electrode. The gold working electrode was electrodeposited with diazonium salt (CMA) with external carboxylic acid from the surface, and the specific Loa22 single-stranded DNA (ssDNA) probe to Leptospira interrogans was immobilized through a carbodiimide chemical reaction. The modified working electrode was characterized by contact angle measurement, cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS). After that, targeted DNA testing showed the EIS change in the range of 5 ag mL-1 - 16 fg mL-1 with a correlation R2 of 0.9638. The high sensitivity electrochemical sensor indicated a lower limit of detection to the attomolar level specifically 5 ag mL-1. Additionally, the developed genosensor exhibited high specificity without crossing other bacteria present in urine such as Escherichia coli, Staphylococcus aureus, and S. typhi as well as non-pathogenic leptospires L. biflexa serovar Patoc. Leptospires DNA was analyzed in both buffer solution and diluted artificial urine and detection in diluted artificial urine 1:1,000 was possible despite salt interferences. This study provides a highly sensitive lower detection platform for leptospirosis, offering potential for further development as a portable and point-of-care testing tool.
LANGUAGE OF ORIGINAL DOCUMENT: English

Naderi M., Sofiani V.H., Hoseinpour R., Alborzi A.M., Soltani S.A.

Study on seroprevalence and leptospiral antibody distribution among livestock breeders and farmers in Golestan province

(2024) Veterinary Medicine and Science, 10 (6), art. no. e70065

DOI: 10.1002/vms3.70065

ABSTRACT: Background: The high prevalence of leptospirosis in humans is of great public health concern, particularly in tropical and subtropical regions. Objective: This study aimed to determine the seroprevalence of leptospiral antibodies and the distribution of serovars in livestock breeders and farmers in Golestan province. Methods: Seventy samples of serum collected from farmers and ranchers suspected of leptospirosis were examined using an ELISA method for surveying Immunoglobulin M (IgM) anti-Leptospira. Also, from samples, DNA was extracted and PCR was performed using by primers for 16s rRNA. Demographic properties of positive patients were analysed. Results: Chi-square statistical test shows a statistically significant difference between the gender and prevalence leptospirosis (p-value = 0.004). Also, by examining the age, it was shown that 68.57% of patients are in the middleaged rang. According to the results obtained from the study and investigation of blood serum IgM-and Immunoglobulin G (IgG) in people suspected of leptospirosis, 3 cases of the patients had IgM higher than 11 and were known to be positive for leptospirosis. Also, by examining the IgG level of patients, 5 cases had intermediate results, and 2 cases were found to be positive for IgG. The PCR results showed that 41.42% of patients tested positive for the 16s rRNA. Conclusion: Leptospirosis is a common disease among farmers, and in Golestan province, considering traditional farming methods, it is considered an important infectious disease. Therefore, health and safety measures should be expanded to control and prevent this disease. Also, by employing mechanised agricultural methods, the prevalence of leptospirosis in this region can be significantly reduced.

LANGUAGE OF ORIGINAL DOCUMENT: English

Aymée L., Reis L., Soares A.C., de Souza G.N., Lilenbaum W.

Detecting Leptospira spp. infection in cows by PCR: what is the best sample to test?

(2025) Theriogenology, 231, pp. 154 - 159

DOI: 10.1016/j.theriogenology.2024.10.020

ABSTRACT: Bovine leptospirosis is a major reproductive disease. As cows can be leptospiral carriers both on the renal and genital tract, diagnosis can be challenging, with an underlying risk of misdiagnosis. Traditionally, the infection has been diagnosed by culturing or PCR from urine samples. Nevertheless, recent studies have suggested testing genital samples rather than urine, particularly for the diagnosis of genital colonization and reproductive disorders. The present study aimed to compare urine versus genital samples to detect leptospiral carriers in naturally infected cows with poor reproductive performance under field conditions. Five herds presenting >20 % of seroreactive animals against the Sejroe serogroup were selected. Of these, 106 cows with poor reproductive performance were studied, and urine, uterine fragment (UF), and cervicovaginal mucus (CVM) were obtained and tested by lipL32-PCR. A total of 73 (68.9 %) cows were infected; 64 of which (87.7 %) were diagnosed via positive genital samples (UF and/or CVM), while only 14 (19.2 %) by urine ($p \leq 0.001$). Therefore, if the study had been limited to urine samples, as largely recommended, less than 20 % of the infected cows would have been detected, representing a huge misdiagnosis of the disease that could undermine the efficacy of control programs. In this context, the present study reinforces prior findings that testing genital samples, particularly CVM, is crucial to effectively diagnosing infected subfertile cows.

LANGUAGE OF ORIGINAL DOCUMENT: English

Mummah R.O., Gomez A.C.R., Guglielmino A.H., Borremans B., Galloway R.L., Prager K.C., Lloyd-Smith J.O.
Navigating cross-reactivity and host species effects in a serological assay: a case study of the microscopic agglutination test for Leptospira serology
(2024) PLoS neglected tropical diseases, 18 (10), pp. e0012042
DOI: 10.1371/journal.pntd.0012042
ABSTRACT: BACKGROUND: Serology (the detection of antibodies formed by the host against an infecting pathogen) is frequently used to assess current infections and past exposure to specific pathogens. However, the presence of cross-reactivity among host antibodies in serological data makes it challenging to interpret the patterns and draw reliable conclusions about the infecting pathogen or strain. METHODOLOGY/PRINCIPAL FINDINGS: In our study, we use microscopic agglutination test (MAT) serological data from three host species [California sea lion (Zalophus californianus), island fox (Urocyon littoralis), and island spotted skunk (Spilogale gracilis)] with confirmed infections to assess differences in cross-reactivity by host species and diagnostic laboratory. All host species are known to be infected with the same serovar of Leptospira interrogans. We find that absolute and relative antibody titer magnitudes vary systematically across host species and diagnostic laboratories. Despite being infected by the same Leptospira serovar, three host species exhibit different cross-reactivity profiles to a 5-serovar diagnostic panel. We also observe that the cross-reactive antibody titer against a non-infecting serovar can remain detectable after the antibody titer against the infecting serovar declines below detectable levels. CONCLUSIONS/SIGNIFICANCE: Cross-reactivity in serological data makes interpretation difficult and can lead to common pitfalls. Our results show that the highest antibody titer is not a reliable indicator of infecting serovar and highlight an intriguing role of host species in shaping reactivity patterns. On the other side, seronegativity against a given serovar does not rule out that serovar as the cause of infection. We show that titer magnitudes can be influenced by both host species and diagnostic laboratory, indicating that efforts to interpret absolute titers (e.g., as indicators of recent infection) must be calibrated to the system under study. Thus, we implore scientists and health officials using serological data for surveillance to interpret the data with caution. Copyright: This is an open access article, free of all copyright, and may be freely reproduced, distributed, transmitted, modified, built upon, or otherwise used by anyone for any lawful purpose. The work is made available under the Creative Commons CC0 public domain dedication.
LANGUAGE OF ORIGINAL DOCUMENT: English

Timurkan M.O., Guven E., Cengiz S., Aydın H., Kirman R., Avcioglu H.
Investigation of viral, bacterial and parasitic zoonotic diseases in rodents in Turkey
(2024) Veterinary Medicine and Science, 10 (6), art. no. e70068
DOI: 10.1002/vms3.70068
ABSTRACT: Background: Rodents are reservoir hosts for zoonotic pathogens that cause tropical diseases, many of which have been overlooked. Objectives: The aim of this study was to investigate the presence of viral lymphocytic choriomeningitis and hantavirus infections, bacterial tularaemia and leptospirosis, and parasitic leishmaniasis and toxoplasmosis in rodents that are likely to carry and spread zoonotic agents, by using molecular methods. Methods: A total of 498 voles collected from 20 counties of Erzurum province. Conventional PCR was used for pathogen search. PCR-positive samples were subjected to sequence analysis. Results: Hantavirus (4.8%, 24/498) and tularaemia (0.8%, 4/498) positivity were detected. However,

no positivity was detected for other selected pathogens. Conclusions: Rodents, which are pathogen carriers and potential risk factors, are thought to may act as reservoirs for hantavirus and tularaemia in the study area. A preliminary study has been carried out at the point of detection of these diseases of global importance. The extent of the distribution of the infections, alternative hosts and the consequences of human exposure needs to be clarified through further studies.
LANGUAGE OF ORIGINAL DOCUMENT: English

Zamri M.I.M., Shafie N.J., Ali M.R.M., Awoniyi A.M., Argibay H.D., Costa F.

Socio-environmental factors associated with small mammal assemblage and Leptospira prevalence in suburban areas of Terengganu, Malaysia

(2024) Asian Pacific Journal of Tropical Medicine, 17 (9), pp. 400 - 407
DOI: 10.4103/apjtm.apjtm_931_23
ABSTRACT: Objective: To examine the socio-environmental factors associated with the assemblage of small mammals and the prevalence of Leptospira pathogen in poor suburban communities of Terengganu, Malaysia. Methods: We trapped small mammals from 119 trapping points scattered around three suburban communities of Terengganu using sausage-baited live traps. On the average, we set up five traps for three nights at each sampling point during the trapping period. Kidneys of captured animals were harvested and processed for Leptospira investigation. Additionally, environmental survey was conducted at each trapping point to obtain information about possible variables supporting small mammal assemblage. We used a generalized linear model to evaluate the effect of different socio-environmental variables on small mammals' assemblage. Results: A total of 89 small mammals, specifically, Rattus norvegicus (n=39), Rattus rattus (n=27), Rattus exulans (n=10), Suncus murinus (n=11), and Tupaia glis (n=2) were captured from 1 385 trap nights. Fourteen individuals (15.7%) of the captured animals tested positive for Leptospira bacteria using PCR detection. Results of our generalized linear model showed only residences bordering vacant lots as the variable positively associated with small mammal occurrence in the three study sites. Conclusions: Small mammal community, especially the often neglected species, could harbour and potentially contribute towards pathogenic Leptospira maintenance in the study sites. To adequately control small mammals' population and subsequent human zoonoses transmission, it is critical to advocate and promote appropriate infrastructure and suburban services, together with good hygiene practices that can reduce the animals' access to food and harborage.
LANGUAGE OF ORIGINAL DOCUMENT: English

Chen X., Xie X., Sun N., Liu X., Liu J., Zhang W., Cao Y.

Gut microbiota-derived butyrate improved acute leptospirosis in hamster via promoting macrophage ROS mediated by HDAC3 inhibition

(2024) mBio, 15 (10), pp. e0190624
DOI: 10.1128/mbio.01906-24
ABSTRACT: Leptospirosis is a re-emerging worldwide zoonotic disease. Infected patients and animals often exhibit intestinal symptoms. Mounting evidence suggests that host immune responses to bacterial infection are closely associated with intestinal homeostasis. Our previous research has shown that the gut microbiota can protect the host from acute leptospirosis, while the specific bacterial metabolic mediators participating in the pathogenesis remain to be identified. Short-chain fatty acids (SCFAs) are metabolites produced mainly by the gut microbiota that play a role in immune regulation. However, whether SCFAs are the key to protecting

the host against leptospirosis and the underlying regulatory mechanisms are unknown. In this study, our results showed that the SCFA butyrate is involved in ameliorating leptospirosis. The depletion of SCFAs by antibiotic cocktail treatment reduced survival time after Leptospira infection while supplementation with butyrate but not acetate or propionate significantly amelioration of leptospirosis. In vitro experiments showed that butyrate treatment enhanced the intracellular bactericidal activity mediated by reactive oxygen species (ROS) production. Mechanistically, butyrate functions as a histone deacetylase 3 inhibitor (HDAC3i) to promote ROS production via monocarboxylate transporter (MCT). The protection of butyrate against acute leptospirosis mediated by ROS was also proven in vivo. Collectively, our data provide evidence that the butyrate-MCT-HDAC3i-ROS signaling axis is a potential therapeutic target for acute leptospirosis. Our work not only interprets the microbial metabolite signaling involved in transkingdom interactions between the host and gut microbiota but also provides a possible target for developing a prevention strategy for acute leptospirosis. IMPORTANCE: Leptospirosis is a worldwide zoonotic disease caused by Leptospira. An estimated 1 million people are infected with leptospirosis each year. Studies have shown that healthy gut microbiota can protect the host against leptospirosis but the mechanism is not clear. This work elucidated the mechanism of gut microbiota protecting the host against acute leptospirosis. Here, we find that butyrate, a metabolite of gut microbiota, can improve the survival rate of hamsters with leptospirosis by promoting the bactericidal activity of macrophages. Mechanistically, butyrate upregulates reactive oxygen species (ROS) levels after macrophage infection with Leptospira by inhibiting HDAC3. This work confirms the therapeutic potential of butyrate in preventing acute leptospirosis and provides evidence for the benefits of the macrophage-HDAC3i-ROS axis.
LANGUAGE OF ORIGINAL DOCUMENT: English

Trankvilevsky D.V., Skudareva O.N., Igonina E.P., Kiseleva E.Yu., Korzun V.M., Verzhutskaya Yu.A., Noskov A.K., Kulikalova E.S., Breneva N.V., Budaeva S.E., Morozova I.V., Trishina A.V.

Analysis of the epizootic and epidemiological situation on Leptospirosis in 2023 and forecast for 2024 in the Russian Federation [анализ эпизоотолого-эпидемиологической ситуации по лептоспирозам в 2023 г. и прогноз на 2024 г. в российской Федерации]

(2024) Problemy Osobo Opasnykh Infektsii, (3), pp. 51 - 62
DOI: 10.21055/0370-1069-2024-3-51-62

ABSTRACT: The aim of the work was to analyze the epizootic and epidemiological situation on leptospirosis in the territory of the Russian Federation in 2023 and to forecast its development for 2024. In the period between 2000 and 2023, the long-term dynamics of morbidity in Russia tended to decrease. Leptospirosis incidence was mainly sporadic. In 2023, cases of this infection in humans were reported in all federal districts, with the exception of the North Caucasian one. The highest incidence rates were recorded in the Southern and Central Federal Districts. The results of testing material from small mammals using bacteriological, immunological and molecular-biological methods confirmed the circulation of pathogenic Leptospira in 50 constituent entities of the Russian Federation in all federal districts. Specific prevention measures were carried out: 20,114 people were vaccinated in 27 entities. The probability of human infection is higher in the territories of the Southern, Central, Northwestern, Volga and Ural Federal Districts. Imported cases of infection from regions with subequatorial and equatorial climates, which are actively visited by tourists, are not excluded.
LANGUAGE OF ORIGINAL DOCUMENT: Russian

Ke L., Hou G., Cao P., Ding Y., Zhao C., Wang F., Liu Y., Fan Y., Liu Q.

Establishment and validation of a real-time fluorescent PCR freeze-dried type assay for 11 sheep and goats pathogens

(2024) Veterinary Journal, 308, art. no. 106255

DOI: 10.1016/j.tvjl.2024.106255

ABSTRACT: Small ruminants are economic mainstay in developing countries because of its direct contribution to food security, but the occurrence of epidemics poses a continuous threat. Early diagnosis can strengthen the prevention of zoonosis. Therefore, a high-sensitivity real-time fluorescent PCR freeze-dried type assay that can be stored and transported at room temperature was developed for 11 sheep and goats pathogens in this study. The results showed that there was no non-specific amplification in systems containing different pathogen positive controls; The areas under the ROC curves were all in the range of 0.99–1.00; The LOD counted by Digital PCR were 194, 96, 84, 40, 265, 68, 208, 236, 118, 53 and 723 copies/mL for M. ovis, Pathogenic Leptospira, C. burnetii, BTV, PPRV, Brucella, exJSRV, C. abortus, ORFV, FMDV and CPV, respectively. The coefficients of variation of both intra-group and inter-group replicate tests were less than 5.00 %; The accelerated thermostatic lyophilization test was used to predict the validity period; The LOD of each positive pathogen was still detected after 6 days at 56 ℃, suggesting that the validity period can be at least 567 days at room temperature. In this study, a high-sensitivity real-time fluorescent PCR freeze-dried type assay that can be stored and transported at room temperature was developed for 11 sheep and goats pathogens, which were Mycoplasma ovis (M. ovis), Pathogenic Leptospira, Coxiella burnetii (C. burnetii), Bluetongue virus (BTV), Peste des pestis ruminants virus (PPRV), Brucella, exogenous jaagsiekte sheep retrovirus (exJSRV), Chlamydia abortus (C. abortus), Orf virus (ORFV), Foot-and-mouth disease virus (FMDV), and Capripox virus (CPV).

LANGUAGE OF ORIGINAL DOCUMENT: English