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Bakhshandeh N., Tebianian M., Khaki P., Esmaelizad M., Saadatmand S.

Design, Development and Immunogenic Evaluation of a Novel Lipl32 Recombinant Protein of Local Pathogenic Leptospira Serovars

(2025) Archives of Razi Institute, 80 (1), pp. 103 - 115

DOI: 10.32592/ARI.2025.80.1.103

ABSTRACT: Leptospirosis, a significant yet often overlooked zoonotic disease, is distributed worldwide, particularly in tropical and subtropical regions. The manifestation of its symptoms can be deceptive, often leading to misdiagnosis due to its resemblance to other infectious diseases. The development of rapid diagnostic tests and the identification of potential vaccine candidates for leptospirosis pose significant challenges. Surface-exposed antigens, found on the outer layer of Leptospira, likely contribute to the initial interactions between the host and the pathogen.Lipl32 is highly conserved and exclusively produced by pathogenic Leptospires, and it plays a significant role in a prominent immunogen in leptospirosis. The objective of this study is to establish the optimal conditions for the expression and purification of the rLipl32 protein of Iranian pathogenic leptospira and to assess its ability to stimulate cellular and humoral immune responses. A comprehensive analysis of all Lipl32 protein sequences was conducted using the NCBI database. The codon sequences of serovars were designed and synthesized, and one local dominant Lipl32 pattern was selected after optimization. The construct was sub-cloned into a pET32a+ vector with His-tag and Trx, then transformed into E. coli (BL21) for expression using IPTG. Subsequent purification and confirmation by immune blotting were then performed. BALB/c mice (4-6 weeks old) were vaccinated with three doses containing 50 mg of rLipl32, with a 14-day interval, and compared with controls. The humoral immune response and the cytokine profile were evaluated using an indirect sandwich ELISA test. The results demonstrated that the rLipl32 protein exhibited elevated levels of expression in the presence of 0.5 mM IPTG following a 16-hour incubation period at 22°C. The optimal conditions for the Ni-NTA pull-down process entailed a one-hour binding period at 37°C, followed by five washing steps and the use of an elution buffer with a pH of 7.4 and a 0.3 mM concentration of imidazole. This process successfully purified the rLipl32 protein in soluble form. The administration of rLipl32 resulted in elevated total antibody titers ($p<0.05$) and a significant increase in cytokine levels ($p<0.05$). Consequently, rLipl32 was found to potently stimulate specific humoral and cellular immune responses. It has been proposed that this agent could be further utilized for immune dominant Lipl32-based diagnosis and has potential as a subunit vaccine.

LANGUAGE OF ORIGINAL DOCUMENT: English

Chinchilla D., Sánchez I., Montero D., Picardeau M., Gutiérrez R.

In-house isolation protocol from human serum samples demonstrates the circulating of a broad diversity of Leptospira serogroups in Costa Rica

(2025) Scientific Reports, 15 (1), art. no. 9614

DOI: 10.1038/s41598-025-93301-0

ABSTRACT: The isolation of pathogenic Leptospira is fundamental for a comprehensive characterization of circulating strains in endemic regions. Unfortunately, culture methods of Leptospira spp. are laborious and challenging. Here, we present a method for the isolation of these pathogenic bacteria from non-fresh serum samples, previously stored at 4–8 °C for several days. Briefly, 730 serum samples collected from leptospirosis-suspected patients (presenting acute signs) were screened for Leptospira DNA by real-time PCR. Thirty-one PCR-positive sera were then assessed for Leptospira isolation on specialized media for up to 6 months. Using

this methodology, 11 Leptospira isolates were obtained, resulting in an isolation rate of 35.4% (11/31). Through whole-genome analysis, ten strains were identified as Leptospira santarosai and one strain as Leptospira borgpertersenii. The isolates were classified into six different serogroups, namely Hebdomadis, Shermani, Tarassovi, Pyrogenes, Ballum, and Grippotyphosa, demonstrating a wide diversity of Leptospira strains circulating in Costa Rica. This study reveals that serum is a suitable sample for Leptospira isolation in patients with positive PCR results, even after maintenance at cold conditions, promoting the use of serum for Leptospira isolation in reference laboratories around the world.
LANGUAGE OF ORIGINAL DOCUMENT: English

Sandoval K.L., Cada K.J.S., Dimasin R.V.D., Labana R.V.

A One Health approach to the prevention, control, and management of leptospirosis: a scoping review

(2025) Discover public health, 22 (1), art. no. 108
DOI: 10.1186/s12982-025-00489-7
ABSTRACT: Leptospirosis is a significant zoonotic disease that poses a global public health challenge, particularly in warm, humid regions. The aim of this review paper is to critically synthesize existing literature on interventions for leptospirosis at the interfaces of humans, animals, and the environment. It also emphasizes the importance of interdisciplinary collaboration and integrated approaches to effectively address the complex challenges posed by this infectious disease. The authors conducted a systematic scoping review following the PRISMA-ScR guidelines and analyzed 344 studies that met the inclusion criteria. The paper highlights advancements in diagnostic techniques, treatment, and vaccine development. It also emphasizes the significance of health governance frameworks that support risk communication, surveillance, policy development, and community engagement. Various health interventions related to each interface are discussed, and the paper concludes with a discussion regarding One Health approach to interventions, which highlights the key targets, including pathogen characteristics and transmission. This paper proposes a framework for leptospirosis interventions across the human-animal-environment interfaces, which may serve as a guide for policymakers and scientists in understanding the gaps and less explored aspects of intervening in leptospirosis.
LANGUAGE OF ORIGINAL DOCUMENT: English

Manyama G.G., Mlowe G.D., Lupindu A.M., Katakweba A.S.

Detection and determinants of leptospira infection in rodents, cattle, and humans in Muheza District, Tanzania: a call for One Health approach

(2025) Public Health Challenges, 4 (1), art. no. e70043
DOI: 10.1002/puh2.70043
ABSTRACT: Interaction among humans, livestock, and wildlife plays an important role in zoonotic disease transmission. The emergence of Leptospira in humans, rodents, and cattle remains relatively understudied. A cross-sectional study was conducted between February and May 2023 in Muheza to determine evidence of Leptospira infection and associated factors in rodents, cattle, and humans. A total of 479 serum samples from rodents (n = 201), humans (n = 198), and cattle (n = 80) were examined by microscopic agglutination test (MAT) to detect antibodies against 6 live Leptospira stock culture serovars, including Pomona, Hebdomadis, Canicola, Grippotyphosa, Sokoine, and Lora. Additionally, a questionnaire survey was conducted on 140 respondents to determine factors that are associated with Leptospira seropositivity. Descriptive statistics and Chi-square test were used to analyze the data. The overall Leptospira seroprevalence in rodents, cattle, and

humans was 6.0% (12/201; 95% CI: 3.12%–10.20%), 12.5% (10/80; 95% CI: 6.16%–21.79%), and 13.1% (26/198; 95% CI: 8.76%–18.65%), respectively, and the most predominant serovars were Grippotyphosa, Sokoine, and Hebdomadis. A significant difference in the seroprevalence was observed in occupation, whereby farmers were more likely to be infected with Leptospira than those in other occupations ($\chi 2 = 9.19$, $df = 3$, $p = 0.027$). This study showed co-agglutination among rodents, cattle, and humans with serovars Hebdomadis, Sokoine, and Grippotyphosa. People aged 36–59 had the highest seropositivity, suggesting they are the most at-risk group. This study shed light on pathogenic serovars circulating among humans, rodents, and cattle and factors associated with seropositivity. The findings appeal for multisectoral One Health approach for effective control of Leptospira infection and other zoonotic diseases.
LANGUAGE OF ORIGINAL DOCUMENT: English

Nunes D.O., Fehlberg H.F., Carneiro L.O., Oliveira K.M.M., Bovendorp R.S., Ribeiro C.M., Albuquerque G.R., Oliveira T.M.F.D.S., Sevá A.D.P.

Synanthropic rodents as bioindicator of human pathogens in a tourist area of Brazil

(2025) EcoHealth, 22 (1), pp. 55 - 68

DOI: 10.1007/s10393-024-01697-4

ABSTRACT: The black rat Rattus rattus is an exotic and synanthropic rodent prominent in Brazil and with high adaptation to urban areas. The species have an omnivorous diet feed on human food resources, potentially becoming infected and spreading infectious agents that cause zoonoses such as leptospirosis, leishmaniosis, Chagas disease, and toxoplasmosis, which are significant public health concerns in the country. We analyzed the epidemiologic profile of R. rattus infected with these agents using molecular diagnostics in the Olivença district, known for its tourism potential, in Ilhéus, Bahia, Brazil. Of 140 animals, the prevalence rates were 30.0% (42) for Leptospira spp., 3.57% (5) for Leishmania spp., and 0.71% (1) for both Trypanosoma cruzi and Toxoplasma gondii. One animal was co-infected with Leptospira interrogans and T. gondii and another with Leptospira spp. and L. (L.) infantum. The high prevalence of Leptospira spp.-infected animals suggests rodents may be a significant infection source for local hosts, as L. interrogans is most common in rodents and humans. Rodents likely become infected through ingestion or contact with contaminated water bodies or food, particularly for Leptospira spp. and T. gondii. It is worth noting that the studied area has beach, high foot traffic, and popular tourist restaurants, which implies the presence of food waste and litter in the environment. This study found synanthropic rodents infected with significant zoonotic agents, indicating their presence in the environment. These agents may not impact the rodent population but can cause serious diseases in humans and other domestic and wild animal species.
LANGUAGE OF ORIGINAL DOCUMENT: English

De La Maza L.M.

Leptospira, Borrelia, Treponema, and Brachyspira

(2024) Color Atlas of Medical Bacteriology, Third Edition, pp. 281 - 289

DOI: 10.1128/9781683671077_35

ABSTRACT: Based on 16S rRNA sequence analyses, spirochetes consist of five clusters: Treponema, Spirochaeta, Borrelia, Leptospira, and Brachyspira. Leptospira infection is thought to be the most widespread zoonosis worldwide, accounting for more than a million cases per year, including 100 reported in the United States, particularly in Hawaii. Leptospira may be free living or live in association with animals, in particular

dogs, rats, and other rodents. Specimens including blood, CSF, and urine can be cultured by using serum-containing semisolid media, such as Fletcher's, Stuart's, Ellinghausen, or PLM-5. Addition of neomycin or 5-fluorouracil to the medium helps to reduce contamination from the normal bacterial microbiota. The genus Borrelia is divided into two groups, with significant overlap of their genetic and phenotypic characteristics: relapsing fever Borrelia and Lyme Borrelia.
LANGUAGE OF ORIGINAL DOCUMENT: English

Salajegheh Tazerji S., Magalhães Duarte P., Gharieb R., Szarpak L., Pruc M., Rahman M.T., J. Rodriguez-Morales A., Furqan Ilyas M., Santos Ferreira M.D.N., Singh Malik Y., Kalantari R., Shahrokhabadi A., Jafari N., Shahabinejad F., Maleki Y., Montajeb S., Mehrpouya R., Ahmadi H., Vazir B., Kabir F., Rehman A., Elmi Z., Hajipour P., El-Seedi H.R., Eisenreich W., Shehata A.A.

Migratory wave due to conflicts: risk of increased infection from zoonotic diseases

(2025) Transboundary and Emerging Diseases, 2025 (1), art. no. 5571316
DOI: 10.1155/tbed/5571316
ABSTRACT: Wars have devastating effects on all the components of the One Health approach: humans, animals, and ecosystems. Wars and the resulting migratory waves massively disrupt normal animal health services and surveillance. Among other consequences, they adversely impact the early detection, prevention, and control of animal diseases. Uncontrolled movement of animals or their undisposed carcasses, the destruction of wildlife habitats, and the increased interface between humans, wildlife, and domestic animals contribute to uncontrolled transmission and spread of zoonotic pathogens from animals to humans. In the last millennium, zoonotic diseases such as the “Black Death” were triggered by devastating wars and led to the deaths of a large fraction of the human population. However, also recent and ongoing wars carry the risk of an uncontrollable increase in zoonotic diseases. The most significant zoonotic diseases reported during the recent wars are African swine fever, highly pathogenic avian influenza, rabies, leptospirosis, and brucellosis, as well as foodborne and waterborne zoonotic diseases. Indeed, alarming rates of infections by antimicrobial-resistant pathogens such as Mycobacterium tuberculosis go along with wars, as seen in the current Ukraine–Russia conflict. Considering human migration, foodborne and waterborne zoonotic diseases are key health threats for refugees due to the consumption of unsafe food, lack of safe water, and disruption of the water supply and sanitation system. This review summarizes the potential factors and some data associated with the increased risk of zoonotic disease emergence and transmission during recent and ongoing conflicts.
LANGUAGE OF ORIGINAL DOCUMENT: English

Saravanan V., Chinnathambi R., Rihan F.A.

Modeling and controlling leptospirosis transmission in humans and rodents

(2025) Journal of Mathematics and Computer Science, 39 (1), pp. 30 - 49
DOI: 10.22436/jmcs.039.01.03
ABSTRACT: Leptospirosis is a commonly undiagnosed and under-reported bacterial disease that affects both animals and humans. Studies suggest that the risk of infection varies based on individuals’ occupations and living environments. This study employs a mathematical model that assesses the impact of rodent-borne diseases on human populations. A disease-causing agent in the environment can lead to human infection. Additionally, humans can become infected by interacting with infected rodents. The purpose of this paper is to construct a SIR (human)-SI (rodent) model of bacterial populations with Holling type II functional responses,

as well as chemical disinfectants. Infection-free and endemic steady states are examined for positivity, boundedness of solutions, and stability. The disease transmission is reduced through non-pharmaceutical interventions as well as the infected rodent populations are controlled by integrated pest management. Using sensitivity analysis, we evaluate the effect of parameters' uncertainty. We study the optimal conditions to reduce bacterial density in the environment by considering control variables as chemical disinfectants and treatment functions. Numerical simulations confirm the theoretical findings.
LANGUAGE OF ORIGINAL DOCUMENT: English

Stose L.L.
Leptospirosis
(2025) The One Health Model as Applied to Zoonotic Diseases, pp. 132 - 138
DOI: 10.1002/9781119985853.ch4.7
ABSTRACT: Leptospirosis is a zoonotic disease that is found worldwide and can infect most mammals. Disease severity depends on the serovar of Leptospira causing infection. Leptospirosis can cause a wide range of clinical symptoms, from subclinical disease to severe infections, which may prove fatal. Equine leptospirosis begins with bacteria infecting the mucous membranes and leading to infection in the blood-stream. Once in the bloodstream, infection is spread to the kidneys, placenta, fetus if pregnant, and the eye. Leptospirosis in humans can have a wide clinical presentation, from subclinical to severe, and can potentially be fatal. If left untreated, leptospirosis can cause kidney damage, meningitis, liver failure, respiratory disease, and death. Current canine leptospirosis vaccines in the United States protect against four serovars, including Canicola, Icterohaemorrhagiae, Grippotyphosa, and Pomona. Under the proper conditions, Leptospira can survive in the environment for weeks to months, and carriers of infection can shed organisms for months to years.
LANGUAGE OF ORIGINAL DOCUMENT: English

Sethi A., Kumar T.P., Vinod K.S., Boodman C., Bhat R., Ravindra P., Chaudhuri S., Shetty S., Shashidhar V., Prabhu A.R., Gupta N.
Kidney involvement in leptospirosis: a systematic review and meta-analysis
(2025) Infection
DOI: 10.1007/s15010-025-02492-1
ABSTRACT: Introduction: From a public health perspective, it is essential to understand the burden of kidney involvement in leptospirosis. We aimed to assess the frequency of acute kidney injury (AKI) and chronic kidney disease (CKD) in patients with leptospirosis. Methodology: This systematic review and meta-analysis included all articles up to 14.08.2024 from three databases (PubMed, Scopus, Web of Science) using search terms related to leptospirosis and kidney involvement. After de-duplication, two independent reviewers independently checked the articles in two phases (title-abstract and full-text), and a third reviewer adjudicated any conflicts. Patient demographics, diagnostic procedures, and details of kidney involvement were extracted from the included studies. Risk of bias analysis was done using the Joanna Briggs Institute critical appraisal tool. A random effects model estimated the pooled rates for AKI, oliguria, and the need for dialysis. Results: Of the 5913 retrieved articles, 48 met the eligibility criteria. The pooled incidence of AKI, reduced urine output, and dialysis requirement was 49.2% (95%CI: 38.2-60.2%, I2 of 99.4%), 31.5% (95%CI: 24.2-38.7%, I2-96.1%) and 14.4% (95%CI: 10.3-18.4%, I2-97%) respectively. The pooled mean serum creatinine and urea levels at admission were 3.6 mg/dl (95% CI: 2.9–4.2, I2-99.1%) and 131.8 mg/dl (95% CI: 98.7-164.9, I2-98.6%), respectively. In four studies, the

incidence of new-onset CKD after leptospirosis infection varied from 13 to 62%. Conclusion: AKI reduced urine output and the requirement for dialysis are frequent complications in patients with leptospirosis. Increased resources for their management in endemic areas are essential to mitigate the burden.
LANGUAGE OF ORIGINAL DOCUMENT: English

Muñoz-Hernández C., Huertas-López A., Sukhumavasi W., Gonzálvez M.
Sewer-associated rodents in countries with lower human development, a time-bomb for zoonoses?
(2025) Research in Veterinary Science, 188, art. no. 105614
DOI: 10.1016/j.rvsc.2025.105614
ABSTRACT: Sewer-associated rodents inhabiting urban and peri-urban areas constitute a potential infection source for many zoonotic pathogens at a global scale. However, there is a lack of scientific information about the implications of these micromammals in regions with fragile sanitary services, low economic resources and weak educational systems. Consequently, this study aimed to review the scientific knowledge about rodent-borne zoonoses in sewer-related environments from countries with lower Human Development Index (HDI). Our results revealed a low number of publications (n = 13) evaluating the epidemiology of sewer-associated rodents in countries with lower HDI, which were distributed across Central/South America (69.2 %; 9/13), Africa (23.1 %; 3/13) and Asia (7.7 %; 1/13). The most evaluated rodents were Rattus norvegicus -brown rat- (present in 10/13 articles), followed by Rattus rattus -black rat- (6/13) and Mus musculus -house mouse- (5/13). Fourteen zoonotic pathogens were assessed, specifically bacteria (n = 6 publications) and parasites (n = 7), with the highest prevalence described for Bartonella spp. (85.0 %), Calodium hepaticum (83.8 %), Rickettsia spp. (75.0 %), Leptospira spp. (68.0 %) and Hymenolepis nana (60.0 %). Most reviewed publications described the use of molecular methods and direct examination of samples to identify the pathogens studied (46.2 %; 6/13 each), followed by the MALDI-TOF technique (15.4 %; 2/13). The four clusters building the semantic network reinforced the pivotal role of sewer-associated rodents as reservoirs of both vector-borne pathogens and directly transmitted zoonoses. Our findings evidence a severe gap of knowledge in lower-resource areas about the role of sewer-associated rodents in the epidemiology of zoonotic diseases, which could impact on the sanitary system of not only the evaluated countries, but also in other developed and non-developed regions worldwide.
LANGUAGE OF ORIGINAL DOCUMENT: English

Antima, Banerjee S.
Understanding the dynamics and drivers of leptospirosis in tropical and subtropical regions: a mathematical and epidemiological approach
(2025) Nonlinear Dynamics, 113 (9), pp. 10705 - 10727
DOI: 10.1007/s11071-024-10767-9
ABSTRACT: Leptospirosis, a neglected tropical zoonotic disease of emerging concern, poses a significant public health threat, particularly in regions vulnerable to heavy rainfall and flooding. This study investigates the dynamics of leptospirosis by employing a comprehensive mathematical model incorporating the temperature-dependent square root growth rate of Leptospira, the causative bacteria. Delving into intricate transmission dynamics, we conduct a stability analysis, identify transcritical bifurcation, and estimate parameters, including the sensitivity index of the reproduction number. Numerical results demonstrate the theoretical results, underscoring the substantial influence of rainfall, climate, and agriculture on leptospirosis prevalence in tropical India, with specific predictions for cases in Kerala and Ratnagiri. In conclusion, our study urges urgent preventive measures,

including enhanced surveillance, impactful awareness campaigns, targeted interventions, and improved hygiene practices, which are necessary to curb leptospirosis and improve public health in India.
LANGUAGE OF ORIGINAL DOCUMENT: English

Sato Y., Hiyajo Y., Tengan T., Yoshida T., Uchima Y., Tokeshi M., Tsurui-Sato K., Toma C.
DNA metabarcoding analysis revealed a silent prevalence of environmental pathogenic Leptospira in urban area of Okinawa Island, Japan
(2025) One Health, 20, art. no. 101016
DOI: 10.1016/j.onehlt.2025.101016
ABSTRACT: Objective: Human activities, such as agriculture, environmental manipulation, and city development, have impacted the distribution of flora, fauna, and microbes (including potential human pathogens) at the global level. This study focused on the bacterial genus Leptospira, an organism causing leptospirosis that is prevalent in tropical and subtropical regions. We hypothesized that although only a few cases of leptospirosis have been reported in the urban region of main island of Okinawa Prefecture (Okinawa Island, OKI), Japan, Leptospira is present in these regions. Methods: Thirty-four samples were collected from rivers in urban OKI and rural Ishigaki Island (ISG) and analyzed to determine the distribution of Leptospira and mammals using environmental DNA (eDNA) metabarcoding. High-throughput sequencing analysis was performed to sequence the polymerase chain reaction products of partial leptospiral 16S rRNA and vertebrate mitochondrial 12S rRNA genes from 16 and 18 river samples of OKI and ISG, respectively, including the waters collected from Leptospira-endemic areas in ISG. Results: Leptospira noguchii and L. interrogans-related, two Leptospira species of the P1+ clade that are pathogenic to humans and mammals, were repeatedly detected in OKI and ISG, supporting our hypothesis. The sequence numbers of the five Leptospira species of P1– and P2 clades showed significant correlations with those of cattle (Bos taurus) in OKI; however, the potential host animals for P1+ species remain unclear. The total number of leptospiral sequences obtained from the ISG samples was correlated with the distance from the mountainous woodlands. Conclusion: The pathogenic P1+ Leptospira was distributed in urban OKI, in addition to rural ISG. The factors correlated with leptospiral detection, that is, cattle eDNAs and the distance from mountainous forests in OKI and ISG, respectively, suggest the silent prevalence of Leptospira in urban and developing regions related to human activities. The findings of the present study provide insights into public health in cities with respect to climate change and possible flood damage.
LANGUAGE OF ORIGINAL DOCUMENT: English

Duangsri J., Potisap C., Techawiwattanaboon T., Patarakul K., Sermswan R.W., Wongratanacheewin S.
Hamster and mouse CD25+CD4+ T cell responses to the C-terminal of leptospiral Ig-like protein A
(2025) Veterinary Immunology and Immunopathology, 283, art. no. 110920
DOI: 10.1016/j.vetimm.2025.110920
ABSTRACT: Leptospirosis is a major public health problem in humans and animals worldwide. The variable carboxy-terminal domain 7–13 of LigA (LigAc) is currently the most promising immunogen for the leptospirosis subunit vaccine. Its protective evidence was investigated in susceptible hamsters whose immunity was mostly based on the knowledge of resistant mice. The difference in immunity of these two animals might be an obstacle to successful vaccine development. The protective immunity induced by LigAc was reported to be specific antibodies while T-cell-mediated immunity has never been investigated. We reported for the first time that hamsters and mice gave dissimilar T-cell responses. Mice and hamsters were divided into 3 groups: an

adjuvant plus recombinant LigAc (rLigAc) immunized, an adjuvant-injected, and a negative control group. Immunizations were done three times at 2-week intervals. The rLigAc-specific IgG antibody titers in rLigAc immunized mice and hamsters were significantly higher than in the control groups but no significant difference between the animals. The percentages of hamster CD4+ T cells were significantly higher than those of mice. Mouse CD25+CD4+ T cells responded to rLigAc significantly higher than hamsters. Interestingly, the rLigAc significantly reduced the percentage of IFN-γ+CD4+ cells in mice (≅30 %) and more decrease (≅70 %) was found in hamsters. Remarkably, it also reduced considerably hamster IL-4+CD4+ T cells (≅80 %) but an extremely low decrease in mice (≅20 %). Our result indicated that mice and hamsters gave different responses to leptospiral antigens which might be the possible key that plays a role in the outcome of disease.
LANGUAGE OF ORIGINAL DOCUMENT: English

Guedes E.F., daCruz C.F., Filho F.M.O.

Quantifying the influence of climatic variables on the incidence of diseases in Salvador-BA

(2025) Fluctuation and Noise Letters, art. no. 2550029

DOI: 10.1142/S0219477525500294

ABSTRACT: In recent years, climate change and its impacts on human health have been the subject of intense discussions in the scientific literature worldwide. Although there is evidence relating climate variations to the occurrence of some pathologies, identification of diseases mostly due to fluctuations in climate variables over time, is still a gap to be filled. In this study, we measured the association between the variables: precipitation, air temperature, relative humidity and radiation and the incidence of the following diseases: dengue, viral hepatitis, leptospirosis, malaria, meningitis, hepatitis and tuberculosis in Salvador-BA through the cross-correlation coefficient and Granger's causality test. Results found indicated the existence of a cross-correlation in large temporal and causality between the time series analyzed.
LANGUAGE OF ORIGINAL DOCUMENT: English

Kositanont U., Lertanantawong B., Patarakul K., Sripinitchai S., Thawornkuno C., Chaibun T., Kreangkaiwal C., Waiwinya W., Promptmas C., Srisawat C.

Performance of electrochemical aptasensor as antigen test in clinical samples for early diagnosis of leptospirosis

(2025) Scientific Reports, 15 (1), art. no. 9398

DOI: 10.1038/s41598-025-92685-3

ABSTRACT: Early diagnosis of leptospirosis is critical for timely treatment and effective disease management. This study evaluated the diagnostic performance of a novel electrochemical aptasensor targeting the electron transfer flavoprotein subunit beta (EtfB) of Leptospira interrogans in clinical samples collected during the acute phase of leptospirosis. The aptasensor assay was tested using plasma samples and compared to the microscopic agglutination test (MAT), the standard reference method. To assess diagnostic performance, aptasensor results were evaluated against leptospirosis status as determined by MAT. Receiver operating characteristic (ROC) analysis identified a 40% decrease in electrochemical signal relative to the blank as the optimal cut-off, yielding an area under the curve (AUC) of 0.93. The assay demonstrated a sensitivity of 100% and a specificity of 80%. For diagnostic concordance, aptasensor results were compared with those obtained from the reference quantitative PCR (qPCR) method. The aptasensor exhibited 100% positive agreement and 57.1% negative agreement with qPCR. Notably, in patients with high MAT titers, the aptasensor outperformed

qPCR in detection rates (100% vs. 25%). These findings indicate that the aptasensor assay is a highly reliable and effective antigen-based diagnostic tool for early leptospirosis detection, making it suitable for both low- and high-prevalence settings.
LANGUAGE OF ORIGINAL DOCUMENT: English

Di Azevedo M.I.N., Soares A.C.D.R., Ezepha C., Carvalho-Costa F.A., Vieira A.S., Lilenbaum W.
Genetic characterization and zoonotic potential of leptospira interrogans identified in small non-flying mammals from Southeastern Atlantic Forest, Brazil
(2025) Tropical Medicine and Infectious Disease, 10 (3), art. no. 62
DOI: 10.3390/tropicalmed10030062
ABSTRACT: Leptospirosis is a zoonotic disease of global public health importance caused by bacteria of the genus Leptospira. Small non-flying mammals are important reservoirs of the pathogen. The Brazilian Atlantic Forest is a biodiversity hotspot located in a densely populated area and subject to intense degradation. Although documented through serosurveys and the detection of leptospiral DNA in wild small mammals, no study has performed a genetic characterization of the bacteria in the region. The present study aimed to evaluate the genetic diversity of pathogenic leptospires identified in small non-flying mammals in the Southeast Atlantic Forest and to perform intraspecific genetic inferences with other hosts. The studied area included five different conservation units. Molecular diagnosis was performed based on the lipl32 gene. The SLST typing method was applied based on the secY gene. In total, 56% of samples were lipL32-PCR-positive and identified as L. interrogans, with a high genetic identity among them, distributed in four main haplogroups. The largest haplogroup also included reference sequences from humans, dogs, and urban rats, all belonging to the Icterohaemorrhagiae serogroup. Our results reinforce the role of small mammals as important carriers of L. interrogans and highlight the Atlantic Forest as a significant environment for the circulation and dissemination of spirochetes with zoonotic potential.
LANGUAGE OF ORIGINAL DOCUMENT: English

de Araújo H.G., de Aquino V.V.F., Pedrosa L.F.A., Santos C.S.A.B., Alves C.J., Silva M.L.C.R., Vilela V.L.R., de Azevedo S.S.
Inefficiency of the Leptospira transport medium (LTM) in the isolation of Leptospira spp. from urine of livestock in the Caatinga biome, Brazil [Ineficácia do Leptospira transport médium (LTM) no isolamento de Leptospira spp. de urina em animais de produção do bioma Caatinga, Brasil]
(2025) Ciencia Rural, 55 (7), art. no. e20240155
DOI: 10.1590/0103-8478cr20240155
ABSTRACT: Leptospirosis is a zoonotic infection caused by bacteria of the genus Leptospira spp. of global importance, and in recent years efforts to isolate leptospires have intensified due to the importance of using these isolated strains to elucidate the phylogenetic behavior of the genus. In this survey, the efficiency of Leptospira transport medium (LTM) for leptospire isolation was evaluated by using 139 urine samples collected from bovine, goat, sheep and swine slaughtered in the Caatinga biome, Brazil. Leptospira spp. DNA was found in 41/139 (29.5%) of the urine cultures from pigs, cattle, sheep and goats, being 20/31 (64.5%) from pigs, 0/36 (0%) from cattle, 13/36 (36.1%) from sheep and 8/36 (22.2%) from goats. There was statistical difference in the proportions of PCR-positivity between pigs and cattle ($P < 0.001$), sheep ($P = 0.038$) and goats ($P = 0.001$). Sequencing of a urine sample from pig revealed 100% identity with L. borgpetersenii. There was no leptospire

growth in any sample, and most culture samples presented high contamination. LTM was ineffective in recovering leptospires in urine cultures from livestock in the Caatinga biome despite PCR positivity, which suggests a further in-depth evaluation of this transport method to identify possible factors that may influence its performance, since the isolation of autochthonous leptospires is essential to elucidate epidemiological aspects of Leptospira spp. infection in semiarid conditions.
LANGUAGE OF ORIGINAL DOCUMENT: English

Bertelloni F., Ebani V.V.
Leptospirosis in Unconventional Mammal Pets
(2025) Veterinary Sciences, 12 (3), art. no. 285
DOI: 10.3390/vetsci12030285
ABSTRACT: The demand for unconventional pets has markedly increased in recent years worldwide. Among them, many species of mammals are frequently kept in domestic environments in close contact with their owners. Pets often harbor zoonotic microorganisms without showing clinical signs; therefore, owners do not suspect that they can be a source of pathogens. Pets of several unconventional species may act mainly as maintenance hosts for leptospires; they are clinically silent but shed the spirochetes in their urine representing a serious risk of infection for people living in the same domestic area. However, their role as maintenance or incidental hosts seems variable in relation to the animal species, and it has not always been elucidated. No vaccines against Leptospira spp. are available for unconventional mammal pets, and so prophylaxis is based on rigorous hygienic measures and the identification of infected animals through indirect and/or direct diagnosis for leptospirosis.
LANGUAGE OF ORIGINAL DOCUMENT: English

Baimova R.R., Riabiko E.G., Ostankova Y.V., Tokarevich N.K.
Optimization of the method for detection and genotyping of pathogenic Leptospira in biological samples
(2025) Klinicheskeskaya Laboratornaya Diagnostika, 70 (3), pp. 210 - 217
DOI: 10.51620/0869-2084-2025-70-3-210-217
ABSTRACT: The method for detection and genotyping of pathogenic leptospires in biological samples has been optimized, based on classical PCR using three pairs of primers. When developing the method, samples obtained from wild and synanthropic small rodents collected in St. Petersburg were used. According to the method we developed, total DNA is extracted from clinical material, then the presence or absence of pathogenic Leptospira DNA is determined using amplification using a fragment of the lipL32 gene. Two fragments of the rpoB and secY genes amplify samples containing DNA of pathogenic Leptospira sequentially. The results obtained are recorded by electrophoresis in an agarose gel, followed by detection on a transilluminator. The resulting fragments are sequenced using Sanger. The optimized method is aimed at improving and expanding the range of methods designed to identify and genotype various types of pathogenic leptospira in order to improve the diagnosis and prevention of the disease.
LANGUAGE OF ORIGINAL DOCUMENT: Russian

Esteves S.B., de Oliveira L.M., Guilloux A.G.A., Cortez A., de Masi E., Ferreira I.M.R., de Lima E.M., Ramalho
Into the spotlight: a spatial study of potentially underreported leptospirosis among dengue-negative patients in São Paulo city, Brazil
(2025) PLoS neglected tropical diseases, 19 (3), pp. e0012888

DOI: 10.1371/journal.pntd.0012888

ABSTRACT: Leptospirosis and dengue share similar unspecific symptoms, complicating differential diagnosis in endemic regions. This overlap is further exacerbated by the often-underrecognized nature of leptospirosis, resulting in low clinical suspicion among healthcare providers. Understanding the scale of underdiagnosed leptospirosis cases, particularly among dengue-negative patients, is critical for improving public health responses. This cross-sectional study analyzed data from 6,936 febrile patients who tested negative for dengue at public health services across São Paulo city. Serum samples from these patients were subsequently tested for anti-Leptospira IgM antibodies. Spatial analysis was conducted to identify areas at increased risk of underdiagnosed leptospirosis, and these findings were compared to cases reported in the Brazilian's Information System for Notifiable Diseases from 2009 to 2019. Our results revealed that, from the 6,936 patients tested, 786 (11.3%) were seroreactive for leptospirosis, with a higher prevalence among women (55.7%; p=0.003). Spatial analysis identified 18 high-risk clusters for potentially unrecognized leptospirosis, predominantly in peripheral regions with socioeconomic vulnerabilities. Notably, two significant high-risk areas were located in the North (RR=2.13) and South (RR=2.69) regions of the city. These findings underscore the urgent need for targeted public health interventions to improve disease surveillance and diagnostic capacity, particularly in the high-risk areas identified. Addressing underrecognition of leptospirosis is essential for reducing morbidity and mortality associated with the disease. Future research should expand on this work by integrating broader temporal, environmental, and socioeconomic data.

LANGUAGE OF ORIGINAL DOCUMENT: English

Rahmat F., Zulkafli Z., Ishak A.J., Abdul Rahman R.Z., Tahir W., Ab Rahman J., Jayaramu V., De Stercke S., Ibrahim S., Ismail M.

Interpretable spatio-temporal prediction using Deep Neural Network - Local Interpretable Model-agnostic Explanations: a case study on leptospirosis outbreaks in Malaysia

(2025) Engineering Applications of Artificial Intelligence, 151, art. no. 110665

DOI: 10.1016/j.engappai.2025.110665

ABSTRACT: Leptospirosis is a widespread zoonotic disease with complex spatio-temporal dynamics. This study investigates the use of Deep Neural Network (DNN) in combination with Local Interpretable Model-Agnostic Explanations (LIME) for weekly spatio-temporal predictions of leptospirosis occurrence. The predictive model integrates hydroclimatic and environmental data to assess its effectiveness in predicting leptospirosis cases and quantifying key input variables in Negeri Sembilan, Malaysia. Using a DNN architecture with hyperparameter tuning via grid search, we developed a globally trained model that achieved an overall prediction accuracy of 70.5% across 214 pixels. We identified acidic soil and a higher presence of rubber plantations as strong predictors of leptospirosis occurrence. Additionally, mean temperature and minimum rainfall emerged as important hydroclimatic contributors. These insights enable public health authorities to proactively identify and prioritize high-risk areas for targeted interventions, improving disease mitigation strategies. Furthermore, the methodology is adaptable to other regions with similar environmental and socio-economic conditions, strengthening early warning systems and enhancing preparedness against future leptospirosis outbreaks. While demonstrated on leptospirosis prediction, the proposed DNN-LIME framework is adaptable to spatio-temporal challenges in diverse domains such as supply chain optimization, urban planning, and industrial risk management. The integration of interpretability via LIME ensures actionable

insights for stakeholders beyond public health, bridging the gap between complex models and real-world decision-making.
LANGUAGE OF ORIGINAL DOCUMENT: English

Ciurariu E., Prodan-Barbulescu C., Mateescu D.-M., Tutac P., Sorop V.-B., Susan M., Varga N.-I.
Diagnostic advances in leptospirosis: a comparative analysis of paraclinical tests with a focus on PCR
(2025) Microorganisms, 13 (3), art. no. 667
DOI: 10.3390/microorganisms13030667
ABSTRACT: Leptospirosis is a zoonotic disease with a varied clinical presentation that can mimic other infectious diseases, posing diagnostic challenges. While the Microscopic Agglutination Test (MAT) remains the gold standard for serological diagnosis, its limitations have led to increasing interest in polymerase chain reaction (PCR) as a rapid and sensitive diagnostic tool. This systematic review evaluates the role and clinical applications of PCR for diagnosing human leptospirosis. We analyzed the sensitivity and specificity of PCR, compared its performance with other diagnostic tests, and assessed the comparative utility of blood and urine samples for PCR testing. Our findings demonstrate that PCR has a high sensitivity and specificity, particularly in the early stages of the disease. Combining PCR with serological tests like MAT can maximize the diagnostic accuracy across different stages of illness. We recommend that PCR be considered a first-line diagnostic test for suspected leptospirosis, especially when rapid diagnosis is crucial. Further research is needed to standardize PCR protocols and explore its potential in differentiating Leptospira species and serotypes. By leveraging the strengths of PCR and combining it with other diagnostic methods, we can significantly improve the diagnosis and management of leptospirosis.
LANGUAGE OF ORIGINAL DOCUMENT: English

Petakh P., Kamyshnyi O.
Serogroup distribution of Leptospira among humans and rodents in Zakarpattia Oblast, Ukraine (2018–2023)
(2025) Microorganisms, 13 (3), art. no. 614
DOI: 10.3390/microorganisms13030614
ABSTRACT: Leptospirosis is a zoonotic disease caused by Leptospira bacteria, which affects both humans and animals. This study investigated the prevalence of Leptospira serogroups in human and rodent reservoirs across Zakarpattia Oblast, Ukraine, from 2018 to 2023. The objective was to identify epidemiological patterns and assess potential public health risks. Data were sourced from the Public Health Center of Ukraine and regional surveillance initiatives, encompassing reported human cases and rodent-carrier detection. Six main serogroups—Icterohaemorrhagiae, Pomona, Grippotyphosa, Hebdomadis, Canicola, and Tarassovi—were included in the analysis. The results showed that Pomona and Hebdomadis serogroups became more common in 2023. The data from different districts also showed regional differences, with Icterohaemorrhagiae and Pomona being the most frequent serogroups in both humans and rodents. Other serogroups, like Grippotyphosa and Canicola, were found less often. Rodents may be an important source of leptospirosis in Zakarpattia. The growing number of cases in recent years shows the need for improved monitoring, control, and prevention in the region.
LANGUAGE OF ORIGINAL DOCUMENT: English

Subhan T.B., Rajasekar K., Sundaram V., Damodharan V., Narayanan R.

Diagnosis of leptospirosis among paediatric population by different serological and molecular methods in a tertiary care centre in South India

(2025) Indian Journal of Microbiology Research, 12 (1), pp. 71 - 75

DOI: 10.18231/j.ijmr.2025.010

ABSTRACT: Background: Leptospirosis is an emerging public health problem globally. The clinical spectrum of illness in Leptospirosis is extremely wide ranging from undifferentiated febrile illness to severe multisystem diseases. Although children experience frequent exposure t o surface waters and animals, studies on paediatric leptospirosis are very scanty, perhaps due to low index of suspicion. This study was conducted to determine the incidence of leptospirosis in clinically suspected paediatric patients by various serological and molecular methods. Materials and Methods: The study comprised 150 paediatric patients who presented with clinical signs and symptoms of Leptospirosis. Blood samples were taken, serum separated and processed for serological and molecular tests including macroscopic slide agglutination test (MSAT), Microscopic agglutination test (MAT), IgM ELISA and Polymerase chain reaction (PCR). Results: Among the 150 clinical suspected cases, 96.66% presented with fever, followed by myalgia 93.33% and headache90.6%. With regard to clinical signs hepatomegaly 58.66%, was the most common followed by muscle tenderness 57.3%, jaundice 54.3%, and conjunctival suffusion 48.6%. Among the 150 samples 32(21.33%) were MSAT positive, 20(13.3%) were IgM ELISA positive and 29 (19.33%) were MAT positive. The most prevalent serovar was Leptospira Pomona with 31.03% positivity. Out of 32 MSAT positive samples 4 were positive by PCR. Serological tests showed higher positivity than PCR in this study. Conclusion: This study suggests the incorporation of both the serological and molecular methods for early diagnosis of paediatric leptospirosis, which is indispensable for the timely management and better outcome of the patient.

LANGUAGE OF ORIGINAL DOCUMENT: English

Soro S., Groud K., Fafournoux A., Monchatre-Leroy E., Kodjo A., Lefebvre S., Chatron N., Lattard V.

Dynamics of leptospirosis transmission within urban norway rat (Rattus norvegicus) populations in densely populated french areas: implications for public health

(2025) Transboundary and Emerging Diseases, 2025 (1), art. no. 3451406

DOI: 10.1155/tbed/3451406

ABSTRACT: Leptospirosis, a bacterial zoonosis with a worldwide distribution, represents a major public health challenge. It is caused by the spirochete Leptospira, whose main reservoir in urban environments is the brown rat (Rattus norvegicus). Understanding the transmission dynamics of this disease within a rat population is essential for controlling the risk of human infection. In this study, an original capture method was used to analyze variations in carriage and bacterial load according to age in two distinct populations of brown rats, to provide a better understanding of the transmission routes of Leptospira within a population. A total of 508 rats were captured from all age categories, from newborns to very young rats (representing 18% of the animals) to very old rats (representing 21% of the animals). The overall prevalence of leptospirosis was between 30% and 50%, depending on the population. A single strain was identified in both studied populations: Leptospira interrogans belonging to the Icterohaemorrhagiae serogroup and the Icterohaemorrhagiae serovar. Surprisingly, in both populations, our study reveals a sudden change in the prevalence at 300/400g, jumping from 20 to 30% to over 75%. Moreover, none of the 98 fetuses collected from 13 pregnant females infected with Leptospira was detected as infected. This sudden change and the absence of infected fetus demonstrate

the major role of horizontal transmission in the dynamics of leptospirosis infections and minimize the importance of vertical transmission.
LANGUAGE OF ORIGINAL DOCUMENT: English
Scopus

Fylenko B., Starchenko I., Roiko N., Kornilova I., Romanyuk A., Lyndin M.
The case of leptospirosis in a female patient with Hodgkin's lymphoma [Slučaj leptospiroze kod bolesnice sa Hodžkinovim limfomom]
(2025) Acta Facultatis Medicae Naissensis, 42 (1), pp. 120 - 127
DOI: 10.5937/afmnai42-44463
ABSTRACT: Introduction. Although we could not find the registered cases of leptospirosis co-occurring with lymphogranulomatosis, it is important to note that both diseases can affect the immune system. Therefore, the reported case is unique and will be interesting and useful for the physicians of various specialties. Case report. We report a case of icterohemorrhagic form of leptospirosis with a fatal outcome in a woman with postmortem diagnosis of Hodgkin's lymphoma. Based on the findings of the autopsy, histological and immunohistochemical studies, it was established that the deceased suffered from Hodgkin's lymphoma during her life, classical form, reticular subtype with depletion of lymphoid tissue and extranodal spread in the liver, ovaries, and epicardium. Conclusion. The combination of leptospirosis and lymphogranulomatosis was characterized by the complication of the diagnostic process, which should be taken into account by physicians of all specialties.
LANGUAGE OF ORIGINAL DOCUMENT: English

Lian Y., Qiu H., Zhou H., Li D., Li Q., Wu X., Wang Z., Zhang Z., Zhang C., Kan B.
The spatiotemporal epidemiology and influencing factor analysis of leptospirosis — Anhui province, China, 2004–2023
(2025) China CDC Weekly, 7 (13), pp. 422 - 427
DOI: 10.46234/ccdcw2025.070
ABSTRACT: Introduction: Leptospirosis has historically been a severe public health concern across multiple Chinese provinces. Despite an overall decline in incidence in recent years, the disease continues to exhibit fluctuations and occasionally triggers localized outbreaks. This study aimed to characterize the demographic and spatiotemporal patterns of leptospirosis in Anhui Province — a historically significant epidemic region — from 2004 to 2023, to investigate potential climatic and environmental risk factors, and to identify critical targets for disease prevention and control. Methods: Spatiotemporal cluster analysis was conducted using SaTScan software. Spearman correlation analysis was performed using SPSS to examine the short-term lagged effects of rainfall, temperature, and normalized difference vegetation index (NDVI) on leptospirosis incidence in the high-risk counties of Huaiyuan and Jingde. Results: A total of 458 leptospirosis cases were reported across Anhui Province during the 20-year study period. Middle-aged individuals (40–59 years), males, and agricultural workers constituted the primary high-risk populations. Spatiotemporal scanning identified nine adjacent hotspots in southern Anhui during 2004–2012, with a subsequent shift to Huaiyuan County in the northern Huaihe River Basin during 2016–2021. Significant associations were observed between leptospirosis cases and temperature, rainfall, and NDVI in both Huaiyuan and Jingde counties. Conclusion: This study revealed significant spatial heterogeneity, distinct spatiotemporal clustering patterns, and potential climatic and environmental risk factors for leptospirosis in Anhui Province during 2004–2023. These findings provide critical

information regarding target regions, high-risk populations, and climatic and environmental factors to inform early warning systems and enhance prevention and control strategies for leptospirosis.
LANGUAGE OF ORIGINAL DOCUMENT: English

de Lisbôa Padilha M., Ricardo Bezerra de Melo L., Henrique Limeira C., Maria de Andrade Magalhães N., Luana Cristiny Rodrigues Silva M., Rodrigues Soares R., José Alves C., Silvano dos Santos Higino S., de Sousa Américo Batista Santos C., Santos de Azevedo S.

Prospective evaluation of Leptospira spp. infection in goats maintained in field conditions in the Caatinga biome, Brazil [Evaluación prospectiva de la infección por Leptospira spp. en cabras criadas en condiciones de campo en el bioma Caatinga, Brasil]

(2025) Revista Argentina de Microbiologia
DOI: 10.1016/j.ram.2025.03.001
ABSTRACT: The Caatinga biome occurs only in Brazil; however, there is no survey on leptospirosis using direct and indirect diagnostic tests in this region with goats maintained in field conditions. We conducted a prospective survey with paired sampling to evaluate the importance of carrier goats in the maintenance of disease. Based on sampling calculation, 60 goats (30 confined and 30 extensively reared) were randomly selected and monitored for three months during the rainy season with paired monthly biological sample collections. The animals underwent urine and vaginal fluid collection for microbiological and molecular diagnosis, and serum samples for serological diagnosis using the microscopic agglutination test (MAT). Overall, 45 (75%) animals were positive in at least one diagnostic method. Anti-Leptospira spp. antibodies were detected in all three sampling moments in 43 (71.7%) animals, antibody titers varied from 25 to 800, and most frequent serogroups were Australis in the 1st and 2nd blood collections (66.7% and 40.7%, respectively) and Cynopteri in the 3rd collection (52.6%). None of the animals tested positive in the microbiological diagnosis or the vaginal fluid PCR; however, five (16.7%) animals were positive in the urine PCR only in the confined group in the first collection. Two DNA urine samples were sequenced, demonstrating 99% similarity with Leptospira interrogans. Different diagnostic techniques for leptospirosis in goats raised under Caatinga biome field conditions are suggested, as well as further studies over a longer period with monthly collections to better understand the prevalence of Leptospira spp. and its variation over time.
LANGUAGE OF ORIGINAL DOCUMENT: English

Bereznyak E.A., Trishina A.V., Breneva N.V., Lyubich Yu.A., Pichurina N.L., Morozova I.V., Simakova D.I., Dobrovol'sky O.P., Zabashta A.V., Goncharov A.Yu., Kovalev E.V., Gaevskaya N.E.

Epidemiological situation on leptospirosis in the Rostov Region in 2024 [Эпидемиологическая ситуация по лептоспирозу в Ростовской области в 2024 г.]

(2025) Problemy Osobo Opasnykh Infektsii, (1), pp. 112 - 119
DOI: 10.21055/0370-1069-2025-1-112-119
ABSTRACT: The aim of the study was to investigate the leptospirosis manifestation peculiarities in the Rostov Region with an assessment of the natural foci epizootic activity and the epidemic significance of infection. Materials and methods. In 2024, an epizootiological study of 15 administrative territories was conducted. Small mammals (314 specimens of 12 species) were captured in open stations. The material from the animals was studied using bacteriological, microscopic, serological and molecular-genetic methods. The testing of 577 blood sera of people from selected groups of conventionally healthy population living in the 18 administrative

districts of Rostov Region and Rostov-on-Don city was conducted using ELISA with detection of IgG and IgM to leptospirosis causative agents. Results and discussion. Specific antibodies to leptospirosis pathogens in animals were found in 11.5 % of samples from nine species of small mammals: house mouse, pygmy wood mouse, field vole, yellow-necked mouse, mound-building mouse, lesser white-toothed shrew, pygmy shrew, social vole, brown rat. Leptospira spp. infecting serogroups have been identified: Sejroe, Icterohaemorrhagiae, Canicola, Grippotyphosa, Pomona, Tarassovi. PCR-positive result was obtained for a sample from a pygmy wood mouse. Seroepidemiological studies of the conventionally healthy population have revealed the presence of specific antibodies to Leptospira in their blood in 14 administrative territories. The total level of seroprevalence was 12.7 %. The serogroup structure of the immune layer of the population in the Rostov Region is as follows: Grippotyphosa (28.5 %), Pomona (23.2 %), Canicola (21.4 %), Tarassovi (7.1 %), Sejroe (5.3 %). Positive reactions to several serogroups were noted in a number of sera. The conducted studies evidence the existance of active natural foci of leptospirosis on the territory of the Rostov Region and involvement of the population in the epidemic process.
LANGUAGE OF ORIGINAL DOCUMENT: Russian

Turlewicz-Podbielska H., Ruszkowski J.J., Pisarek M., Adaszek L., Pomorska-Mól M.

Serological and molecular screening for zoonotic pathogens among wild hedgehogs (Erinaceus europaeus) from urban areas of Poland

(2025) Journal of Veterinary Research (Poland)
ABSTRACT: Wild European hedgehogs (Erinaceus europaeus) can carry various pathogens potentially harmful to humans. This study was conducted to determine the occurrence of selected zoonotic pathogens in European hedgehogs from urban areas of central-western Poland. Sixty-nine samples (43 of sera and 26 spleens) were collected from 54 hedgehogs brought to the Wildlife Rehabilitation Centre in Poznań, Poland, between June 2020 and September 2023. Antibodies against Coxiella burnetii, hepatitis E virus genotype 3, Toxoplasma gondii and Trichinella spp. in serum samples were determined using commercial ELISA tests. A PCR was used to evaluate the prevalence of Anaplasma spp., Ehrlichia spp., Borrelia spp., Rickettsia spp. and Leptospira spp. genetic material in spleens. The genetic material of Anaplasma phagocytophilum was found in 18 out of 26 spleens (69.23%; 95% confidence interval (CI): 50.01-83.50), and the genetic material of Rickettsia helvetica in 4 out of these 26 (15.38 %; 95% CI: 6.15-33.53). All Rickettsia-positive spleens were also positive for Anaplasma spp. None of the other pathogens or antibodies against them were detected. This study provides valuable insights into the prevalence of some zoonotic pathogens in urban hedgehog populations and their potential impact on public health and urban biodiversity.
LANGUAGE OF ORIGINAL DOCUMENT: English

Hamer M., Saraullo V., Muschetto E., Esteban M., Tripodi M.A., Sánchez C., Hancke D., Suárez O.V., Brihuega B., Martínez M.L.

Surveillance of leptospiral reservoirs in synanthropic rodents using loop-mediated isothermal amplification

(2025) Veterinary Journal, 311, art. no. 106340
DOI: 10.1016/j.tvjl.2025.106340
ABSTRACT: Leptospirosis, a zoonotic disease caused by pathogenic Leptospira spp., represents a major public health concern due to its impact on both rural and urban populations. Rodents, particularly Rattus

norvegicus, Rattus rattus, and Mus musculus, are key reservoirs, excreting leptospires in their urine and contributing to environmental contamination. In this study, we evaluated the efficacy of loop-mediated isothermal amplification (LAMP), a molecular diagnostic tool, for detecting leptospiral DNA in kidney samples from captured rodents. LAMP results were compared with the standard lipL32 PCR assay. Leptospiral DNA was detected in 9.0 % (14/156) of samples, with 5.8 % positive by both LAMP and lipL32 PCR and 3.2 % positive by LAMP alone. No samples were positive by PCR and negative by LAMP. Cohen's Kappa index (0.77) indicated substantial agreement between the two methods. The higher sensitivity of LAMP, its ability to detect both pathogenic and intermediate leptospiral strains, and its cost-effectiveness make it a valuable tool for low-resource settings. However, the technique's inability to differentiate between Leptospira species highlights the need for complementary methods for epidemiological studies. These findings contribute to the understanding of rodent leptospirosis reservoirs and offer practical diagnostic solutions for veterinary and public health surveillance.
LANGUAGE OF ORIGINAL DOCUMENT: English

Farman M., Ahmad A., Atta U., Nisar K.S., Ghaffar A.
Hyers Ulam stability and bifurcation control of leptospirosis disease dynamics and preventations: modeling with singular and non-singular kernels
(2025) PLoS ONE, 20 (3 March), art. no. e0314095
DOI: 10.1371/journal.pone.0314095
ABSTRACT: Due to its various uses, the dynamical system is a significant research area in the field of mathematical biology. The model is first developed by applying the usual derivative with combined recovery measures of humans as well as animals for leptospirosis transmission and then converted into a generalized form of the fractal fractional sense with power law kernel, exponential law kernel, and Mittag-Leffler kernel. We verify all the fundamental characteristics of the newly developed model for the validation analysis of the system such as equilibrium points, local stability, positivity of solutions, reproductive number, and existence of a unique solution. Also, bifurcation analysis has been used for newly developed systems to observe the impact of each sub-compartment with the effect of different parameters. The results on Hyers Ulam stability are established by utilizing different kernels to observe its stable state. We used a numerical scheme based on the Lagrange polynomials for all three cases of fractal fractional derivatives having different kernels. The efficiency of the fractional operators with comparative analysis of different kernels is shown in simulation form to verify the validity and real behavior of leptospirosis transmission for humans as well as animals. he graphical explanation of our model’s solution depicts the effectiveness of our techniques applied and this study helps for future predictions and developing better control strategies.
LANGUAGE OF ORIGINAL DOCUMENT: English

Ling B.L., Tay Z.E., Philip N.
Detection of Leptospira in environmental samples of wet markets and paddy fields in Penang, Malaysia
(2025) Tropical Biomedicine, 42 (1), pp. 51 - 57
DOI: 10.47665/tb.42.1.009
ABSTRACT: Leptospirosis, caused by the Leptospira spp., is endemic in humid subtropical and tropical climates. Several environmental settings can harbour the survival of Leptospira; hence, continuous surveillance of the high-risk areas is critical. This study was conducted to detect the presence of Leptospira in

wet markets and paddy fields in Penang, Malaysia. A total of 62 soil and water samples were collected aseptically from three wet markets and two paddy fields. The samples were cultured twice on the sampling day and after two weeks of storage in the dark at ambient temperature. All environmental samples and positive cultures were subjected to deoxyribonucleic acid (DNA) extraction and polymerase chain reaction (PCR) targeting 16S rRNA, lipL32 and rrs genes. 16S rRNA-positive samples were further sent for sequencing. Of 62 samples, 21 (21/62, 33.9%) tested positive via culture and PCR. Wet markets significantly had a higher detection rate of leptospires (29%) than paddy fields (4.8%). Four Leptospira species (L. selangorensis, L. dzoumogneensis, L. mtsangambouensis, and L. meyeri) were identified in wet markets and three (L. meyeri, L. wolffii, and L. kmetyi) in paddy fields. Storing the environmental samples for two weeks before isolation yielded a higher positivity (11/14) than culturing samples on the sampling day (6/14). The presence of Leptospira in the environment of wet markets and paddy fields in Penang although primarily intermediate and saprophyte indicates the crucial need to implement preventive measures to prevent the possibility of leptospirosis infection among the workers.
LANGUAGE OF ORIGINAL DOCUMENT: English

Kraljevic M., Poloni J.A.T., Buchkremer F.
Leptospiral casts in the urinary sediment
(2025) Journal of Nephrology
DOI: 10.1007/s40620-025-02270-0
LANGUAGE OF ORIGINAL DOCUMENT: English
Scopus
EXPORT DATE: 28 April 2025

Gupta S., Dayal H.
Neuroleptospirosis in a patient admitted to the pediatric intensive care unit: a rare case report
(2025) Annals of Child Neurology, 33 (2), pp. 80 - 82
DOI: 10.26815/acn.2024.00801
LANGUAGE OF ORIGINAL DOCUMENT: English

Lechtenberg I.
59732553900
Case report: 38-year-old male with hemoptysis, jaundice and acute kidney injury [38-jähriger Mann mit Hämoptysen, Ikterus und akutem Nierenversagen]
(2025) Pneumologie
DOI: 10.1055/a-2559-9411
ABSTRACT: Globally, leptospirosis represents one of the most common zoonotic diseases, with approximately 1 million cases re- ported annually. It predominantly occurs in tropical and subtropical regions. In light of climate change, raising awareness of such diseases among clinicians in moderate climate zones might become increasingly important. We report the following case of a hybrid presentation of leptospirosis, characterized by predominant pulmonary involvement in the form of diffuse alveolar hemorrhage, as well as jaundice and nephritis. A 38-year-old patient presented one week after a summer riverside barbecue with fever and jaundice. Laboratory tests revealed elevated CRP and procalcitonin levels, direct hyperbilirubinemia and acute kidney

injury. The following day he developed diffuse alveolar hemorrhage with rapidly progressive respiratory failure and the need for invasive ventilation. Serological testing for Leptospira was positive and the diagnosis was further confirmed by PCR.With supportive measures and anti-infective therapy with ceftriaxone the patient's condition progressively improved. After 8 days of invasive ventilation he was successfully extu- bated.This case highlights the importance of considering a broader differential diagnosis in complex and severe disease presen- tations. Despite the currently sporadic occurrence of this disease in Germany, leptospirosis should be considered in cases of pulmonary hemorrhage in conjunction with kidney.
LANGUAGE OF ORIGINAL DOCUMENT: German

Rahmat F., Zulkafli Z., Ishak A.J., Abdul Rahman R.Z., Tahir W., Ab Rahman J., Jayaramu V., De Stercke S., Ibrahim S., Ismail M.

Corrigendum to “Interpretable spatio-temporal prediction using deep neural network - Local interpretable model-agnostic explanations: A case study on leptospirosis outbreaks in Malaysia” [Engineering Applications of Artificial Intelligence 151 (2025) 110665] (Engineering Applications of Artificial Intelligence (2025) 151, (S0952197625006657), (10.1016/j.engappai.2025.110665))

(2025) Engineering Applications of Artificial Intelligence, 152, art. no. 110849
DOI: 10.1016/j.engappai.2025.110849
ABSTRACT: The authors regret that the name of one of the co-authors, Wouter Buytaert, was inadvertently omitted from the published manuscript. The correct list of authors should include Wouter Buytaert with the following affiliation: Wouter Buytaert, Department of Civil and Environmental Engineering, Imperial College London, South Kensington, SW7 2BX, London, United Kingdom. The complete list of authors is the following: Fariq Rahmata, Zed Zulkaflib∗, Asnor Juraiza Ishaka, Ribhan Zafira Abdul Rahmana, Wardah Tahirc, Jamalludin Ab Rahmand, Veianthan Jayaramub, Simon De Sterckee, Wouter Buytaerte, Salwa Ibrahimf, Muhamad Ismailf aDepartment of Electrical and Electronic Engineering, Universiti Putra Malaysia, Serdang, 43400, Selangor, Malaysia. bDepartment of Civil Engineering, Universiti Putra Malaysia, Serdang, 43400, Selangor, Malaysia. cFlood Control Research Group, Faculty of Civil Engineering, Universiti Teknologi Mara, Shah Alam, 40450, Selangor, Malaysia. dDepartment of Community Medicine, Kulliyyah of Medicine, International Islamic University Malaysia, Kuantan, 25200,Pahang, Malaysia. eDepartment of Civil and Environmental Engineering, Imperial College London, South Kensington, SW7 2BX, London, United Kingdom. fNegeri Sembilan State Health Department, Ministry of Health Malaysia, Seremban, 70300, Negeri Sembilan, Malaysia. The authors confirm that this correction does not affect the scientific content or conclusions of the article. The authors would like to apologise for any inconvenience caused.
LANGUAGE OF ORIGINAL DOCUMENT: English

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Secondary hemophagocytic lymphohistiocytosis due to icteric leptospirosis with acute renal failure [Sekundäre hämophagozytische Lymphohistiozytose bei Leptospirose mit ikterischem Verlauf und Nierenversagen]

(2025) Deutsche medizinische Wochenschrift (1946), 150 (8), pp. 434 - 437
DOI: 10.1055/a-2455-6902
ABSTRACT: A 51-year-old patient presented himself with fever, upper abdominal pain and exertional dyspnea. Hemodynamic instability accompanied by generalized icterus, hepatosplenomegaly, a morbilliform rash with

petechia and bilateral conjunctivitis revealed in clinical examination.Laboratory results revealed elevated C-reactive protein and procalcitonin as well as pancytopenia and hyperbilirubinemia. Furthermore hypertriglyceridemia, hyperferritinemia and elevated soluble IL-2-receptor were found. Testing for infectious diseases detected IgM-antibodies to leptospires. Bone marrow cytology featured hemophagocytosis.Secondary hemophagocytic lymphohistiocytosis due to icteric leptospirosis (Weil's disease) was diagnosed.Immediate antibiotic therapy and circulatory support by fluid and vasopressors was initiated and non-invasive ventilation and hemodialysis stabilized the patient. With steroids and polyvalent immunoglobulins the organ functions recovered.Hemophagocytic lymphohistiocytosis is an important differential or concomitant diagnosis in sepsis and can be induced by rarely diagnosed infectious triggers like leptospirosis.
LANGUAGE OF ORIGINAL DOCUMENT: German

Sajiv G., Meenakshisundaram N.

CNOL: a convoluted neural optimization logic to predict leptospirosis disease detection based on medical data evaluation scheme

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DOI: 10.1109/ICEARS64219.2025.10940801
ABSTRACT: Leptospirosis is a widespread zoonotic disease that can cause severe health issues if not detected and treated early. This study presents a Convoluted Neural Optimization Logic (CNOL) framework designed to predict Leptospirosis Disease using both structured and unstructured medical data. The proposed model integrates convolutional layers for feature extraction from complex datasets, including clinical information and medical images, and utilizes advanced optimization techniques like Adam to enhance learning. The CNOL framework tested on a Leptospirosis Disease Dataset, and results show a significant improvement in predictive accuracy. The model achieved an accuracy of 95.67%, outperforming traditional machine learning models such as Logistic Regression (85.45%) and Random Forest (89.56%), and deep learning models like Deep Neural Networks (93.10%). Additionally, the CNOL framework exhibited superior precision (94.85%) and recall (96.42%), highlighting its effectiveness in both identifying true positive cases and minimizing false negatives. This study demonstrates the potential of combining convolutional layers and advanced optimization techniques for enhancing disease prediction, providing a robust tool for early diagnosis and intervention.
LANGUAGE OF ORIGINAL DOCUMENT: English

Pellegrini F.V., Caflisch E.A., Aulik N.A.

Verification of the efficacy of the gentamicin, tylosin, lincomycin, and spectinomycin antibiotic cocktail on frozen bovine semen

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ABSTRACT: Artificial insemination (AI) is a common method used internationally for breeding cattle but may have the potential to introduce pathogenic bacteria to naïve populations during the process. Certain bacterial pathogens, such as Mycoplasmopsis bovis, have been a priority for disease transmission control and prevention via bovid semen for certain countries. One such method to prevent the transmission of infectious agents during the AI process has been prophylactically adding antimicrobials to both the neat and extended

semen to kill or inhibit bacterial growth. A study published in 1988, detailed a method using a combination of gentamicin, tylosin, lincomycin, and spectinomycin (GTLS) as a means of controlling certain pathogenic bacteria in extended bovine semen. This was widely adopted and is still in use today, with Certified Semen Services making it required for their members. Publications since 1988 have provided evidence against the efficacy of the GTLS cocktail, arguing that M. bovis specifically is not being adequately controlled. Along with globally increasing antimicrobial resistance, a verification of the efficacy of the GTLS cocktail was warranted. Here the authors spiked various strains of bacteria into bovine GTLS-extended semen and quantified the bactericidal and bacteriostatic effect using bacterial culture. Our results demonstrate that multiple strains of Campylobacter fetus subspecies venerealis and Histophilus somni as well as one strain each of Ureaplasma diversum and Leptospira interrogans were effectively killed by the GTLS cocktail. However, the GTLS cocktail had only a bacteriostatic effect on several strains of M. bovis.
LANGUAGE OF ORIGINAL DOCUMENT: English