

A model of sentinel surveillance program in the Colombian Caribbean Region

Salim Máttar, Ph.D.



Institute for Tropical Biological Research, IIBT.

Institute of Tropic's Biological Researches (IIBT) was born in 2000

Geographic Location



Department of Córdoba



Colombia



**Influence
Area of
IIBT**

Tropical areas and
Strategic location of
IIBT in the
Caribbean Region

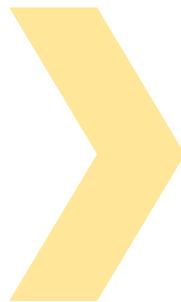
Institute of Tropic's Biological Research

**Who are
we?**



We are a Research Center,
ascribed to the Faculty of Veterinary Medicine, University of
Cordoba. Colombia.

**Our
purposes**



**Develop and promote scientific research in
Colombian Caribbean region focus on:**

- Emerging and re-emerging diseases
- Vector borne and Zoonotic diseases
- Human and animal public health
- Molecular epidemiology of infectious diseases

Institute of Tropic's Biological Research

Postgraduate
programs

Doctorate in
Microbiology and Tropic's health

Master in
Tropical Microbiology



Our Team

We are an interdisciplinary team: Microbiologists,
Biologists, Physicians, Epidemiologists, Vets,
Pharmacists.



Our strategy is in the field: we pursuit the virus, literally we go behind them.



Lab's facilities

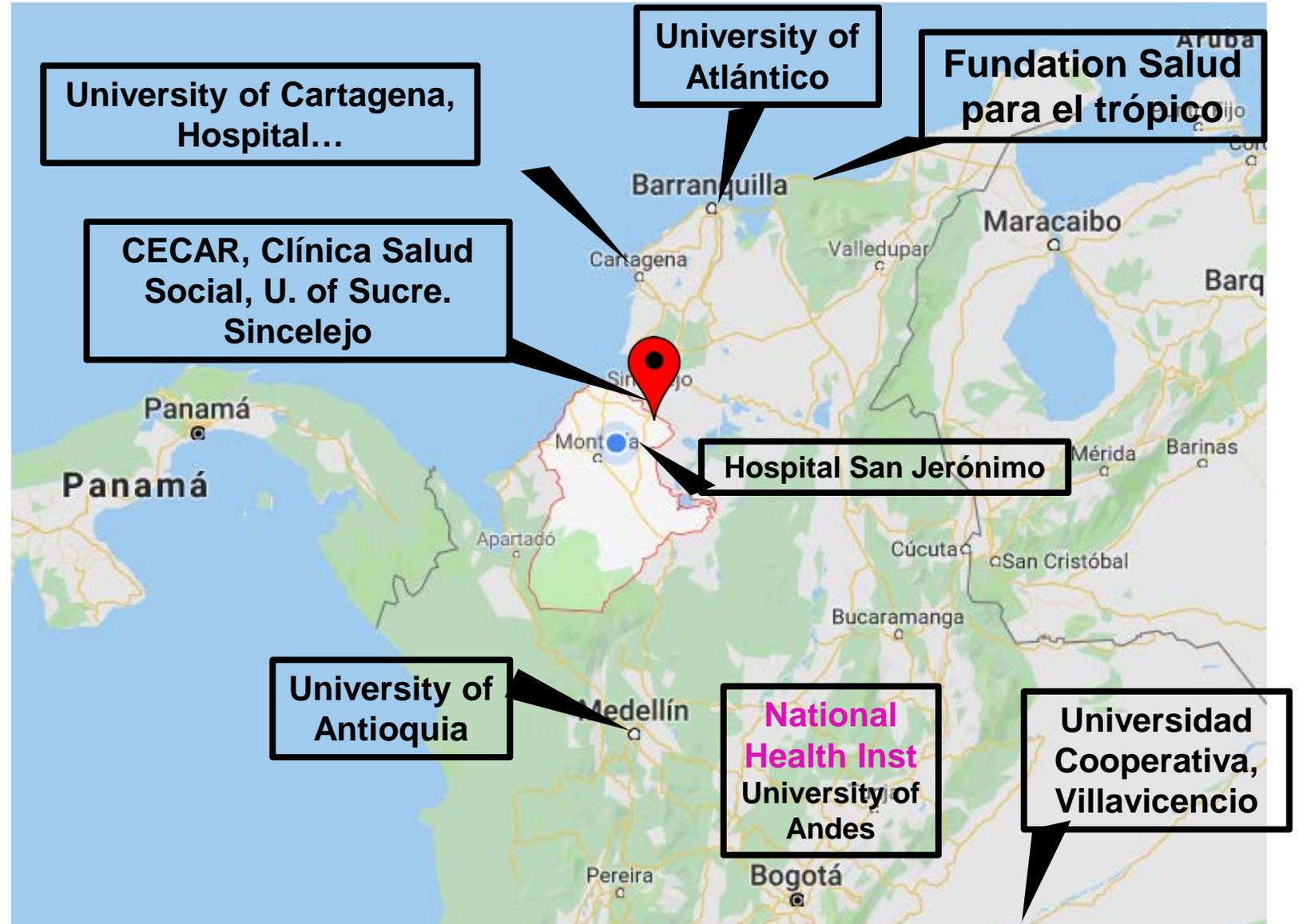
Microbiology, Serology,
Molecular Biology, Cell
culture.



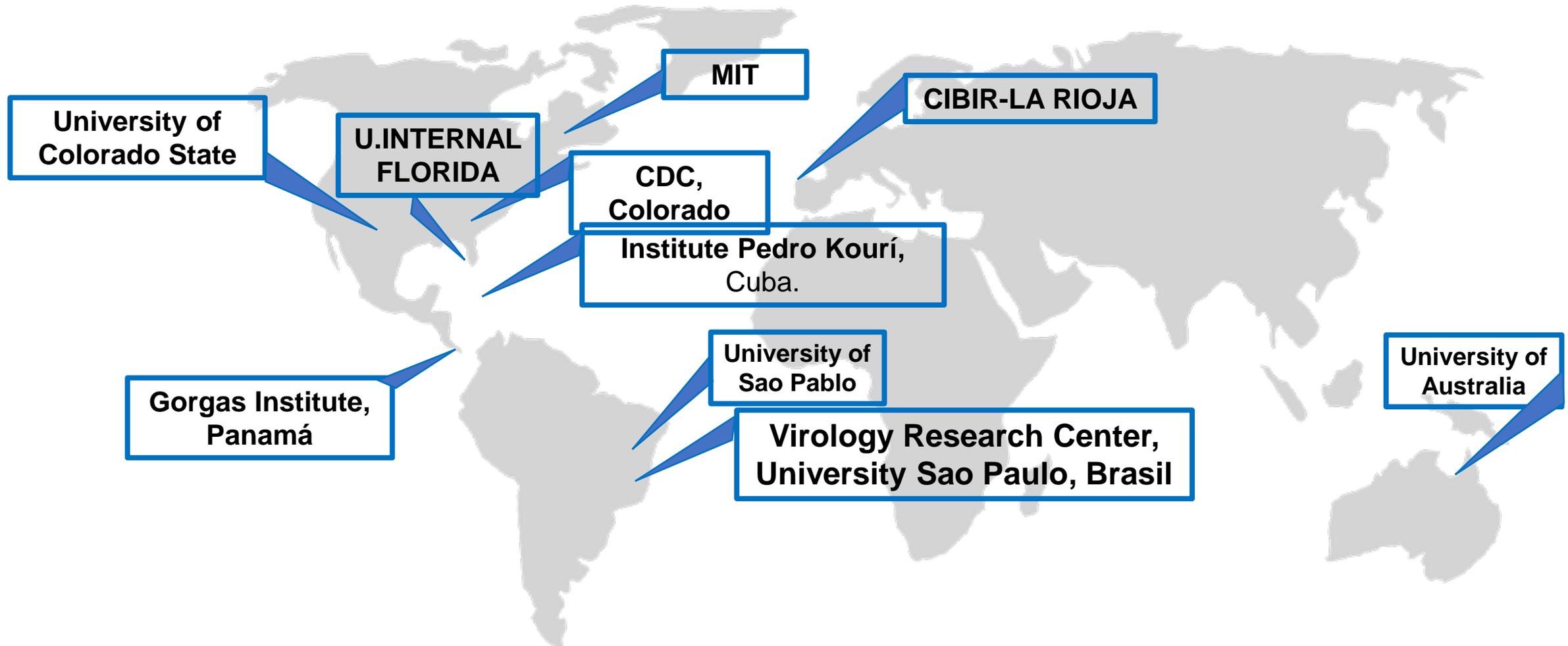
Our Partners In Colombia

We have collaborations with Clinics, Hospitals Universities, Foundations...

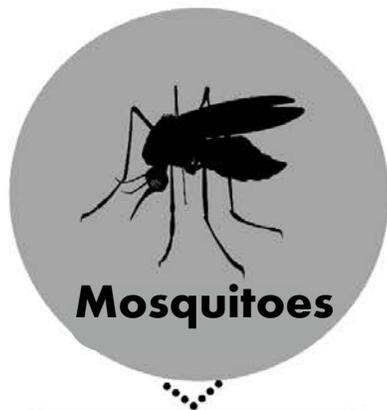
Institute of Tropic's Biological Research



Our Partners around the world



Study of Vector borne and Zoonotic Diseases

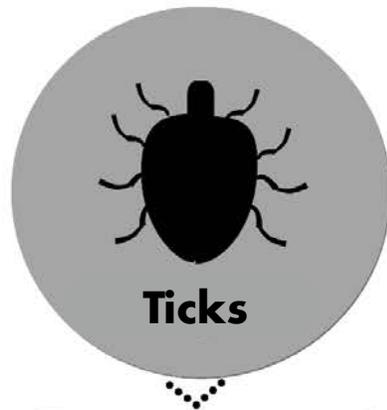


Mosquitoes

BUNYAVIRUS
Fiebre del Valle del Rift
Fiebre de Oropuche
Enfermedad de LaCrosse
Virus Bunyamwera

FLAVIVIRUS
Dengue, Zika,
Virus del Oeste del Nilo, Encefalitis de San Luis, Usutu,
Fiebre Amarilla
PARÁSITOS
Malaria (Plasmodium)

ALFAVIRUS
Encefalitis Equina del Este, Encefalitis Equina del Oeste, Encefalitis Equina Venezolana, Chikungunya, Madariaga, Mayaro
O'nyong nyong



Ticks

BUNYAVIRUS
Virus Heartland
Fiebre severa con trombocitopenia
Fiebre Hemorrágica
Crimea-Congo

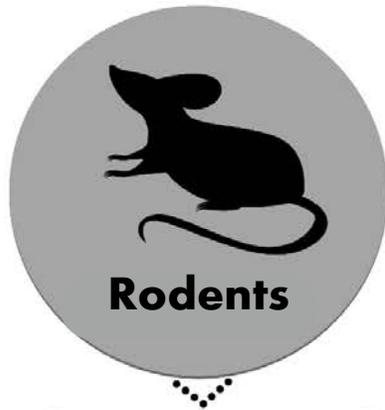
FLAVIVIRUS
Encefalitis transmitidas por garrapatas. Enfermedad Bosque Kyanasur, Fiebre de Omsk.

ORTHOMIXOVIRUS
Thogoto, Dhori

REOVIRIDAE
Fiebre de garrapata del colorado

BACTERIAS
Rickettsiosis GFM, Ehrlichiosis, Anaplasmosis, Fiebre Q

PARÁSITOS
Babesia.

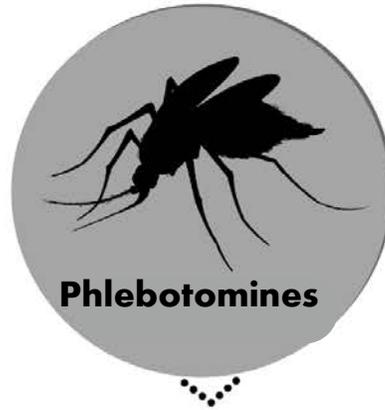


Rodents

HANTAVIRUS
Síndrome cardiopulmonar por hantavirus,
Fiebre hemorrágica con síndrome renal.

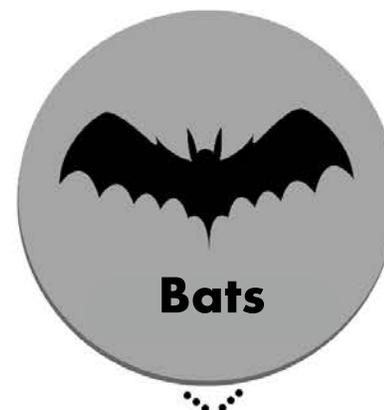
ARENAVIRUS
Síndrome febril de origen viral; Fiebres hemorrágicas con o sin compromiso neurológico; meningitis asépticas y meningo-encefalitis

BACTERIAS
Leptospirosis
Fiebre por mordedura de ratas (*Streptobacillus moniliformes*)
Tularemia (*Francisella tularemia*)



Phlebotomines

BUNYAVIRUS
Punta del toro,
fiebres de flebotominos (Virus Toscana, Siciliano, Salehabad, Nápoles)
PARÁSITOS: Leishmania

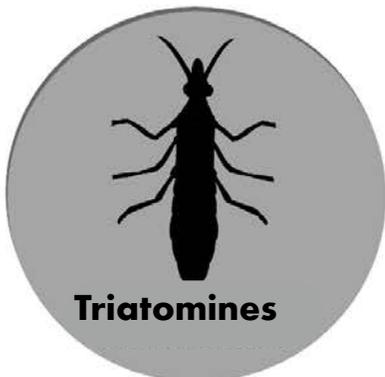


Bats

RHABDOVIRUS
Virus de la rabia

CORONAVIRUS
SARS Y MERS

FILOVIRUS
Ébola y Margburg



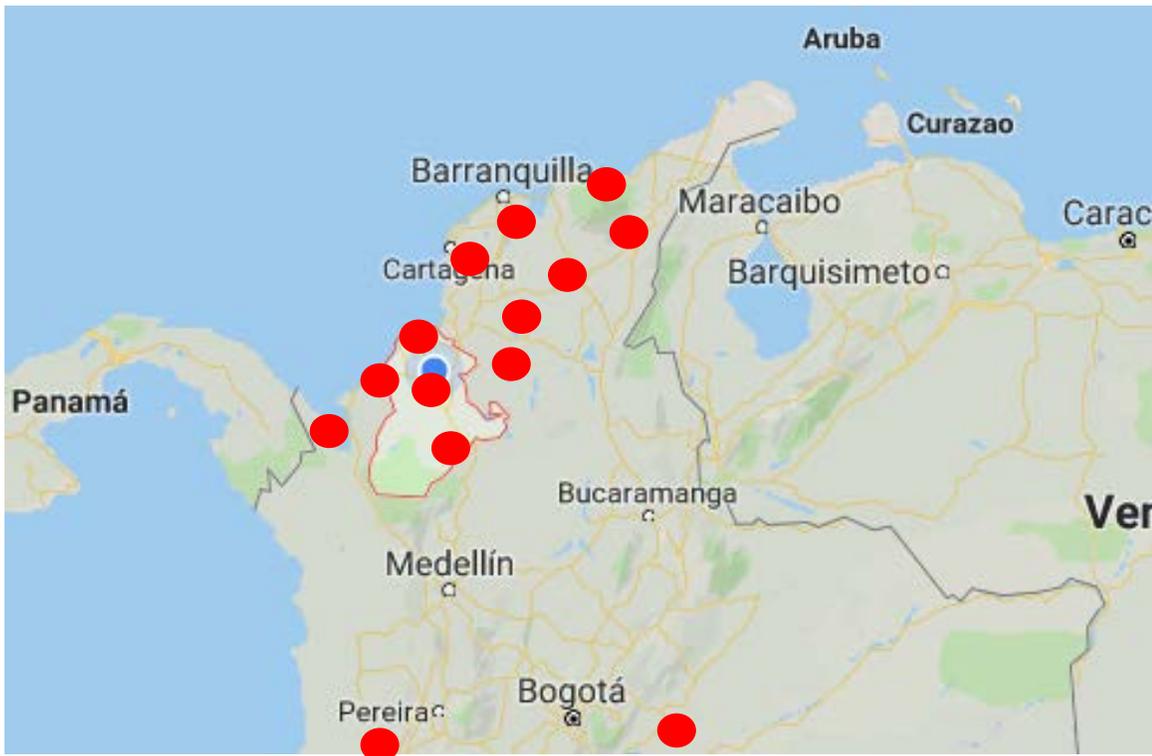
Triatomines

PARÁSITOS
Enfermedad de Chagas (*Trypanosoma cruzi*)

Vector borne and Zoonotic Diseases

Field Work

Capture of vectors, sampling in humans, Wild and domestic animals.



Institute of Tropic's Biological Research



Institute of Tropic's Biological Research



Vector borne and Zoonotic Diseases



Field Work

Capture of vectors, sampling in humans,
Sampling wild and domestic animals





Mosquitos borne diseases

Colombia Médica

Vol. 36 N° 3, 2005 (Julio-Septiembre)

Limitaciones para el serodiagnóstico del virus del oeste del Nilo en zonas endémicas con co-circulación de Flavivirus en el Caribe colombiano

Salim Máttar, Ph.D.¹, Miguel Parra, M.Sc.², José Torres, Microbiol.³



West Nile Virus Antibodies in Colombian Horses

SENTINEL SUEILLANCE FOR WEST NILE VIRUS IN CULICIDES AND DOMESTIC BIRDS IN CÓRDOBA

Manolo Jaramillo¹, José Peña¹, Luis Berrocal¹, Nicholas Komar², Marco González¹, César Ponce³, Katuska Ariza³, Salim Máttar^{1*}

976 Mem Inst Oswaldo Cruz, Rio de Janeiro, Vol. 106(8): 976-979, December 2011

Seroconversion for West Nile and St. Louis encephalitis viruses among sentinel horses in Colombia

Salim Mattar^{1/+}, Nicholas Komar², Ginger Young², Jaime Alvarez¹, Marco Gonzalez¹

¹Universidad de Córdoba, Instituto de Investigaciones Biológicas del Trópico, Córdoba, Colombia
²Division of Vector-Borne Diseases, Centers for Disease Control and Prevention, Fort Collins, CO, USA





Original Article

Outbreak of Chikungunya virus in the north Caribbean area of Colombia: clinical presentation and phylogenetic analysis

Salim Mattar¹, Jorge Miranda¹, Hernando Pinzon², Vanesa Tique¹, Amada Bolaños¹, Jose Aponte¹, German Arrieta^{1,3}, Marco Gonzalez¹, Katerine Barrios², Hector Contreras¹, Jaime Alvarez¹, Ader Aleman¹

¹ Universidad de Córdoba, Instituto de Investigaciones Biológicas del Trópico, Montería, Colombia

² Clínica del Niño, Cartagena, Universidad de Cartagena, Colombia

³ Corporación Universitaria del Caribe (Cecar), Grupo de Salud Pública, Sincelejo, Colombia

Abstract

Introduction: The Caribbean area of Colombia has been severely affected by a Chikungunya virus (CHIKV) outbreak since 2014. Methodology: The study was carried out on 100 patients during a fever outbreak from August to September 2014 in two small rural villages in the northern Caribbean area of Colombia. The molecular assays performed by reverse transcription-polymerase chain reaction (RT-PCR)

Figure 2. Clinical manifestations of Colombian patients with chikungunya infection.



A: arthritis with edema in ankle; B: severe exanthema on legs; C: Hemorrhagic manifestations in lips.

Features of Dengue and Chikungunya Infections of Colombian Children under 24 Months of Age Admitted to the Emergency Department

by Angel Paternina-Caicedo,¹ Fernando De la Hoz-Restrepo,² Fredi Díaz-Quijano,³ William Caicedo-Torres,⁴ María Auxiliadora Badillo-Viloria,⁵ Doris Bula-Anichiarico,¹ Nelson Alvis-Guzmán,^{1,6} Salim Mattar,⁷ Dagna Constenla,⁸ and Hernando Pinzón-Redondo^{1,6}

RESEARCH

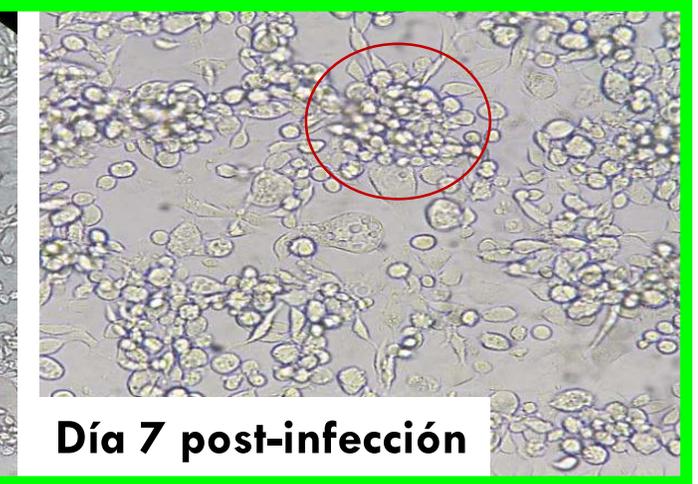
Open Access



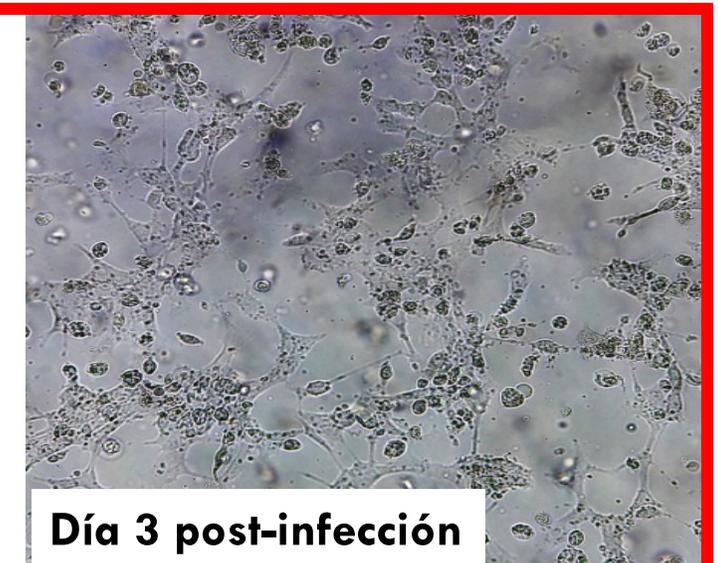
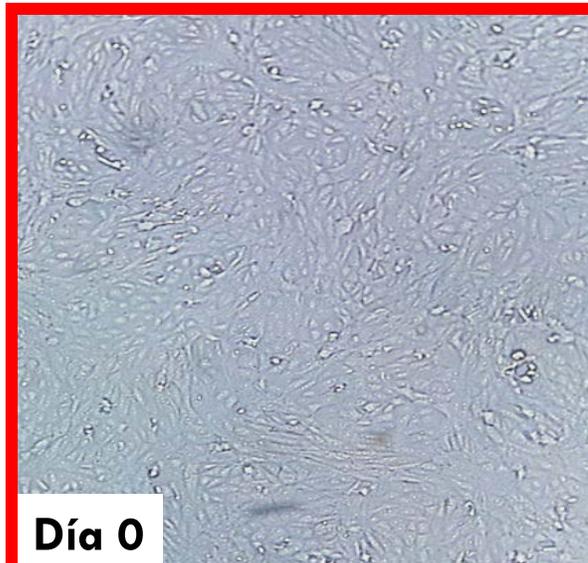
Epidemic outbreak of Chikungunya in two neighboring towns in the Colombian Caribbean: a survival analysis

viral isolation in **96,5%** (n=54/57) of clinic samples. Positives cultures obtained from samples with viral charges of **$1,19 \times 10^2$ y 1.25×10^7 virus/mL.**

**Cells
C6/36**



**Vero
Cells**

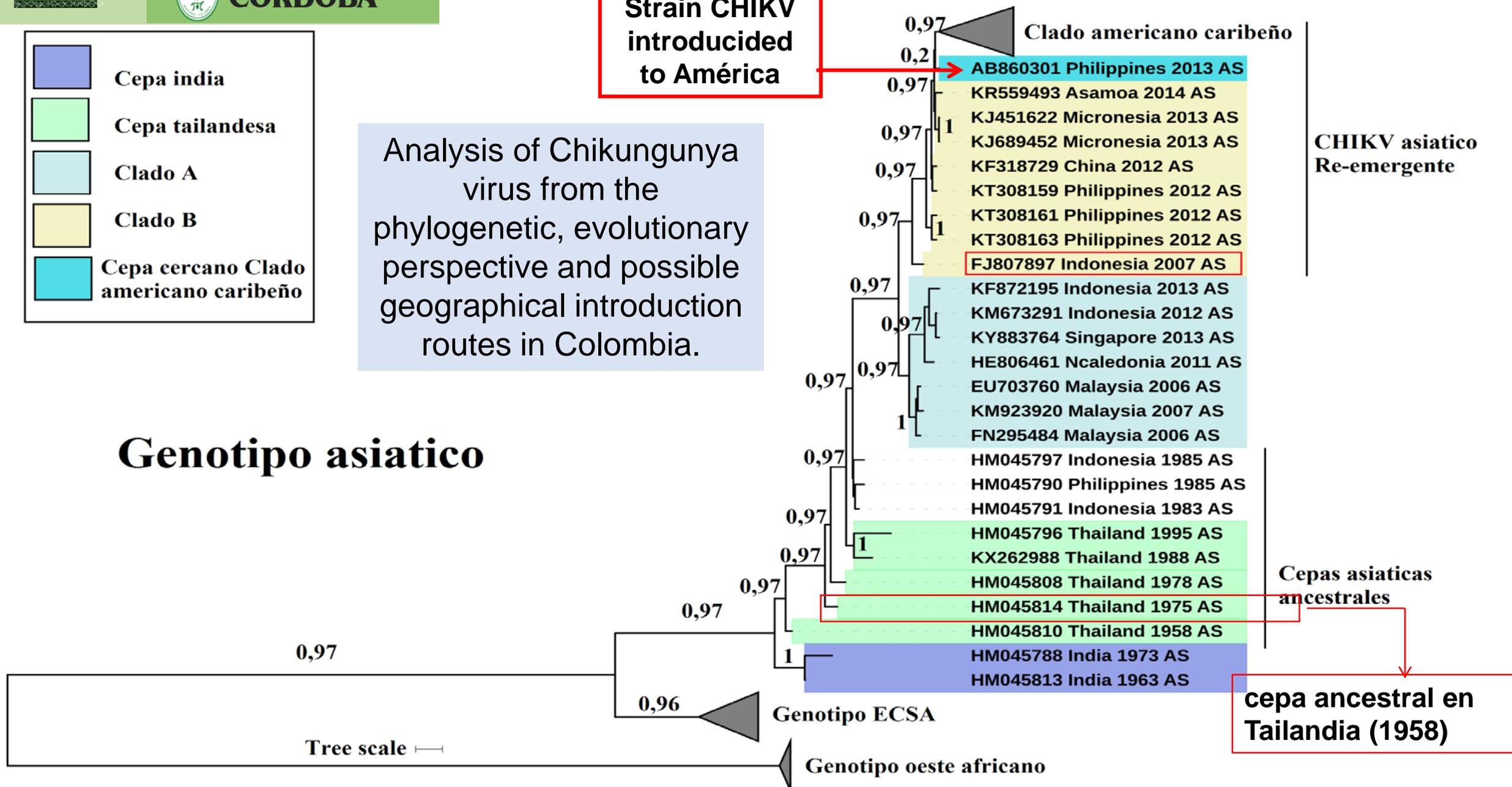


- Cepa india
- Cepa tailandesa
- Clado A
- Clado B
- Cepa cercano Clado americano caribeño

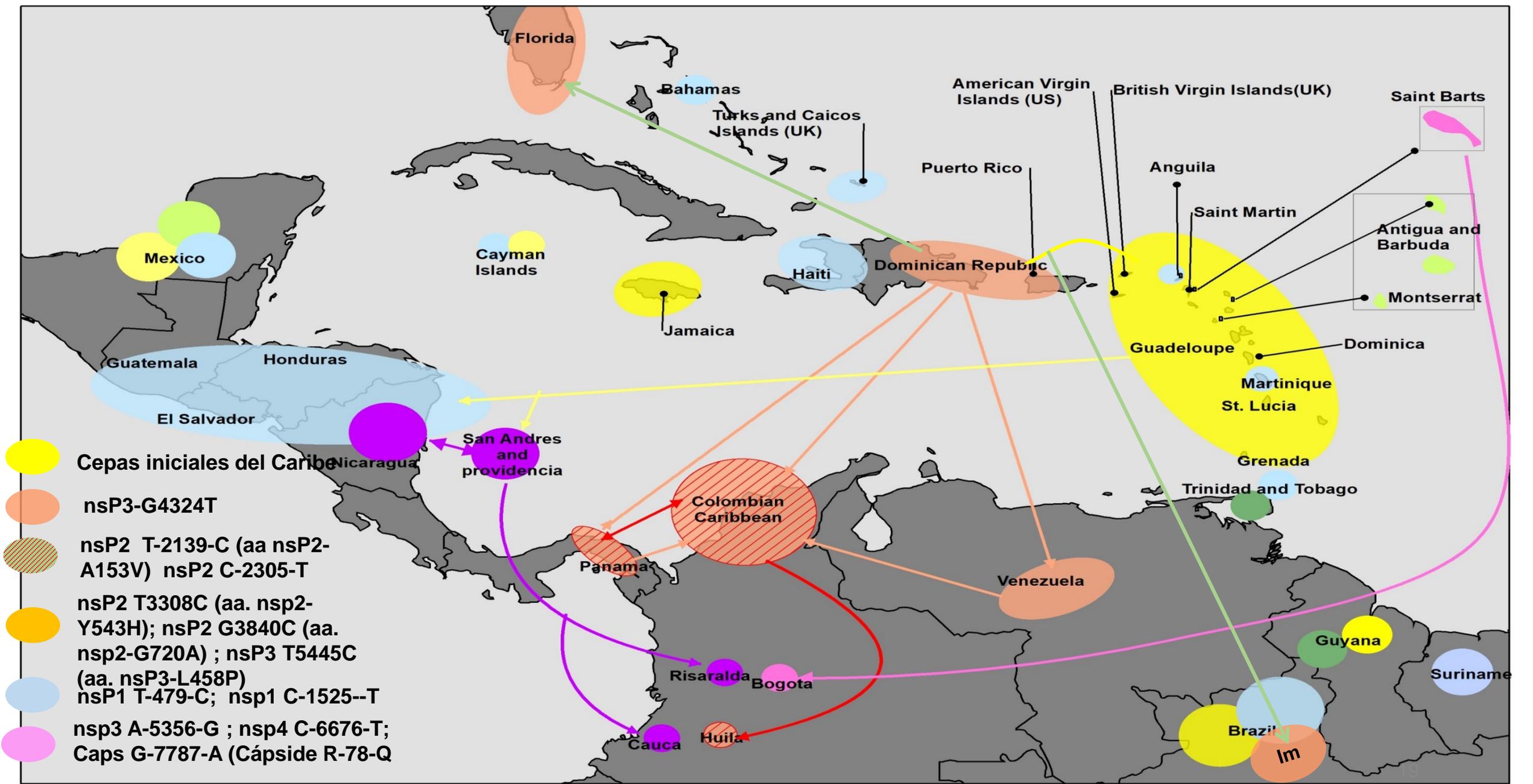
Analysis of Chikungunya virus from the phylogenetic, evolutionary perspective and possible geographical introduction routes in Colombia.

Strain CHIKV introduced to América

Genotipo asiatico



Possible routes of introduction of CHIKV to Colombia based on the phylogenetic analysis,



RESEARCH

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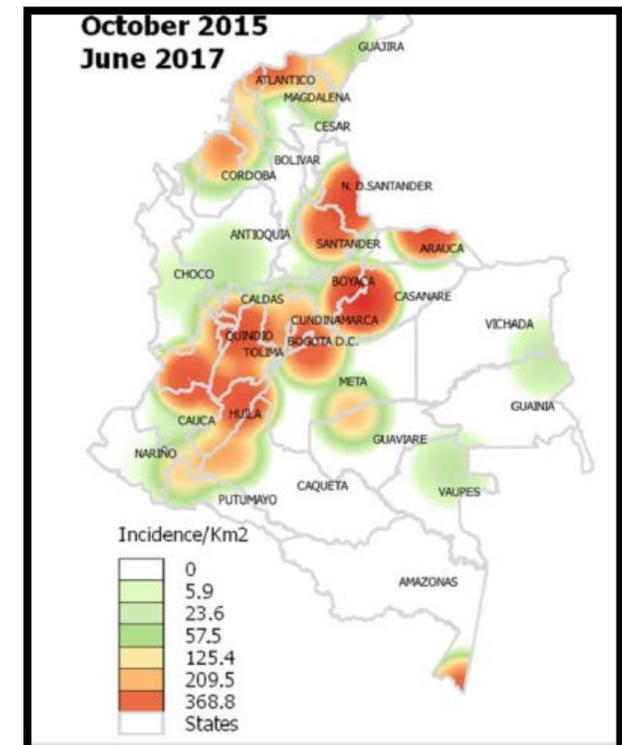
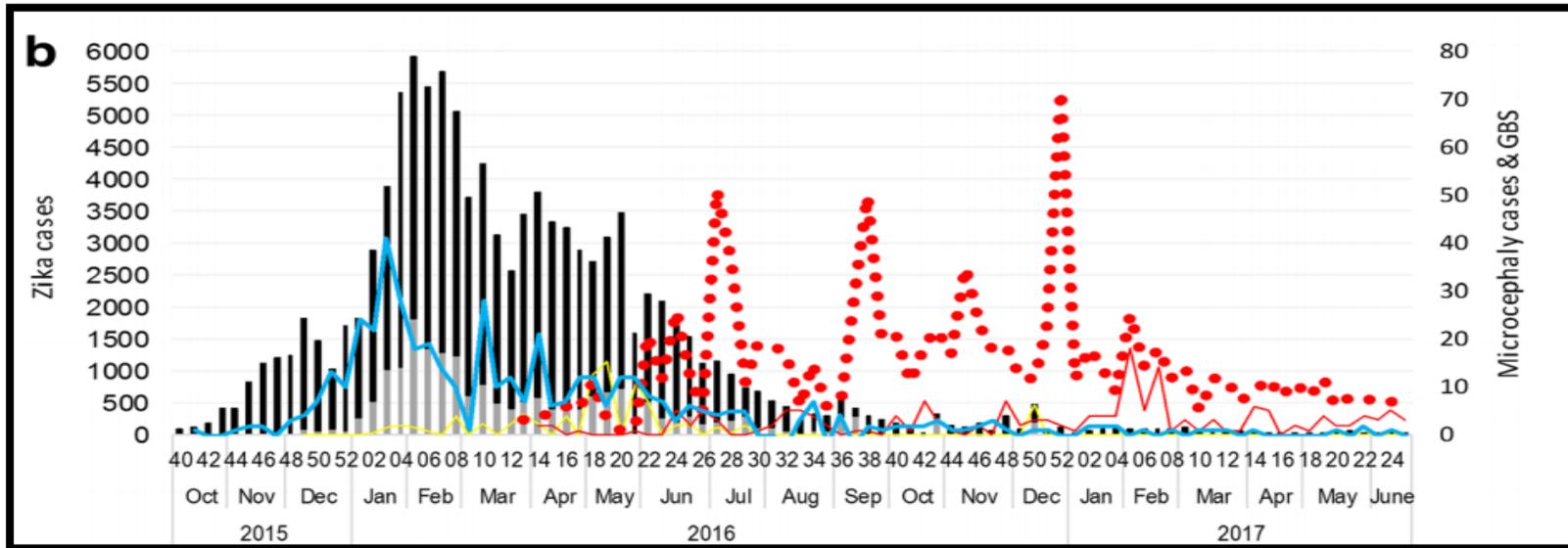
Mosquitoes borne diseases

Zika Virus

Zika virus disease, microcephaly and Guillain-Barré syndrome in Colombia: epidemiological situation during 21 months of the Zika virus outbreak, 2015–2017

2017

Nelson Méndez¹, Misael Oviedo-Pastrana¹, Salim Mattar^{1,4*}, Isaac Caicedo-Castro² and German Arrieta^{1,3,4}





Mosquitoes borne diseases

2017

2017

Journal of Tropical Pediatrics, 2017, 0, 1–7
doi: 10.1093/tropej/fmx024
Original paper

OXFORD

Features of Dengue and Chikungunya Infections of Colombian Children under 24 Months of Age Admitted to the Emergency Department

by Angel Paternina-Caicedo,¹ Fernando De la Hoz-Restrepo,² Fredi Díaz-Quijano,³ William Caicedo-Torres,⁴ María Auxiliadora Badillo-Viloria,⁵ Doris Bula-Anichiarico,¹ Nelson Alvis-Guzmán,^{1,6} Salim Mattar,⁷ Dagna Constenla,⁸ and Hernando Pinzón-Redondo^{1,6}

Mattar et al. *BMC Infectious Diseases* (2017) 17:423
DOI 10.1186/s12879-017-2522-6

BMC Infectious Diseases

CASE REPORT

Open Access



Case report: microcephaly associated with Zika virus infection, Colombia

Salim Mattar^{1,2*}, Carolina Ojeda², Janna Arboleda², German Arrieta^{1,2,3}, Irene Bosch⁴, Ingrid Botia², Nelson Alvis-Guzman⁵, Carlos Perez-Yepes⁶, Lee Gerhke⁴ and German Montero²

SCIENCE TRANSLATIONAL MEDICINE | RESEARCH ARTICLE

INFECTIOUS DISEASE

Rapid antigen tests for dengue virus serotypes and Zika virus in patient serum

September, 2017

doi:10.1038/nature22402

Zika virus evolution and spread in the Americas

15 June 2017 | VOL 546 | NATURE



Mosquitoes borne diseases

Miranda et al. *Virology Journal* (2019) 16:1
<https://doi.org/10.1186/s12985-018-1108-2>

Virology Journal

SHORT REPORT

Open Access

First report of *Culex flavivirus* infection from *Culex coronator* (Diptera: Culicidae), Colombia



Jorge Miranda¹, Salim Mattar^{1*}, Marco Gonzalez¹, Richard Hoyos-López², Ader Aleman¹ and Jose Aponte¹

2019

Oviedo-Pastrana et al. *Archives of Public Health* (2018) 76:36
<https://doi.org/10.1186/s13690-018-0284-2>

Archives of Public Health

RESEARCH

Open Access

Lessons learned of emerging Chikungunya virus in two populations of social vulnerability of the Colombian tropics: epidemiological analysis



Misael Oviedo-Pastrana¹, Nelson Méndez¹, Salim Mattar^{1,3,4*}, Germán Arrieta^{1,2,3} and Luty Gomezcaeres²

2018

Salim Máttar*, Miguel Parra



Tick-borne diseases

DETECTION OF ANTIBODIES TO *ANAPLASMA*, *BARTONELLA* AND *COXIELLA* IN RURAL INHABITANTS OF THE CARIBBEAN AREA OF COLOMBIA

2015

Molecular detection of *Anaplasma* sp. and *Ehrlichia* sp. in ticks collected in domestical animals, Colombia

Tropical Biomedicine 32(4): 726–735 (2015)

Jorge Miranda¹ and Salim Máttar^{1*}

¹Instituto de Investigaciones Biológicas del Trópico, Facultad de Medicina Veterinaria y Zootecnia, Universidad de Córdoba, Montería, Colombia

DETECCION MOLECULAR DE *Anaplasma* sp., *Ehrlichia* sp. Y *Rickettsia* sp. EN GARRAPATAS DE LA FAMILIA IXODIDAE (*Acari: Ixodidae*) EN IBAGUE, TOLIMA

REVISTA CIENCIAS BIOMÉDICAS

PRESENTACIÓN DE CASOS CLÍNICOS

ENTENDIENDO LAS EHRlichiosis HUMANAS Y DESTACANDO A UN AGENTE CAUSAL: *ANAPLASMA PHAGOCYTOPHILUM*

Rev. cienc.biomed. 2013;4(1):165-169

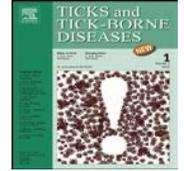
REVISTA CIENCIAS BIOMÉDICAS

PRESENTACIÓN DE CASOS CLÍNICOS

COINFECCIÓN DE BABESIOSIS Y EHRlichiosis: UN CASO EN CARTAGENA DE INDIAS, COLOMBIA*

CO-INFECTION OF BABESIOSIS AND EHRlichiosis: A CASE IN CARTAGENA DE INDIAS, COLOMBIA

Rev. cienc.biomed. 2012;3(2):339-345



Short communication

Infection of *Amblyomma ovale* by *Rickettsia* sp. strain Atlantic rainforest, Colombia



2017



infectio

REPORTE DE CASO

Primer caso del síndrome hemofagocítico asociado con posible infección con *Rickettsia* sp del grupo de las fiebres manchadas, Meta, Colombia

Liliana Sánchez^a, Salim Máttar^{a,b}, Verónica Contreras^b

2018



Human prevalence of the spotted fever group (SFG) rickettsiae in endemic zones of Northwestern Colombia



2010

Vigilancia de la infección por *Rickettsia* sp. en capibaras (*Hydrochoerus hydrochaeris*) un modelo potencial de alerta epidemiológica en zonas endémicas

Jorge Miranda¹, Verónica Contreras¹, Yésica Negrete¹, Marcelo B. Labruna², Salim Máttar¹





Tick-borne diseases

[Ticks Tick Borne Dis.](#) 2017 Jun;8(4):477-482. doi:
10.1016/j.ttbdis.2017.02.006. Epub 2017 Feb 9.

Rev.MVZ Córdoba 21(1):5099-5101, 2016. ISSN: 0122-0268

EDITORIAL

Heartland virus: a novel and emerging tick-borne encephalitis

Human prevalence of the spotted fever group (SFG) rickettsiae in endemic zones of Northwestern Colombia

Andrés F. Londoño^a, Leidy Y. Acevedo-Gutiérrez^a, Diana Marín^b, Verónica Contreras^c, Francisco J. Díaz^d, Gustavo Valbuena^e, Marcelo B. Labruna^f, Marilyn Hidalgo^g, Margarita Arboleda^h, Salim Mattar^c, Sergio Solariⁱ, Juan D. Rodas^{a,*}

Kafkas Univ Vet Fak Derg
24 (6): 829-834, 2018
DOI: 10.9775/kvfd.2018.19982

KAFKAS UNIVERSITESI VETERINER FAKULTESI DERGISI
JOURNAL HOME-PAGE: <http://vetdergi.kafkas.edu.tr>
ONLINE SUBMISSION: <http://submit.vetdergikafkas.org>

Research Article

***Babesia* spp. in Dogs from Córdoba, Colombia**

Carmen GALVÁN^{1,a} Jorge MIRANDA^{1,b} Salim MATTAR^{1,c}  Juan BALLUT^{1,d}

¹ Instituto de Investigaciones Biológicas del Trópico, Facultad de Medicina Veterinaria y Zootecnia, Universidad de Córdoba, Montería, COLOMBIA

^a ORCID: 0000-0002-3782-1473; ^b ORCID: 0000-0002-7110-7791; ^c ORCID: 0000-0003-0526-4630; ^d ORCID: 0000-0002-1008-5496

Tick-borne diseases



***Rickettsia* sp. Strain Colombianensi (Rickettsiales: Rickettsiaceae) : A New Proposed *Rickettsia* Detected in *Amblyomma dissimile* (Acari: Ixodidae) from Iguanas and Free-Living Larvae Ticks from Vegetation**

Author(s): Jorge Miranda, Aránzazu Portillo, José A. Oteo, and Salim Mattar

Source: Journal of Medical Entomology, 49(4):960-965. 2012.

2019; Microbiol Resour Announc 8:e01433-18. <https://doi.org/10.1128/MRA.01433-18>.

Genome Sequence of “*Candidatus Rickettsia colombianensi*,” a Novel Tick-Associated Bacterium Distributed in Colombia



Zoonotic diseases

2014

Coxiella burnetii in bulk tank milk and antibodies in farm workers at Montería, Colombia[□]

Coxiella burnetii en leche de tanque y anticuerpos en trabajadores rurales en Montería, Colombia

Coxiella burnetii em leite de tanque bovina e anticorpos em trabalhadores rurais de Montería, Colômbia

Verónica Contreras¹, Biol. MSc; Salim Máttar^{1*}, Ph.D; Marco González¹, MV, MSc; Jaime Álvarez¹, MV, MSc; José A Oteo² MD, Ph.D.

Rev. salud pública. 16 (6): 958-961, 2014

Caso en Salud Pública/Public Health Case

Infection by *Coxiella burnetii* in a patient from a rural area of Montería, Colombia

Infección por *Coxiella burnetii* en un paciente de un área rural de Montería, Colombia

Salim Mattar¹, Verónica Contreras¹, Marco González¹, Francisco Camargo², Jaime Álvarez¹ y José A. Oteo³

2014



infectio

ARTÍCULO ORIGINAL

Coxiella burnetii infection in sheep and goats: a public risk health, Colombia

Verónica Contreras¹, Marco Gonzalez¹, Jaime Alvarez¹, Salim Mattar^{1,*}

2018

Short communication

First molecular evidence of *Coxiella burnetii* infecting ticks in Cuba

Angel A. Noda^{a,*}, Islay Rodríguez^a, Jorge Miranda^b, Verónica Contreras^b, Salim Mattar^b

^a Instituto de Medicina Tropical "Pedro Kouri", Habana, Cuba

^b Instituto de Investigaciones Biológicas del Trópico, Universidad de Córdoba, Montería, Colombia

2015



Rodent-borne diseases

Emerging Infectious Diseases • www.cdc.gov/eid • Vol. 10, No. 12, December 2004
2004

Serologic Evidence of Hantavirus Infection in Humans, Colombia

2004

Primera Evidencia Serológica de Infección por Hantavirus en Roedores, en Colombia

Ader Alemán¹, Haydeé Iguarán², Henry Puerta³, César Cantillo⁴, James Mills⁵, William Ariz⁶ y Salim Mattar.⁷

Antibody to Arenaviruses in Rodents, Caribbean Colombia

Emerging Infectious Diseases • www.cdc.gov/eid • Vol. 17,
No. 7, July 2011

2013

Mem Inst Oswaldo Cruz, Rio de Janeiro, Vol. 108(2): 167-171, April 2013 167

Prevalence of antibody to hantaviruses in humans and rodents in the Caribbean region of Colombia determined using Araraquara and Maciel virus antigens

Camilo Guzmán¹, Salim Mattar^{1/+}, Silvana Levis², Noemí Pini²,
Tadeu Figueiredo³, James Mills⁴, Jorge Salazar-Bravo⁵

Rodent-borne diseases



ELSEVIER

Contents lists available at ScienceDirect

International Journal of Infectious Diseases

journal homepage: www.elsevier.com/locate/ijid



Short Communication

2015

Serological diagnosis of hantavirus pulmonary syndrome in a febrile patient in Colombia

Salim Mattar^{a,*}, Denisse Garzon^a, Luis Tadeu^b, Alvaro A. Faccini-Martínez^c, James N. Mills^d

^a Instituto de Investigaciones Biológicas del Trópico, Universidad de Córdoba, Montería, Colombia

^b School of Medicine of Ribeirão Preto, University of São Paulo, Brazil

^c Departamento de Microbiología, Pontificia Universidad Javeriana, Bogotá, Colombia

^d Population Biology, Ecology and Evolution Program, Emory University, Atlanta, Georgia, USA

Hindawi
BioMed Research International
Volume 2018, Article ID 6473851, 8 pages
<https://doi.org/10.1155/2018/6473851>

2018

Research Article

Clinical and Epidemiological Status of Leptospirosis in a Tropical Caribbean Area of Colombia

Vaneza Tique,¹ Salim Mattar¹, Jorge Miranda,¹ Misael Oviedo,¹ Angel Noda,² Eney Montes,³ and Virginia Rodriguez¹

BRAZ J INFECT DIS 2016;20(5):507-508

2016



The Brazilian Journal of
INFECTIOUS DISEASES

www.elsevier.com/locate/bjid



Letter to the Editor

First serological evidence of hantavirus infection in humans from the Orinoquia region of Colombia[☆]





Calderón et al. *Ann Clin Microbiol Antimicrob* (2019) 18:11
<https://doi.org/10.1186/s12941-019-0308-y>

(2019) 18:11

Annals of Clinical Microbiology
and Antimicrobials

2019

RESEARCH

Open Access

Frugivorous bats in the Colombian Caribbean region are reservoirs of the rabies virus



Alfonso Calderón¹ , Camilo Guzmán² , Salim Mattar^{1*} , Virginia Rodríguez³ , Arles Acosta⁴ and Catty Martínez⁴

Acta Tropica 191 (2019) 178–184

2019



ELSEVIER

Contents lists available at ScienceDirect

Acta Tropica

journal homepage: www.elsevier.com/locate/actatropica



Eco-epidemiology of the Venezuelan equine encephalitis virus in bats of Córdoba and Sucre, Colombia



Camilo Guzmán^{a,b}, Alfonso Calderón^{a,b}, Catty Martínez^a, Misael Oviedo^a, Salim Mattar^{a,*}

Tropical infectious diseases

2015



Contents lists available at [ScienceDirect](http://www.sciencedirect.com)

Journal of Infection and Public Health

journal homepage: <http://www.elsevier.com/locate/jiph>

Undifferentiated tropical febrile illness in Cordoba, Colombia: Not everything is dengue

Salim Mattar^{a,*}, Vaneza Tique^a, Jorge Miranda^a, Eney Montes^b, Denisses Garzon^a

^a University of Cordoba, Montería, Córdoba, Colombia

^b Hospital San Jerónimo de Montería, Córdoba, Colombia

Revista Cubana de Medicina Tropical. 2018;70(1):45-54

2018

ARTÍCULO ORIGINAL

**Seroprevalencia de leptospirosis en pacientes
con síndrome febril no palúdico**

We need an international help to establish a sentinel center surveillance in the Colombian Caribbean region

