SALUD
SECRETARÍA DE SALUD

CENAPRECE
Centro Nacional de Programas Preventivos y Control de Enfermedades

Enfermedades Transmitidas por Vectores

RICKETTSIOSIS

2º Foro Binacional para la atención integral de la Rickettsiosis en la frontera Norte de México
2nd. Binational forum on whole care of Rickettsiosis in northern border of Mexico
8 al 10 de Junio del 2016/ June 8-10, 2016. Saltillo, Coahuila. México

KNIPLING BUSHLAND U.S. LIVESTOCK INSECTS RESEARCH LABORATORY
USDA AGRICULTURAL RESEARCH SERVICE
Kerrville TX

Avances en la Investigación Para Mitigar el Problema de Resistencia a los Garrapaticidas

Dr. Adalberto A. Pérez de León

Felicitación con Precaución

Public Health

Averting a malaria disaster: will insecticide resistance derail malaria control?

Janet Hemingway, Hilary Ranson, Alan Magill*, Jan Kolaczinski, Christen Fornadel, John Gimnig, Maureen Coetzee, Frederic Simard, Dabiré K Roch, Clément Kerah Hinzoumbe, John Pickett, David Schellenberg, Peter Gething, Mark Hoppé, Nicholas Hamon

Veterinary Parasitology 191 (2013) 97–101

Contents lists available at SciVerse ScienceDirect

Veterinary Parasitology

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

First report of fipronil resistance in *Rhipicephalus (Boophilus) microplus* of Mexico

Robert J. Miller[a,*], Consuelo Almazán[b], Martín Ortíz-Estrada[c], Ronald B. Davey[a], John E. George[d], Adalberto Peréz De León[d]

Veterinary Parasitology 201 (2014) 128–136

Contents lists available at ScienceDirect

Veterinary Parasitology

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

First report of fluazuron resistance in *Rhipicephalus microplus*: A field tick population resistant to six classes of acaricides

José Reck[1], Guilherme Marcondes Klafke*[,1], Anelise Webster, Bruno Dall'Agnol, Ramon Scheffer, Ugo Araújo Souza, Vivian Bamberg Corassini, Rafael Vargas, Julsan Silveira dos Santos, João Ricardo de Souza Martins

Instituto de Pesquisas Veterinárias Desidério Finamor (IPVDF), Fundação Estadual de Pesquisa Agropecuária (FEPAGRO), Eldorado do Sul, RS, Brazil

The Nobel Prize in Physiology or Medicine 2015

Ill. N. Elmehed. © Nobel Media AB 2015.

William C. Campbell

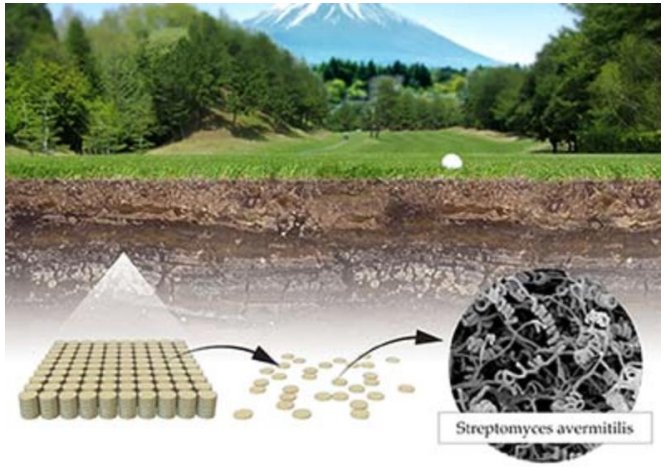
Ill. N. Elmehed. © Nobel Media AB 2015.

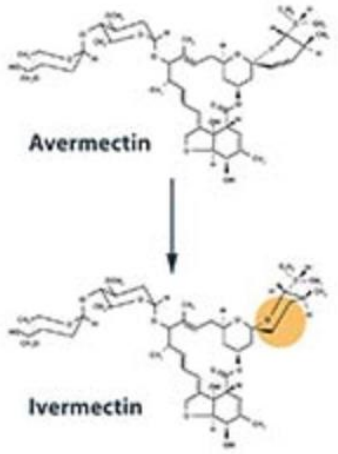
Satoshi Ōmura

Ill. N. Elmehed. © Nobel Media AB 2015.

Youyou Tu

The Prize was divided, one half jointly to William C. Campbell and Satoshi Ōmura *"for their discoveries concerning a novel therapy against infections caused by roundworm parasites"* and the other half to Youyou Tu *"for her discoveries concerning a novel therapy against Malaria"*





Enfermedades Transmitidas por Garrapatas: Sistemas Dinamicos en Flujo

TRANSLATING ECOLOGY, PHYSIOLOGY, BIOCHEMISTRY, AND POPULATION GENETICS RESEARCH TO MEET THE CHALLENGE OF TICK AND TICK-BORNE DISEASES IN NORTH AMERICA

Maria D. Esteve-Gassent
Department of Veterinary Pathobiology, College of Veterinary Medicine and Biomedical Sciences, Texas A&M University, College Station, Texas, USA

Ivan Castro-Arellano
Department of Biology, College of Science and Engineering, Texas State University, San Marcos, Texas, USA

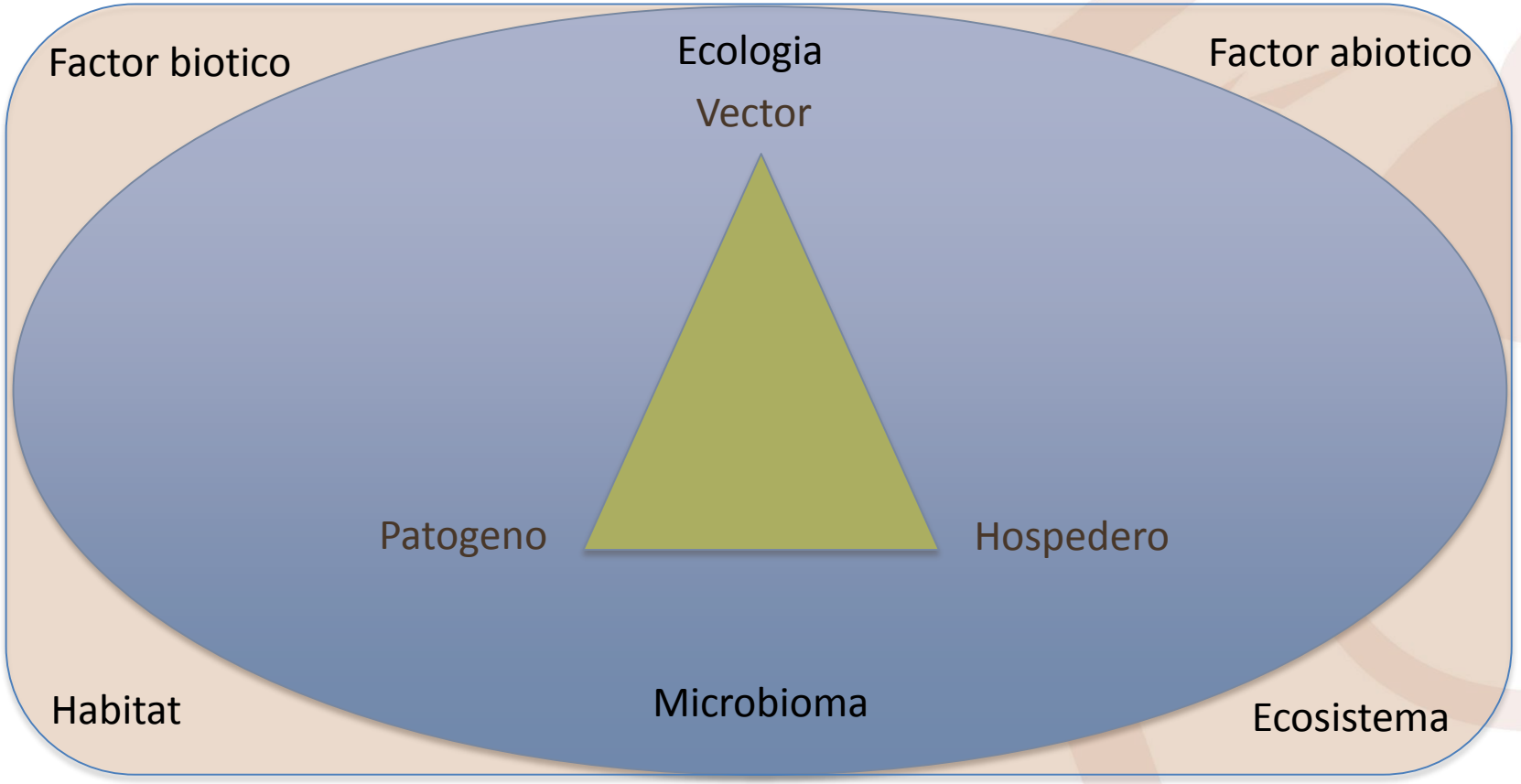
Teresa P. Feria-Arroyo and Ramiro Patino
Department of Biology, The University of Texas Rio Grande Valley, Edinburg, Texas, USA

Andrew Y. Li
Invasive Insect Biocontrol and Behavior Laboratory, USDA-ARS, Beltsville, Maryland, USA

Raul F. Medina
Department of Entomology, College of Agriculture and Life Sciences, Texas A&M University, College Station, Texas, USA

Adalberto A. Pérez de León
Knipling-Bushland U.S. Livestock Insects Research Laboratory, and Veterinary Pest Genomics Center, USDA-ARS, Kerrville, Texas, USA

Roger Iván Rodríguez-Vivas
Campus de Ciencias Biológicas y Agropecuarias, Facultad de Medicina Veterinaria y Zootecnia, Yucatán, México



SALUD
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CENAPRECE
CENTRO NACIONAL DE PROGRAMAS PREVENTIVOS Y CONTROL DE ENFERMEDADES

RICKETTSIOSIS

Vivir Mejor

SAGARPA

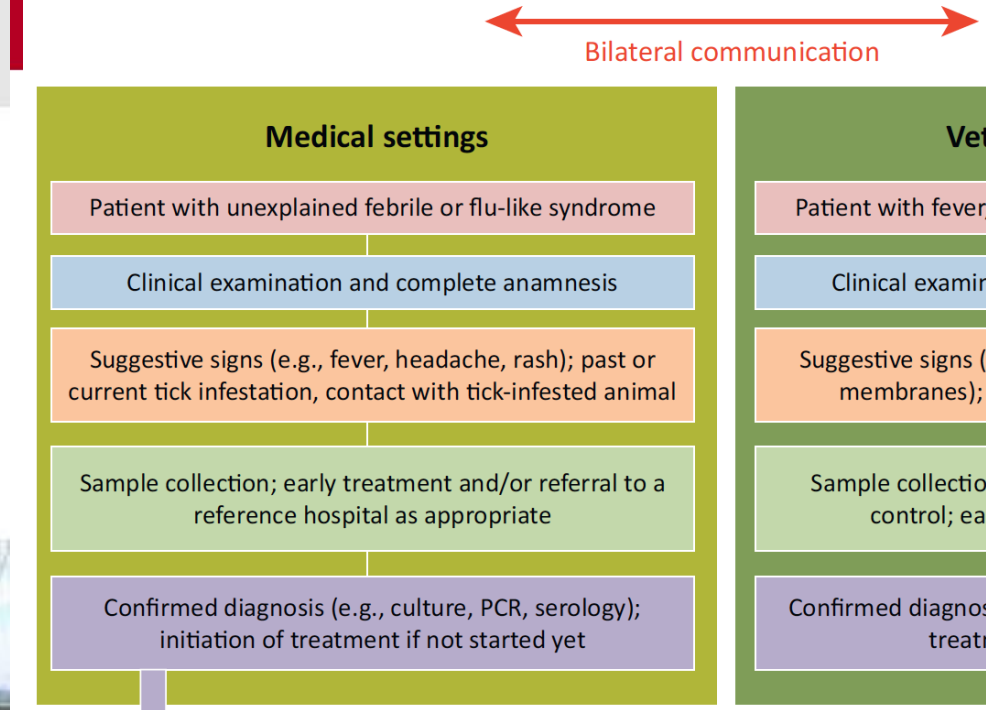
GOBIERNO FEDERAL

UNA FRONTERA; UNA SALUD

Oficina de Salud Fronteriza Binacional de California
Proyecto: Alerta Temprana para la Vigilancia de Enfermedades Infecciosas (EWIDS).
California Department of Public Health

San Diego, California
23 y 24 de junio de 2011

Av. Reforma y calle "L" s/n Col. Nueva, Mexicali, B.C. Tel. (686) 583 61 40 Ext. 73259



Review

Cell PRESS

Ticks and tick-borne diseases: a One Health perspective

Filipe Dantas-Torres[1,2], Bruno B. Chomel[3] and Domenico Otranto[2]

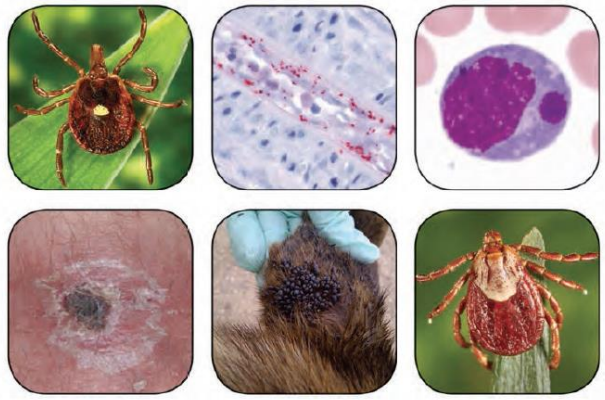
[1] Department of Immunology, Aggeu Magalhães Research Centre, Oswaldo Cruz Foundation, 50670-420 Recife, Pernambuco, Brazil
[2] Department of Veterinary Public Health, Faculty of Veterinary Medicine, University of Bari, 70010 Valenzano, Bari, Italy
[3] Department of Population Health and Reproduction, School of Veterinary Medicine, University of California, Davis, CA 95616, USA

TRENDS in Parasitology

Centers for Disease Control and Prevention
MMWR
Morbidity and Mortality Weekly Report
Recommendations and Reports / Vol. 65 / No. 2
May 13, 2016

Diagnosis and Management of Tickborne Rickettsial Diseases: Rocky Mountain Spotted Fever and Other Spotted Fever Group Rickettsioses, Ehrlichioses, and Anaplasmosis — United States

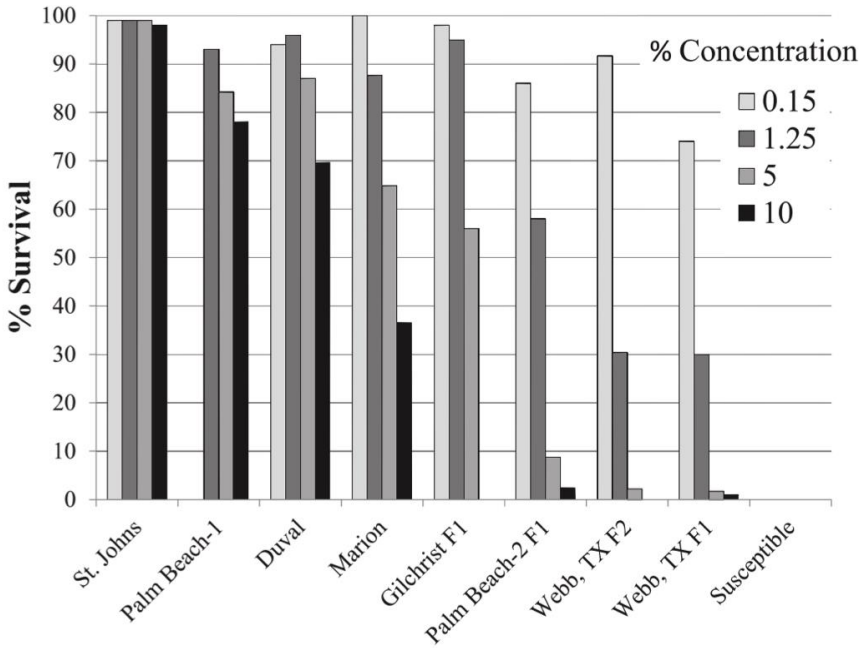
A Practical Guide for Health Care and Public Health Professionals



Continuing Education Examination available at http://www.cdc.gov/mmwr/cme/conted.html.

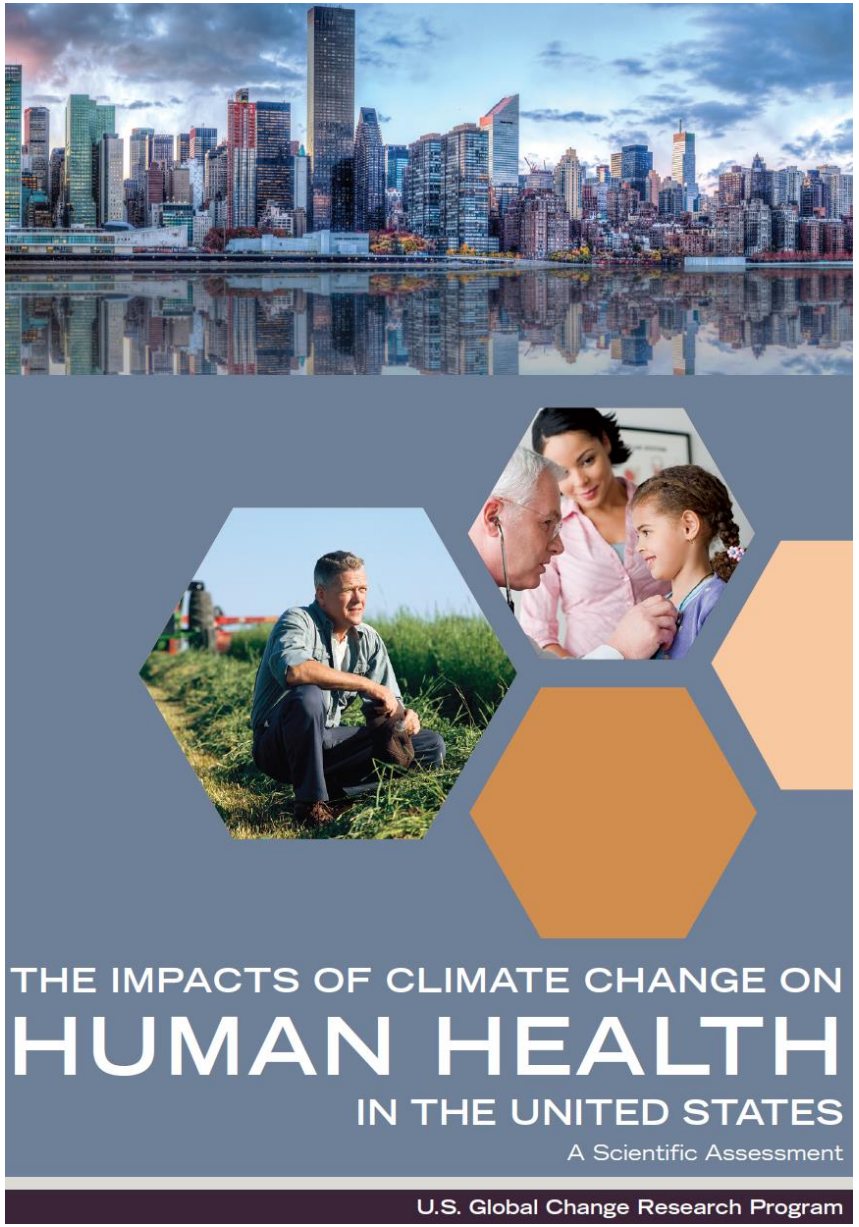
U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

Pyrethroid Resistance in *Brown Dog Ticks: USA*



Tick strain	*n*	Slope (SE)	LC_{50} (95% CI)	LC_{90} (95% CI)	RR_{50}	RR_{90}
Susceptible	5,240	4.64 (0.15)	0.027 (0.026–0.028)	0.051 (0.048–0.054)	—	—
Broward	1,945	—	>10	ND	>370	—
Duval	1,442	—	>10	ND	>370	—
Gilchrist F1	2,209	—	>30	ND[a]	1,100	—
Gilchrist F2	4,302	—	>5	ND[b]	>185	—
Marion	800	—	>10	ND	>370	—
Palm Beach-1	1,025	—	>10	ND	>370	—
Palm Beach-2 F1	1,245	1.46 (0.08)	0.775 (0.646–0.929)	5.860 (4.384–8.451)	29*	115*
Palm Beach-2 F1a	2,505	—	>7	ND	>250	—
Sarasota-2	2,419	—	>7	ND	>250	—
St. Johns	1,760	—	>10	ND	>370	—
Webb, TX F1	1,913	2.19 (0.11)	0.703 (0.569–0.843)	2.71 (2.190–3.567)	26*	53*
Webb, TX F2	3,221	2.58 (0.82)	0.833 (0.759–0.908)	2.615 (2.362–2.963)	31*	51*

Lethal concentration determined using Probit analysis. Values represent percentage of active ingredient (w/v) applied to treated filter papers $7.5 \times 8.5\ cm^2$.
ND, lethal concentrations could not be determined due to low mortality at 10% active ingredient, unless otherwise stated.
[a] Low mortality at all concentrations beginning at 5% active ingredient. No effect determined by chemical treatment.
[b] Low mortality at 30% active ingredient. Unable to obtain specific levels, but resistance demonstrated.
*Indicates significance at corresponding LC-value due to nonoverlapping confidence intervals ($P > 0.05$).
RR, resistance ratio.



Eiden, A. L., Kaufman, P. E., Oi, F. M., Allan, S. a. & Miller, R. J. Detection of Permethrin Resistance and Fipronil Tolerance in Rhipicephalus sanguineus (Acari: Ixodidae) in the United States. *J. Med. Entomol.* **52,** 429–436 (2015).

Veterinary Parasitology 215 (2016) 106–113

Contents lists available at ScienceDirect

Veterinary Parasitology

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

Ticks collected from humans, domestic animals, and wildlife in Yucatan, Mexico

R.I. Rodríguez-Vivas[a,*], D.A. Apanaskevich[b], M.M Ojeda-Chi[a], I. Trinidad-Martínez[a], E. Reyes-Novelo[c], M.D. Esteve-Gassent[d], A.A. Pérez de León[e]

Table 3
Municipality, species, number of examined specimens, developmental stage, and sex of Ixodid ticks collected from humans in Yucatan, Mexico.

Municipality	Ticks species	Number, stage, and sex of ticks
Tizimin	*Amblyomma parvum*	1F
	Rhipicephalus sanguineu s.l.	4M
	Amblyomma mixtum	2F
Panaba	*Amblyomma mixtum*	1M, 3F
	Rhipicephalus sanguineus s.l.	1M, 2F
Tzucacab	*Amblyomma mixtum*	1M, 3F
	Rhipicephalus sanguineus s.l.	1M, 2F
Tzucacab	*Rhipicephalus microplus*	18L

M: male, F: female, L: larvae, *Rhipicephalus sanguineus s.l.: Rhipicephalus sanguineus* sensu lato.

Primer reporte de *Rhipicephalus sanguineus* sensu lato resistente a amitraz y cipermetrina (Rodríguez-Vivas et al., 2016, en revisión en Medical and Veterinary Entomology).

Metodología:

- Se evaluaron 14 poblaciones de *R. sanguineus* s.l. en Yucatán, México.
- Las poblaciones de garrapatas provenían de perros en clínica veterinarias, hogares y ranchos ganaderos.
- Diagnóstico de resistencia: Prueba de inmersión de larvas.

Resultados

Amitraz:

- 12 poblaciones de garrapatas (85.7%) fueron clasificadas como resistentes con baja variación interpoblaciones.
- Factor de resistencia a la DL50%: 1-13

Resultados

Cipermetrina:

- **12 poblaciones de garrapatas (85.7%) fueron clasificadas como resistentes con alta variación interpoblaciones.**
- **Factor de resistencia a la DL50%: 1-104**

Conclusiones

- **La Resistencia de *R. sanguineus* s.l. al amitraz es común en perros de Yucatán pero en bajos niveles, pero la resistencia a los Piretroides (cipermetrina) es alarmante debido al alto nivel de resistencia.**
- **El uso intensivo de amitraz y piretroides (cipermetrina) probablemente aumente el problema de resistencia de *R. sanguineus* s.l. con fallas evidentes en el control.**

Scientific Note

Rickettsia rickettsii and *Rickettsia felis* infection in *Rhipicephalus sanguineus* ticks and *Ctenocephalides felis* fleas co-existing in a small city in Yucatan, Mexico

Gaspar Peniche-Lara[1]✉, Bertha Jimenez-Delgadillo[1], and Karla Dzul-Rosado[2]

Biomédica 2016;36(Supl.1):45-50
doi: http://dx.doi.org/10.7705/biomedica.v36i2.2913

ARTÍCULO ORIGINAL

Detección molecular de *Rickettsia typhi* en perros de una comunidad rural de Yucatán, México

Daly Martínez-Ortiz[1], Marco Torres-Castro[2], Edgar Koyoc-Cardeña[3], Karina López[2], Alonso Panti-May[3], Iván Rodríguez-Vivas[4], Adriano Puc[1], Karla Dzul[2], Jorge Zavala-Castro[2], Anuar Medina-Barreiro[3], Juan Chablé-Santos[5], Pablo Manrique-Saide[3,5]

A Mutation in a voltage-gated Sodium Channel gene is Associated with Pyrethroid Resistance in the Brown Dog Tick, *Rhipicephalus sanguineus*

Jason Tidwell, Rafael Barreto, Felix Guerrero, Phil Kaufman, Adalberto Pérez de León, & Robert Miller

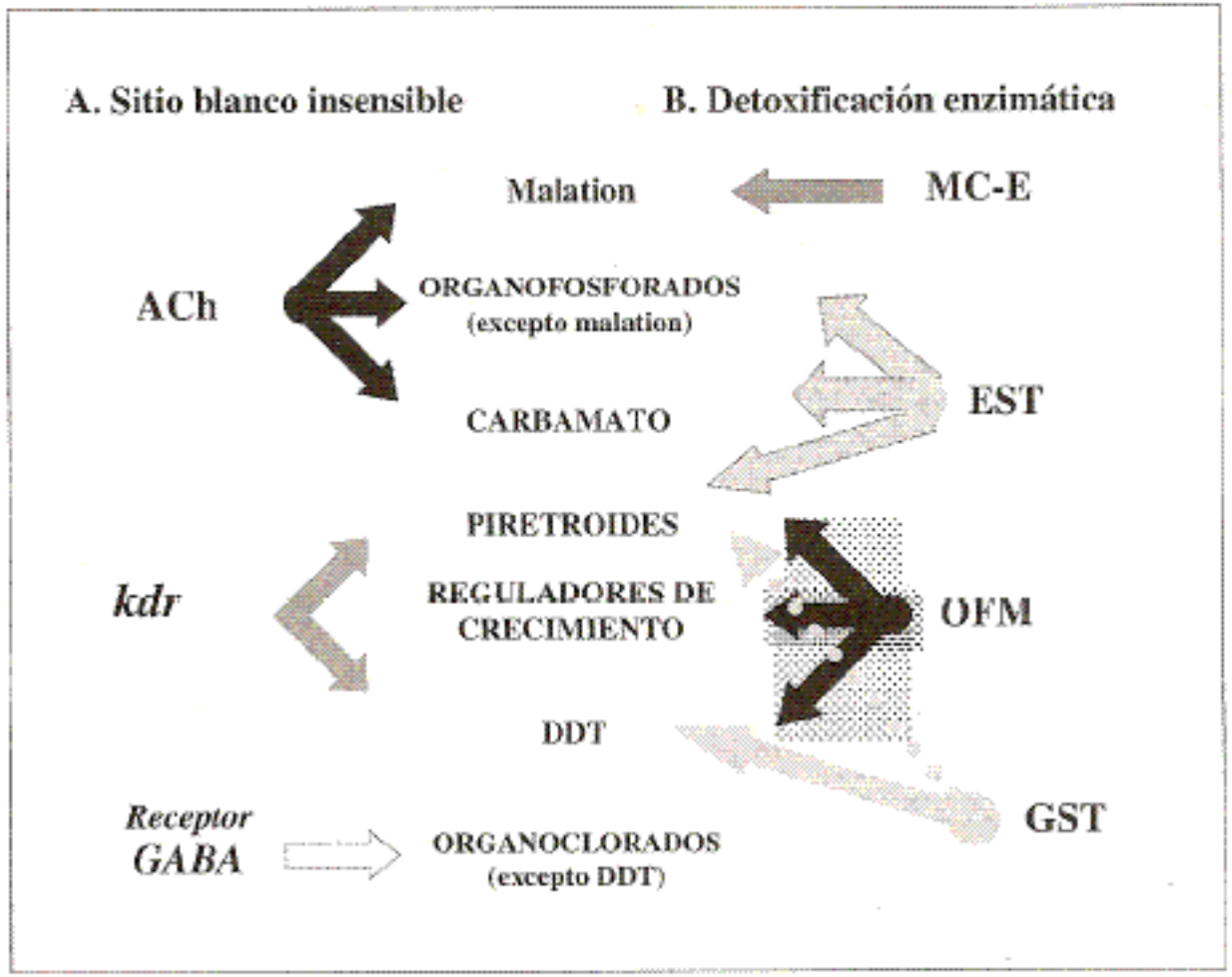
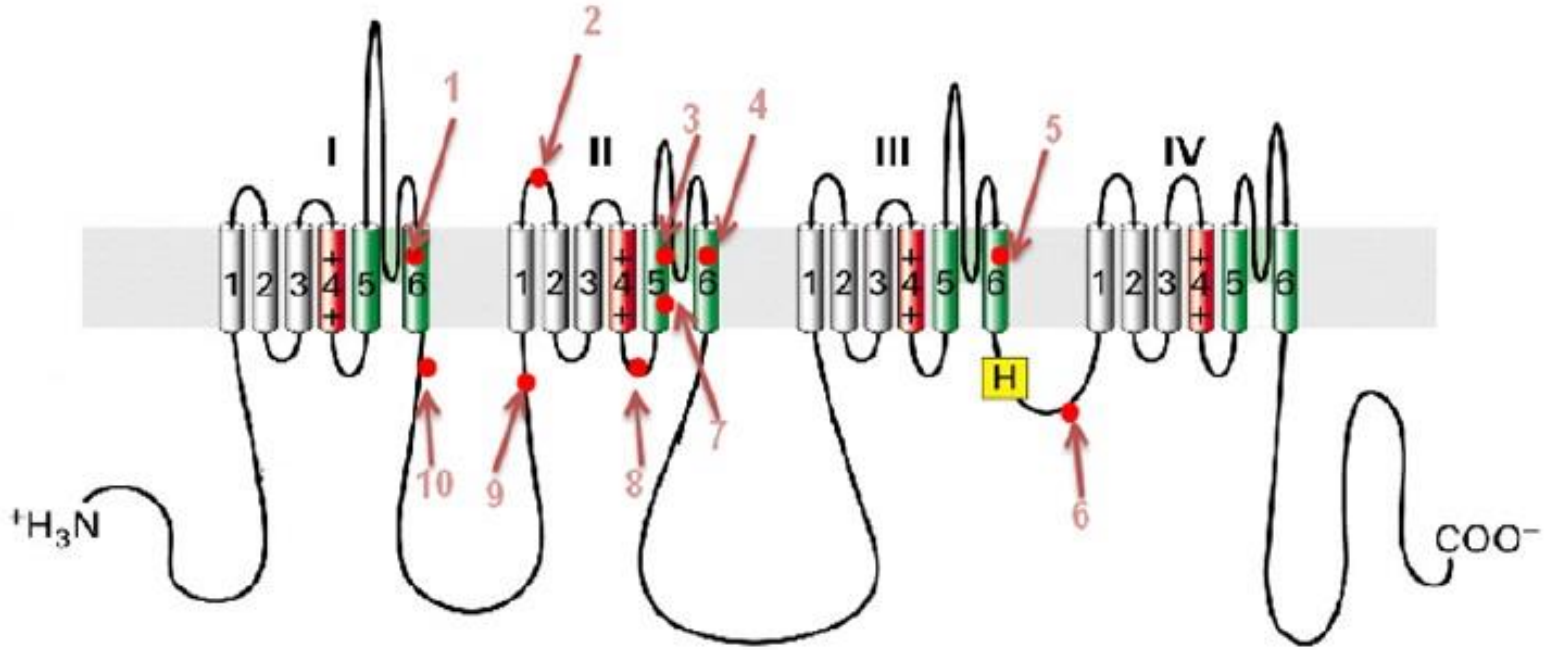


Figura 1. Mecanismos de Resistencia a Insecticidas. *AchE:* Acetilcolinestarasa Inhibida. *Kdr:* resistencia "Knockdown". *GST*: Glutation S-transferasas. EST: Esterasas inespecíficas. OFM: Oxidasas de función mixta. MC-E: Malation carboxil-esterasas.

Fuente: Fonseca y Quiñones 2005

Figura 1. Mutaciones de la resistencia de derribe (*kdr*) en canales de sodio de diversos artrópodos.
Figure 1. Knock down resistance (kdr) mutations in insect sodium channels.



Solamente se muestran (como puntos rojos) aquellas mutaciones *kdr* en las que se ha confirmado la reducción de la sensibilidad a Piretroides sintéticos (SP). / *Only those* ***kdr*** *mutations that have been confirmed to reduce the sodium channel sensitivity to SPs are indicated (solid red dots).*

1 (V → M, *H. virescens*), 2 (M → I, *P. capitis*), 3(L →F, *P. capitis*), 4 (L → F/HS, many insects), 5 (F → I, *R. (B.) microplus*), 6 (L → P, *V. destructor*), 7 (T → I/C/V, *P. xyllostella, P. capitis, F. occidentalis, C. felis*), 8 (M → T, *M. domestica, H. irritans;* L→I, *R. (B.) microplus*), 9 (C → A, *B. germanica*), 10 (E → K, *B. germanica*).

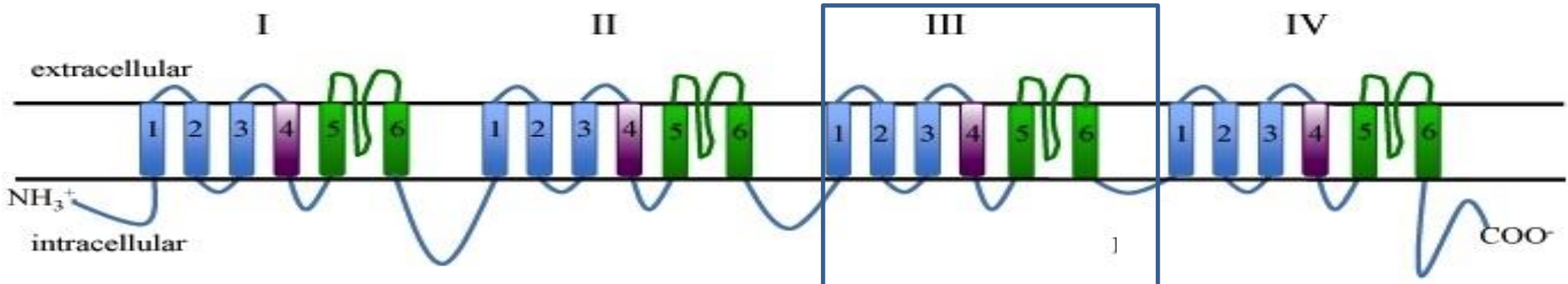
Adapted from Lodish *et al*[40], Dong[38] and Morgan *et al*[41].

Fuente: Rodriguez Vivas et al. 2012

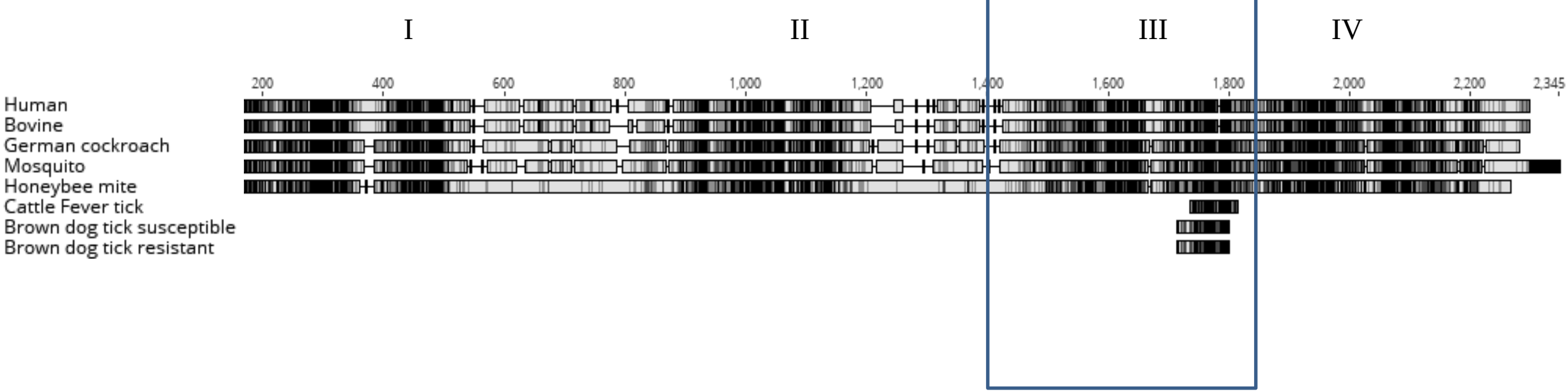
Methods

- Design degenerate primers for domains III of the sodium channel
- RNA extraction and cDNA synthesis
- Touchdown PCR
- Sequence PCR amplicons
- Sequence analysis through BLAST and Geneious

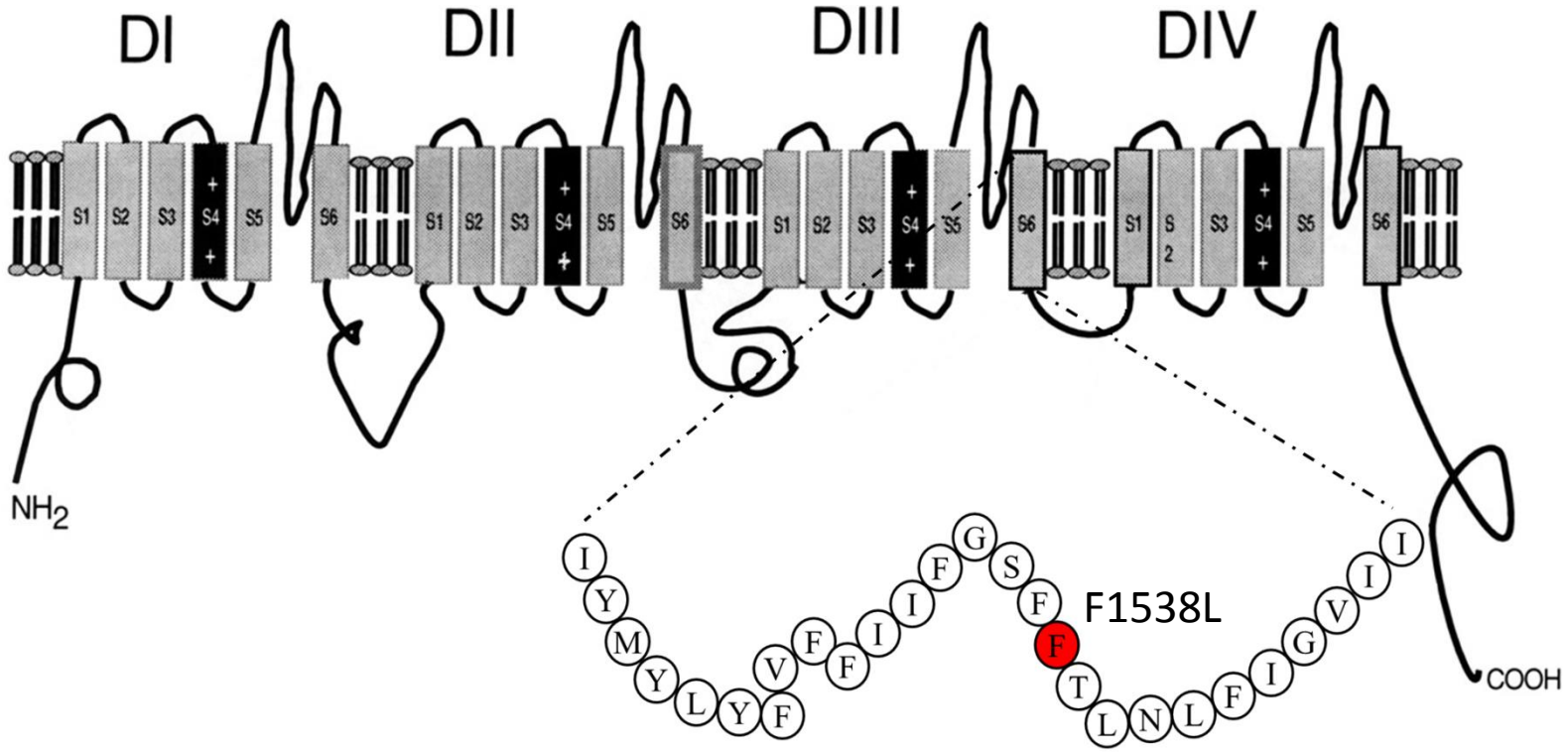
Sodium Channel Alignment

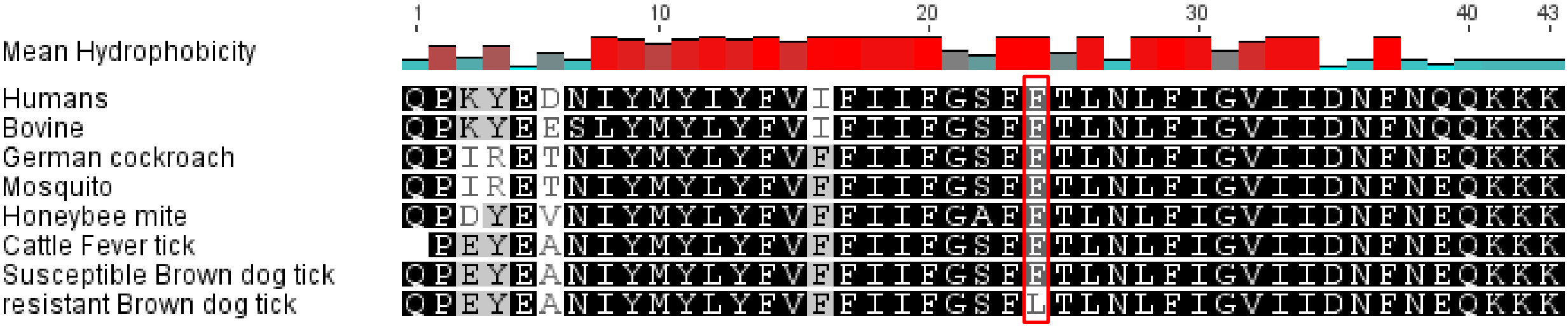


Wakeling, E. N., Atchison, W. D. & Neal, A. P. in *Pestic. - Adv. Chem. Bot. Pestic.*

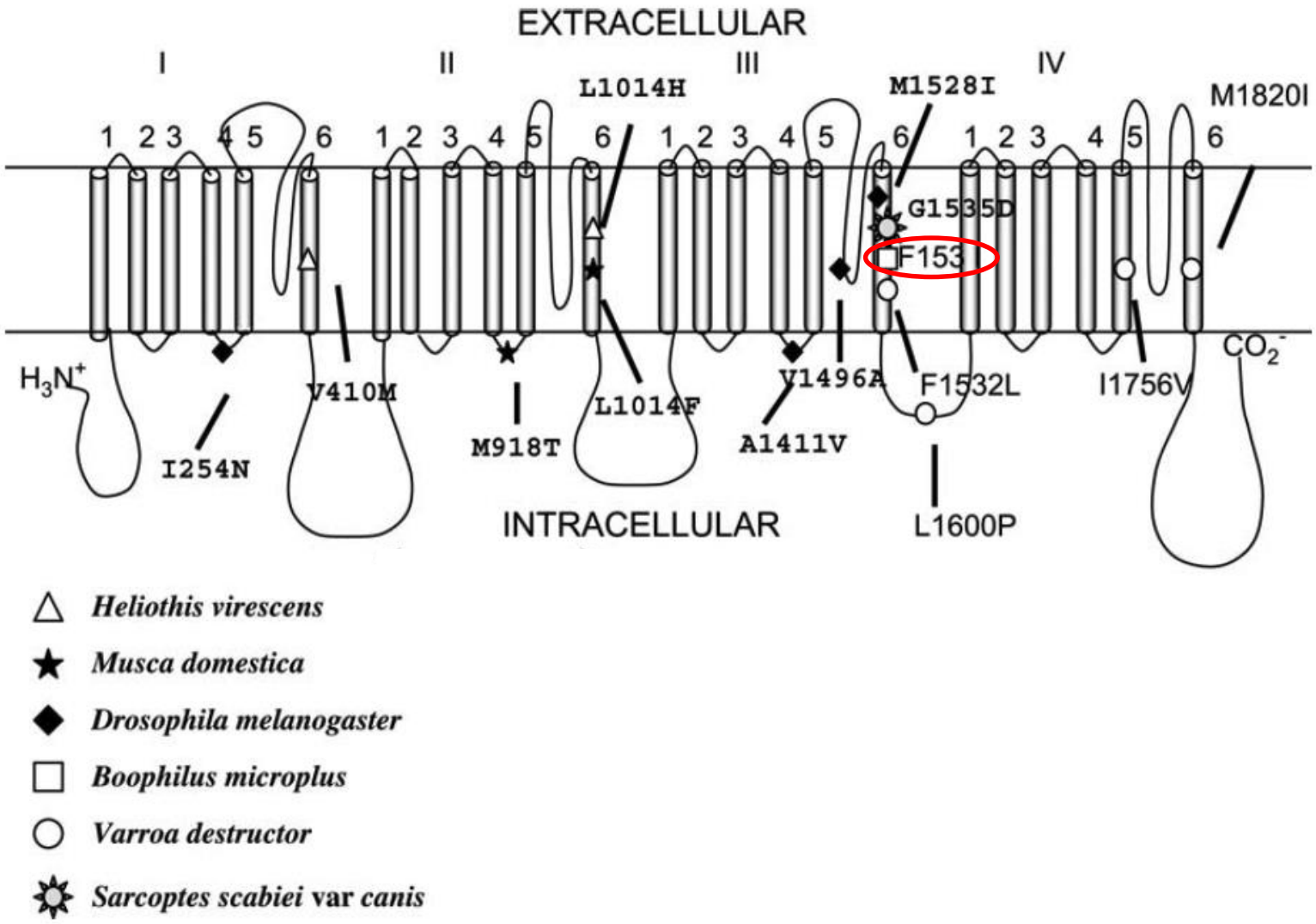


Sodium Channel domain III S6





kdr Mutations



Pasay, C. *et al.* High-resolution melt analysis for the detection of a mutation associated with permethrin resistance in a population of scabies mites. *Med. Vet. Entomol.* **22,** 82–88 (2008).

Next Step

- Design specific primers for the mutation in Domain III S6 of the Brown dog tick, *Rhipicephalus sanguineus*
- Test individual tick larval samples for allelic ratios
- Test individual tick larval samples for correlation to the acaricide resistance phenome

NEWS RELEASE

Texas Animal Health Commission
"Serving Texas Animal Agriculture Since 1893"
Andy Schwartz, DVM • Executive Director
P.O. Box 12966 • Austin, Texas 78711 • (800) 550-8242 http://www.tahc.texas.gov
For more information contact the Communications Dept. at 512-719-0750 or at callie.ward@tahc.texas.gov

June 7, 2016

Tackling the Cattle Fever Tick with Vaccine

AUSTIN – The Texas Animal Health Commission (TAHC) is proud to announce the arrival of a new tool in fever tick eradication efforts. The new fever tick vaccine will be a valuable tool for reducing the risk of new fever tick infestations in quarantine areas such as the tick eradication quarantine area, or permanent quarantine zone, and in temporary preventative or control quarantine areas.

After more than five years of cooperative research and development between USDA - Agricultural Research Services (ARS), USDA – Veterinary Services (VS) and Zoetis, the first doses of the vaccine were delivered to TAHC on May 17. Plans are underway to hold producer meetings in the counties along the permanent quarantine zone to provide information on the effectiveness and use of the vaccine and provide producers the opportunity to ask questions. The dates of these meetings will be set in the coming weeks.

"There are numerous benefits of the fever tick vaccination, with the most significant being the potential to prevent the establishment of fever tick infestations on properties where cattle are being grazed. Additionally, the vaccine will be another tool aiding in more rapid eradication of fever ticks on infested premises," said Dr. Andy Schwartz, TAHC Executive Director.

Vaccinating cattle on a property with fever ticks will help assure that ticks are eradicated as quickly as possible under established gathering, inspection, and treatment schedules. While proper use of the vaccine helps assure ticks are eradicated as soon as possible so quarantines can be lifted, it does not eliminate the need to do regular inspections.

The vaccine will be administered by state or federal regulatory personnel at no cost to the producer. It is approved for use in beef cattle only, two months of age and older. To be most effective, the vaccine should be administered as two priming doses given 28 days apart followed by a booster every 6 months.

TAHC, USDA-VS, and USDA-ARS continue to investigate other treatment and/or preventative products to find additional options with comparable efficacy, greater residual effect, better protection from both strains of fever ticks found in current infestations in Texas, and less frequent treatments in an effort to achieve fever tick eradication.

Commercial Anti-tick vaccines:

TickGARD (Australia)

Gavac (Cuba)

Both use recombinant Bm86 tick protein.

Registration / commercialization in Australia and Latin American countries 1993-1997.

Continued field use in the following decade.

CSIRO

Dr. Peter Willadsen

Cattle tick
Boophilus microplus

Dr. Manuel Rodriguez Valle

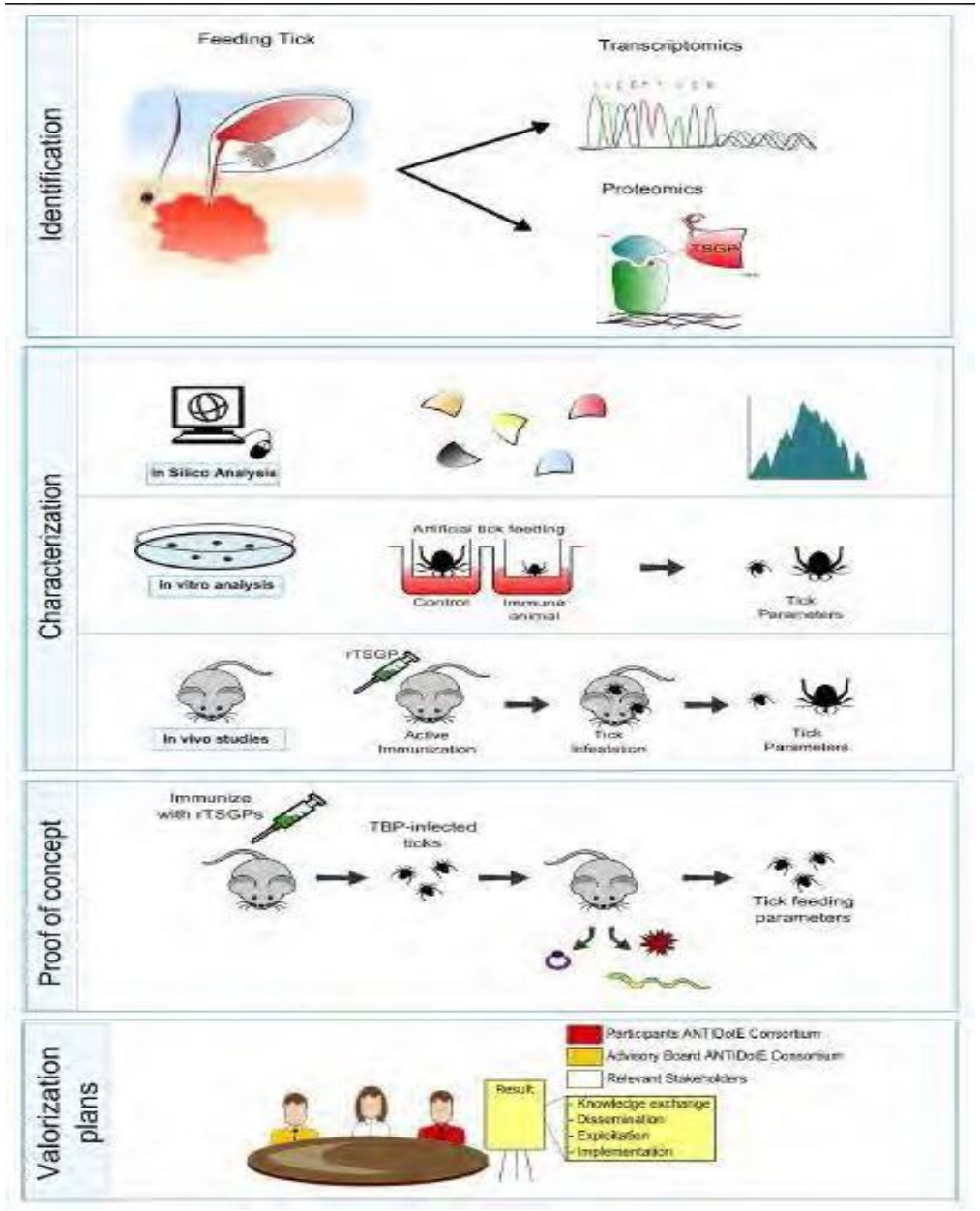
Dr. Jose de la Fuente

The Center for Genetic Engineering and Biotechnology (CIGB) was inaugurated on July 1, 1986.

European approach toward solving ticks and tick-borne disease affecting humans, animals and wildlife

ANTIDotE:
ANti-tick vaccines to prevent TIck-borne Diseases in Europe

Ixodes ricinus



Sprong *et al*. 2014. Parasites & Vectors 7:77.

Schetters *et al. Parasites & Vectors* (2016) 9:105
DOI 10.1186/s13071-016-1386-8

Parasites & Vectors

MEETING REPORT Open Access

Cattle tick vaccine researchers join forces in CATVAC

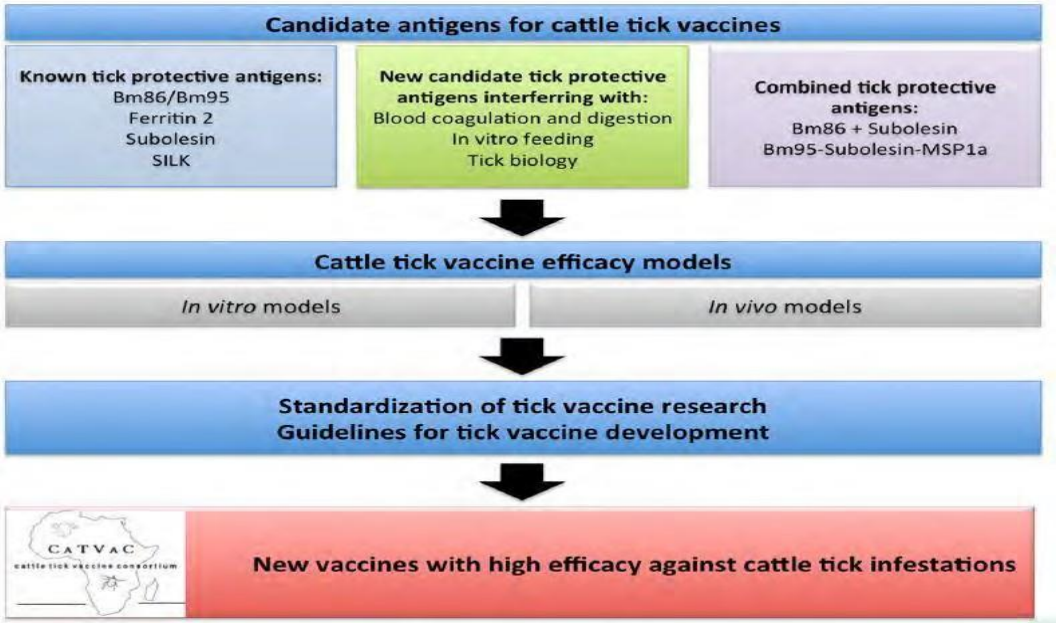
Theo Schetters[1,2*], Richard Bishop[3], Michael Crampton[4], Petr Kopáček[5], Alicja Lew-Tabor[6,7], Christine Maritz-Olivier[8], Robert Miller[9], Juan Mosqueda[10], Joaquín Patarroyo[11], Manuel Rodriguez-Valle[6], Glen A. Scoles[12] and José de la Fuente[13,14]

Cattle Tick Vaccine Consortium

(**CATVAC**)

- A meeting sponsored by the Bill & Melinda Gates Foundation was held at the Avanti Hotel, Mohammedia, Morocco. July 14–15, 2015.
- The meeting resulted in the formation of the Cattle Tick Vaccine Consortium (CATVAC).

Working pipeline proposed by CATVAC for development of effective vaccines for cattle tick control



Journal of Chromatography B, 1022 (2016) 64–69

Contents lists available at ScienceDirect

Journal of Chromatography B

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

Quantification of brown dog tick repellents, 2-hexanone and benzaldehyde, and release from tick-resistant beagles, *Canis lupus familiaris*

Jaires Gomes de Oliveira Filho[a], André Lucio Franceschini Sarria[b], Lorena Lopes Ferreira[a], John C. Caulfield[b], Stephen J. Powers[c], John A. Pickett[b], Adalberto A. Pérez de León[d], Michael A. Birkett[b], Lígia Miranda Ferreira Borges[e,*]

- *Rhipicephalus sanguineus* sensu lato repellency by the tick resistant dog breed, the beagle, is mediated by the volatile organic compounds 2-hexanone and benzaldehyde present in beagle odour.
- The aim of this study was to quantify the release rate, and the ratio, of 2-hexanone and benzaldehyde from beagles.
- Compounds were identified using GC–MS, and authentic standards of compounds were used to generate external calibration curves for quantification. Both compounds were found in all dogs on all days and the amount of benzaldehyde was always higher than that of 2-hexanone.
- This knowledge enables the development of repellents to protect dogs from *R. sanguineus* infestation.

Conclusiones

- Resistencia a los acaricidas es inevitable
- Amenaza requiere actitud proactiva y anticipación
- Manejo integrado requiere planes para rotación de garrapaticidas con diferentes modos de acción
- Sustentabilidad de los programas requiere la incorporación de otras tecnologías
- Concepto de Una Salud ayuda a mitigar la carga de enfermedades transmitidas por garrapatas

Acknowledgements

- Rafael Barreto - FEPAGRO
- Dr. Felix Guerrero – USDA/ARS
- Dr. Phil Kaufman – University of Florida
- Dr. Robert Miller – USDA/ARS Cattle Fever Tick Research Laboratory
- USDA/ARS – Cattle Fever Tick Research Laboratory

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Centro Nacional de Programas Preventivos y Control de Enfermedades

Enfermedades Transmitidas por Vectores

RICKETTSIOSIS

2º Foro Binacional para la atención integral de la Rickettsiosis en la frontera Norte de México
2nd. Binational forum on whole care of Rickettsiosis in northern border of Mexico

8 al 10 de Junio del 2016/ June 8-10, 2016. Saltillo, Coahuila. México

USDA AGRICULTURAL RESEARCH SERVICE
KNIPLING BUSHLAND U.S. LIVESTOCK INSECTS RESEARCH LABORATORY
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¡Muchas Gracias!