Curriculum Vitae

Maria Eugenia FRANCIA VINA

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Sistema Nacional de Investigadores

Ciencias Naturales y Exactas / Ciencias Biológicas

Categorización actual: Nivel I

Ingreso al SNI: Asociado (01/06/2013)

Datos generales

Información de contacto

E-mail: mfrancia@pasteur.edu.uy

Teléfono: 25220910

Dirección: Mataojo 2020. Montevideo, Uruguay. 11400

URL: http://www.linkedin.com/profile/edit?trk=hb_tab_pro_top

Institución principal

Unidad de Biologia Molecular / Institut Pasteur de Montevideo / Institut Pasteur de Montevideo / Uruguay

Dirección institucional

Dirección: Instituto Gulbenkian de Ciencia / Rua da Quinta Grande 6 / Oeiras / Oeiras / Portugal

Teléfono: (+351) 214407925

E-mail/Web: mfrancia@uga.edu / http://www.linkedin.com/profile/edit?trk=hb_tab_pro_top

Formación

Formación concluida

Formación académica/Titulación

Posgrado

2009 - 2013 Doctorado

University of Georgia , Estados Unidos

Título: MOLECULAR DISSECTION OF CELL DIVISION IN APICOMPLEXAN PARASITES

Tutor/es: Boris Striepen

Obtención del título: 2013

Becario de: National Instutes of Health , Estados Unidos

Sitio web de la Tesis: http://athenaeum.libs.uga.edu/handle/10724/29039

Palabras clave: Microscopia ; Biologia Molecular/ Genetica Molecular ; Toxoplasma gondii; Division Celular; Estructura Nuclear

Areas del conocimiento: Ciencias Naturales y Exactas / Ciencias Biológicas / Bioquímica y Biología Molecular / Parasitologia

2007 - 2009 Maestría

University of Idaho , Estados Unidos

Título: Characterization of two Sodium Hydrogen Exchanger isoforms in the Apicomplexa Toxoplasma gondii

Tutor/es: Gustavo Arrizabalaga

Obtención del título: 2009

Becario de: National Instutes of Health , Estados Unidos

Sitio web de la Tesis:
http://books.google.com/books/about/Characterization_of_two_sodium_hydrogen.html?id=qzw4QwAACAAJ

Areas del conocimiento: Ciencias Naturales y Exactas / Ciencias Biológicas / Bioquímica y Biología Molecular / Parasitologia

Grado

2004 - 2007 Grado

University of Idaho , Estados Unidos

Obtención del título: 2007

Areas del conocimiento: Ciencias Naturales y Exactas / Ciencias Biológicas / Biología Celular, Microbiología / Bioquimica / Biologia Molecular

Formación complementaria

Cursos corta duración

05 / 2015 - 05 / 2015 EMBO Laboratory Management Course for post-docs

European Molecular Biology Organization , Alemania

Palabras clave: Gestion; Comunicacion; Liderazgo; Motivacion

Areas del conocimiento: Humanidades / Otras Humanidades / Otras Humanidades

04 / 2015 - 04 / 2015 Fundamentals and Application in Flow Cytometry

Instituto Gulbenkian de Ciencia , Portugal

Palabras clave: FACS; Citometria

Areas del conocimiento: Ciencias Naturales y Exactas / Ciencias Biológicas / Bioquímica y Biología Molecular / Microscopia/Division Celular/Parasitologia/Centrosoma

08 / 2010 - 12 / 2010 Practical Course on Transmission and Scanning Electron microscopy

University of Georgia , Estados Unidos

Palabras clave: Microscopia ; Electronica; Barrido; Transmision

02 / 2010 - 05 / 2010 Biomedical Grant Writing

University of Georgia , Estados Unidos

Palabras clave: Subsidio; Grant

Otras instancias

2014 Congresos

Nombre del evento: Centrosomes and Spindle Pole Bodies

Institución organizadora: European Molecular Biology Organization (EMBO) , Portugal

Palabras clave: Polo-like kinase 4; Centrosoma; Division Celular

Areas del conocimiento: Ciencias Naturales y Exactas / Ciencias Biológicas / Biología Celular, Microbiología

2012 Congresos

Nombre del evento: Molecular Parasitology Meeting

Institución organizadora: Marine Biological Laboratories , Estados Unidos

2012 Congresos

Nombre del evento: Gordon Research Conference. Biology of Host-Parasite Interactions

Institución organizadora: Salve Regina University , Estados Unidos

2011 Congresos

Nombre del evento: Molecular Parasitology Meeting

Institución organizadora: Marine Biological Laboratories , Estados Unidos

2008 Congresos

Nombre del evento: 19th Annual Parasitology Meeting

Institución organizadora: Seattle Biomedical Research Institute , Estados Unidos

2008 Congresos

Nombre del evento: Molecular Parasitology Meeting

Institución organizadora: Marine Biological Laboratories , Estados Unidos

2012 Simposios

Nombre del evento: Center for Tropical and Emerging Diseases Research Symposium

Institución organizadora: University of Georgia , Estados Unidos

2011 Simposios

Nombre del evento: Center for Tropical and Emerging Diseases Research Symposium

Institución organizadora: University of Georgia , Estados Unidos

2015 Talleres

Nombre del evento: CRISPR Tools in Genetically Tractable Organisms Workshop

Institución organizadora: Champalimaud Center for the Unknown , Portugal

Palabras clave: CRISPR/Cas

Areas del conocimiento: Ciencias Naturales y Exactas / Ciencias Biológicas / Bioquímica y Biología Molecular / Microscopia/Division Celular/Parasitologia/Centrosoma

2015 Talleres

Nombre del evento: Strategies to better communicate Science with lay audiences

Institución organizadora: Instituto Gulbenkian de Ciencia , Portugal

Palabras clave: Comunicacion; Medios

Areas del conocimiento: Humanidades / Otras Humanidades / Otras Humanidades

2013 Talleres

Nombre del evento: Structural Biology and Bioinformatics

Institución organizadora: FOCEM/Institut Pasteur Montevideo , Uruguay

Palabras clave: Bioinformatica; Biologia Estructural

Areas del conocimiento: Ciencias Naturales y Exactas / Ciencias Biológicas / Bioquímica y Biología Molecular / Microscopia/Division Celular/Parasitologia/Centrosoma

2011 Talleres

Nombre del evento: EuPathDB Workshop

Institución organizadora: EuPathDB.org Bioinformatics Resource Center , Estados Unidos

Palabras clave: Database; genomics; mining

Construcción institucional

Idiomas

Francés

Entiende (Bien) / Habla (Regular) / Lee (Bien) / Escribe (Regular)

Inglés

Entiende (Muy Bien) / Habla (Muy Bien) / Lee (Muy Bien) / Escribe (Muy Bien)

Portugués

Entiende (Muy Bien) / Habla (Bien) / Lee (Muy Bien) / Escribe (Regular)

Areas de actuación

Ciencias Naturales y Exactas / Ciencias Biológicas / Bioquímica y Biología Molecular / Bioquimica / Biologia Molecular /Microscopia / Genetica Molecular

Actuación Profesional

Cargos desempeñados actualmente

Desde: 05/2016

Investigador Postdoctoral Senior , (35 horas semanales) , Institut Pasteur de Montevideo , Uruguay

University of Georgia , University of Georgia , Estados Unidos

Vínculos con la institución

08/2009 - 08/2013, *Vínculo:* *Investigador Asistente / Estudiante Doctorado, (60 horas semanales / Dedicación total)*

Actividades

08/2009 - 08/2013
Líneas de Investigación , Department of Cellular Biology - University of Georgia , Center for Tropical and Emerging Global Diseases

Division of Apicomplexan Parasites , Coordinador o Responsable

Institut Pasteur de Montevideo , Institut Pasteur de Montevideo , Uruguay

Vínculos con la institución

05/2009 - 08/2009, *Vínculo:* Pasantia de investigacion no remunerada, (30 horas semanales)

Universidad de la República , Facultad de Ciencias - UDeLaR , Uruguay

Vínculos con la institución

03/2005 - 08/2005, *Vínculo:* Asistente Quimica General I , No docente (6 horas semanales)

Actividades

03/2005 - 08/2005

Docencia , Grado

Quimica General I , Asistente , Biología

Universidad de Montpellier I , Francia

Vínculos con la institución

02/2011 - 05/2012, Vínculo: Investigador Visitante, (40 horas semanales / Dedicación total)

Idaho State University , Estados Unidos

Vínculos con la institución

01/2008 - 05/2009, Vínculo: Investigador/Estudiante de Maestria, (40 horas semanales / Dedicación total)

Actividades

08/2008 - 12/2008

Docencia , Grado

Introductory Microbiology Laboratory , Responsable

08/2008 - 12/2008

Docencia , Pregrado

Microbiologia , Responsable , Bs. Biological Sciences

Instituto Gulbenkian de Ciencia , Portugal

Vínculos con la institución

03/2014 - 02/2016, *Vínculo:* Investigador PostDoctoral, (50 horas semanales / Dedicación total)

Actividades

03/2014 - Actual

Líneas de Investigación

Uncovering the role of Cep135/Bld10 in centriole length control , Coordinador o Responsable

Institut Pasteur de Montevideo , Institut Pasteur de Montevideo , Uruguay

Vínculos con la institución

05/2016 - Actual, *Vínculo:* Investigador Postdoctoral Senior, (35 horas semanales)

Lineas de investigación

Título: Division of Apicomplexan Parasites

Tipo de participación: Coordinador o Responsable
Objetivo: Research focused on the molecular characterization of division, and chromosome segregation in apicomplexan parasites.

Areas del conocimiento: Ciencias Naturales y Exactas / Ciencias Biológicas / Bioquímica y Biología Molecular / Parasitologia/Microbiologia/Genetica/Microscopia

Título: Uncovering the role of Cep135/Bld10 in centriole length control

Tipo de participación: Coordinador o Responsable

Objetivo: Centrosomes are microtubule organizing centers (MTOCs), important for cellular and developmental processes, such as cell division and motility. Centrosomes are composed of two centrioles made of microtubules and pericentriolar material. Every round of replication, centriole microtubules polymerize into exactly reproducible lengths. Loss of centriole length control is a hallmark of pathogenic conditions and can have devastating consequence to the cell. Despite its importance to human health, very little is known about the molecular players regulating and establishing centriole length. Cep135/Bld10 is a microtubule binding protein implicated in regulation of centriole length both in humans and in Drosophila. This proposed project aims to uncover how Cep135/Bld10 contributes to the regulation of centriole length by studying its regulation at the centriole and by determining how it exerts its function in microtubule elongation. Preliminary results suggest that Cep135/Bld10 interacts with Polo-like kinase 4 (PLK4) and Neurl4/Herc2 (an E3 ubiquitin ligase). We will examine whether ubiquitination and/or phosphorylation affect overall Cep135/Bld10 protein levels or its recruitment/turnover at the centriole. We will perform RNAi experiments of additional Cep135/Bld10 interactors identified by co-immunoprecipitation and yeast two hybrid analyses, and will identify Cep135/Bld10's functions in centriole length control by establishing how its interactions regulate its biological activity.

Palabras clave: Centrosoma

Areas del conocimiento: Ciencias Naturales y Exactas / Ciencias Biológicas / Bioquímica y Biología Molecular / Centrosoma/Centriolo/Genetica/Microscopia/Division Celular

Producción científica/tecnológica

Durante mi doctorado, me enfoque en entender los mecanismos moleculares y los elementos de regulacion que gobiernan la propagacion y replicacion de parasitos como Toxoplasma gondii, Plasmodium falciparum y Sarcocystis neurona, entre otros. Estos patogenos causan enfermedades de interes clinico y veterinario como la Toxoplasmosis, la Malaria, cryptosporidiosis, etc. Asi como tambien enfermedades en ganado y animales domesticos, que impactan directamente al sector productivo economico. Mi estrategia para abarcar preguntas basicas sobre los modos de propagacion de estos patogenos se baso en el uso de genetica molecular e ingeniera genetica para analizar fenotipos de parasitos mutantes, asi como el uso extensivo de tecnicas bioquimicas, y de microscopia tanto electronica como de fluorescencia y super resolucion, para el analisis de estos fenotipos. Dada la divergencia en los mecanismos de replicacion de los patogenos en cuestion, es probable que esta linea de investigacion identifique procesos y factores esenciales para la sobrevivencia del patogeno, que no se encuentran en el huesped mamifero. Es probable que esta linea de investigacion arroje potenciales candidatos para el desarrollo de nuevas drogas y vacunas, llenando asi el vacio existente en esta area. Durante mi primer postdoctorado, mi interes se enfoco en analizar mecanismos de control de division celular en celulas humanas a traves del analisis del centrosoma. El centrosoma controla aspectos fundamentales de la division celular y homeostasis en celulas normales. En lineas celulares derivadas de pacientes con cancer se observan fenotipos aberrantes que afectan el centrosoma. Tanto el numero como la estructura de los centriolos que componen el centrosoma se ven afectados. Mi proyecto se enfoco en identificar factores moleculares que impactan la division y biogenesis del centrosoma tanto en el contexto de celulas normales asi como tambien en celulas cancerigenas. Como resultado de este proyecto, identifique, en colaboracion con colegas del area, el mecanismo que coordina la division celular con la division del centrosoma, asegurando de esta manera el correcto numero de centrosomas en la celula. Actualmente me encuentro realizando un postdoctorado en el Instituto Pasteur de Montevideo adonde estudio los mecanismos de division celular del parasito Neospora caninum. Este parasito causa abortos en vacas infectadas, impactando asi la economia nacional de produccion. Mi proyecto se enfoca tambien en generar herramientas que permitan manipular el genoma del parasito. Lo ultimo, es altamente relevante para permitir la validacion y prueba de candidatos y generacion de cepas atenuadas para la generacion de vacunas anti-Neospora, asi como tambien para el testeo de hipotesis sobre la biologia general de este parasito.

Sistema Nacional de Investigadores

Producción bibliográfica

Artículos publicados

Arbitrados

Completo

MARIA E FRANCIA; DUBREMETZ JF; MORRISSETTE NM

Basal body structure and composition in the apicomplexans Toxoplasma and Plasmodium. Cilia, 2016

Palabras clave: Microtubule organizing center ; Microgamete ; Coccidia; Malaria ; Centriole; Flagellum

Areas del conocimiento: Ciencias Naturales y Exactas / Ciencias Biológicas / Biología Celular, Microbiología / Parasitologia

Medio de divulgación: Internet ; *ISSN:* 20462530 ; *DOI:* 10.1186/s13630-016-0025-5

The phylum Apicomplexa encompasses numerous important human and animal disease-causing parasites, including the Plasmodium species, and Toxoplasma gondii, causative agents of malaria and toxoplasmosis, respectively. Apicomplexans proliferate by asexual replication and can also undergo sexual recombination. Most life cycle stages of the parasite lack flagella; these structures only appear on male gametes. Although male gametes (microgametes) assemble a typical 9+2 axoneme, the structure of the templating basal body is poorly defined. Moreover, the relationship between asexual stage centrioles and microgamete basal bodies remains unclear. While asexual stages of Plasmodium lack defined centriole structures, the asexual stages of Toxoplasma and closely related coccidian apicomplexans contain centrioles that consist of nine singlet microtubules and a central tubule. There are relatively few ultra-structural images of Toxoplasma microgametes, which only develop in cat intestinal epithelium. Only a subset of these include sections through the basal body: to date, none have unambiguously captured organization of the basal body structure. Moreover, it is unclear whether this basal body is derived from pre-existing asexual stage centrioles or is synthesized de novo. Basal bodies in Plasmodium microgametes are thought to be synthesized de novo, and their assembly remains ill-defined. Apicomplexan genomes harbor genes encoding δ- and ε-tubulin homologs, potentially enabling these parasites to assemble a typical triplet basal body structure. Moreover, the UNIMOD components (SAS6, SAS4/CPAP, and BLD10/CEP135) are conserved in these organisms. However, other widely conserved basal body and flagellar biogenesis elements are missing from apicomplexan genomes. These differences may indicate variations in flagellar biogenesis pathways and in basal body arrangement within the phylum. As apicomplexan basal bodies are distinct from their metazoan counterparts, it may be possible to selectively target parasite structures in order to inhibit microgamete motility which drives generation of genetic diversity in Toxoplasma and transmission for Plasmodium.

Completo

ZITOUNI S; MARIA E FRANCIA; LEAL F; MONTENEGRO GOUVEIA S; NABAIS C; DUARTE P; GILBERTO S; BRITO D; MOYER T; KENDEL-LEWIS S; OHTA M; KITAGAWA O; HOLLAND AJ; KARSENTI E; LORCA T; LINCE-FARIA M; BETTENCOURT-DIAS M

CDK1 Prevents Unscheduled PLK4-STIL Complex Assembly in Centriole Biogenesis.. Current Biology, 2016

Palabras clave: CDK; PLK4; STIL; centriole duplication; centrosome ; licensing

Areas del conocimiento: Ciencias Naturales y Exactas / Ciencias Biológicas / Biología Celular, Microbiología / Cell Cycle Regulation

Medio de divulgación: Internet ; *ISSN:* 09609822 ; *DOI:* 10.1016/j.cub.2016.03.055

Zitouni S and Francia ME are first co-authors and corresponding authors

Completo

MORLON-GUYOT J; MARIA E FRANCIA; Jean-François Dubremetz; DAHER, W

Towards a molecular architecture of the centrosome in Toxoplasma gondii.. Cytoskeleton, 2016

Palabras clave: centrosome ; Toxoplasma

Areas del conocimiento: Ciencias Naturales y Exactas / Ciencias Biológicas / Biología Celular, Microbiología / Parasitologia Molecular

Medio de divulgación: Internet ; *ISSN:* 19493592 ; *DOI:* 10.1002/cm.21353

Completo

LENTINI G; KONG-HAP M; MARIA E FRANCIA; EL HAJJ H

Identification and characterization of Toxoplasma SIP, a conserved apicomplexan cytoskeleton protein involved in maintaining the shape, motility and virulence of the parasite.. Cellular Microbiology (E), *p.:* 62 - 78, 2015

Areas del conocimiento: Ciencias Naturales y Exactas / Ciencias Biológicas / Bioquímica y Biología Molecular / Microscopia/Division Celular/Parasitologia

ISSN: 14625822 ; *DOI:* 10.1111/cmi.12337

http://onlinelibrary.wiley.com/doi/10.1111/cmi.12337/abstract;jsessionid=62AD9A36B0402CD46ACF6D5E6DD17106.f04t03

Apicomplexa possess a complex pellicle that is composed of a plasma membrane and a closely apposed inner membrane complex (IMC) that serves as a support for the actin-myosin motor required for motility and host cell invasion. The IMC consists of longitudinal plates of flattened vesicles, fused together and lined on the cytoplasmic side by a subpellicular network of intermediate filament-like proteins. The spatial organization of the IMC has been well described by electron microscopy, but its composition and molecular organization is largely unknown. Here, we identify a novel

protein of the IMC cytoskeletal network in Toxoplasma gondii, called TgSIP, and conserved among apicomplexan parasites. To finely pinpoint the localization of TgSIP, we used structured illumination super-resolution microscopy and revealed that it likely decorates the transverse sutures of the plates and the basal end of the IMC. This suggests that TgSIP might contribute to the organization or physical connection among the different components of the IMC. We generated a T.gondii SIP deletion mutant and showed that parasites lacking TgSIP are significantly shorter than wild-type parasites and show defects in gliding motility, invasion and reduced infectivity in mice.

Completo

SUROVOVA ES; MARIA E FRANCIA; STRIEPEN B; WHITE M

A novel bipartite centrosome coordinates the apicomplexan cell cycle.. PLos Biology, 2015

Areas del conocimiento: Ciencias Naturales y Exactas / Ciencias Biológicas / Bioquímica y Biología Molecular / Microscopia/Division Celular/Parasitologia

Ciencias Naturales y Exactas / Ciencias Biológicas / Bioquímica y Biología Molecular / Microscopia/Division Celular/Parasitologia/Centrosoma

ISSN: 15449173 ; *DOI:* 10.1371/journal.pbio.1002093.

http://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.1002093

Apicomplexan parasites can change fundamental features of cell division during their life cycles, suspending cytokinesis when needed and changing proliferative scale in different hosts and tissues. The structural and molecular basis for this remarkable cell cycle flexibility is not fully understood, although the centrosome serves a key role in determining when and how much replication will occur. Here we describe the discovery of multiple replicating core complexes with distinct protein composition and function in the centrosome of Toxoplasma gondii. An outer core complex distal from the nucleus contains the TgCentrin1/TgSfi1 protein pair, along with the cartwheel protein TgSas-6 and a novel Aurora-related kinase, while an inner core closely aligned with the unique spindle pole (centrocone) holds distant orthologs of the CEP250/C-Nap protein family. This outer/inner spatial relationship of centrosome cores is maintained throughout the cell cycle. When in metaphase, the duplicated cores align to opposite sides of the kinetochores in a linear array. As parasites transition into S phase, the cores sequentially duplicate, outer core first and inner core second, ensuring that each daughter parasite inherits one copy of each type of centrosome core. A key serine/threonine kinase distantly related to the MAPK family is localized to the centrosome, where it restricts core duplication to once per cycle and ensures the proper formation of new daughter parasites. Genetic analysis of the outer core in a temperature-sensitive mutant demonstrated this core functions primarily in cytokinesis. An inhibition of ts-TgSfi1 function at high temperature caused the loss of outer cores and a severe block to budding, while at the same time the inner core amplified along with the unique spindle pole, indicating the inner core and spindle pole are independent and co-regulated. The discovery of a novel bipartite organization in the parasite centrosome that segregates the functions of karyokinesis and cytokinesis provides an explanation for how cell cycle flexibility is achieved in apicomplexan life cycles.

Completo

LOPES CAM; CHANDRA JANA S; CUNHA-FERREIRA I; ZITOUNI S; BENTO I ; DUARTE P; GILBERTO S; FREIXO F; GUERRERO A; Maria Francia; LINCE-FARIA M; CARNEIRO J; BETTENCOURT-DIAS M

PLK4 trans-autoactivation regulates centriole biogenesis in space. Developmental Cell, *v.:* 35 2, *p.:* 222 - 235, 2015

Palabras clave: Centrosoma; Polo Like Kinase

Areas del conocimiento: Ciencias Naturales y Exactas / Ciencias Biológicas / Biología Celular, Microbiología / Microscopia/Division Celular/Parasitologia/Centrosoma

ISSN: 15345807 ; *DOI:* 10.1016/j.devcel.2015.09.020

Completo

MARIA E FRANCIA; Boris Striepen

Cell Division in Apicomplexan Parasites. Nature Reviews Microbiology, *v.:* 12 1, 2014

Areas del conocimiento: Ciencias Naturales y Exactas / Ciencias Biológicas / Bioquímica y Biología Molecular / Microscopia/Division Celular/Parasitologia

ISSN: 17401526 ; *DOI:* 10.1038/nrmicro3184

Completo

MARIA E FRANCIA; Carly N. Jordan; Jay D. Patel; Lilach Sheiner; Jessica L. Demerly; Justin D. Fellows; Jessica Cruz de Leon; Naomi S. Morrissette; Jean-François Dubremetz; Boris Striepen

Cell division in apicomplexan parasites is organized by a homolog of the striated rootlet fiber of algal flagella . PLos Biology, v.: 10 12, 2012

Palabras clave: *Toxoplasma; Apicomplexa; Division; Flagella*

Areas del conocimiento: *Ciencias Naturales y Exactas / Ciencias Biológicas / Bioquímica y Biología Molecular / Parasitologia/Microbiologia/Genetica/Microscopia*

Medio de divulgación: *Internet* ; *ISSN:* *15449173* ; *DOI:* *10.1371/journal.pbio.1001444*

plosbiology.org

Maria E. Francia, Carly N. Jordan, Jay D. Patel, Lilach Sheiner, Jessica L. Demerly, Justin D. Fellows, Jessica Cruz de Leon, Naomi S. Morrissette, Jean-François Dubremetz, and Boris Striepen Apicomplexa are intracellular parasites that cause important human diseases including malaria and toxoplasmosis. During host cell infection new parasites are formed through a budding process that parcels out nuclei and organelles into multiple daughters. Budding is remarkably flexible in output and can produce two to thousands of progeny cells. How genomes and daughters are counted and coordinated is unknown. Apicomplexa evolved from single celled flagellated algae, but with the exception of the gametes lack flagella. Here we demonstrate that a structure that in the algal ancestor served as the rootlet of the flagellar basal bodies is required for parasite cell division. Parasite striated fiber assemblins (SFA) polymerize into a dynamic fiber that emerges from the centrosomes immediately after their duplication. The fiber grows in a polarized fashion and daughter cells form at its distal tip. As the daughter cell is further elaborated it remains physically tethered at it its apical end, the conoid and polar ring. Genetic experiments in ToxoplasmaToxoplasma gondiigondii demonstrate two essential components of the fiber, TgSFA2 and 3. In the absence of either of these proteins cytokinesis is blocked at its earliest point, the initiation of the daughter microtubule organizing center (MTOC). Mitosis remains unimpeded and mutant cells accumulate numerous nuclei but fail to form daughter cells. The SFA fiber provides a robust spatial and temporal organizer of parasite cell division, a process that appears hard-wired to the centrosome by multiple tethers. Our findings have broader evolutionary implications. We propose that Apicomplexa abandoned flagella for most stages yet retained the organizing principle of the flagellar MTOC. Instead of ensuring appropriate numbers of flagella, the system now positions the apical invasion complexes. This suggests that elements of the invasion apparatus may be derived from flagella or flagellar associated structures.

SCOPUS

doi

Completo

MARIA E FRANCIA

A Toxoplasma gondii protein with homology to intracellular type Na⁺/H⁺ exchangers is important for osmoregulation and invasion. Experimental Cell Research, 2011

Areas del conocimiento: *Ciencias Naturales y Exactas / Ciencias Biológicas / Bioquímica y Biología Molecular / Parasitologia*

Medio de divulgación: *Internet* ; *ISSN:* *00144827* ; *DOI:* *10.1016/j.yexcr.2011.03.020*

http://www.ncbi.nlm.nih.gov/pubmed/21501607

Francia ME, Wicher S, Pace DA, Sullivan J, Moreno SN, Arrizabalaga G. Abstract The obligate intracellular parasite Toxoplasma gondii is exposed to a variety of physiological conditions while propagating in an infected organism. The mechanisms by which Toxoplasma overcomes these dramatic changes in its environment are not known. In yeast and plants, ion detoxification and osmotic regulation are controlled by vacuolar compartments. A novel compartment named the plant-like vacuole or vacuolar compartment (PLV/VAC) has recently been described in T.gondii, which could potentially protect extracellular tachyzoites against salt and other ionic stresses. Here, we report the molecular characterization of the vacuolar type Na(+)/H(+) exchanger in T. gondii, TgNHE3, and its co-localization with the PLV/VAC proton-pyrophosphatase (TgVP1). We have created a TgNHE3 knockout strain, which is more sensitive to hyperosmotic shock and toxic levels of sodium, possesses a higher intracellular Ca(2+) concentration [Ca(2+)](i), and exhibits a reduced host invasion efficiency. The defect in invasion correlates with a measurable reduction in the secretion of the adhesin TgMIC2. Overall, our results suggest that the PLV/VAC has functions analogous to those of the vacuolar compartments of plants and yeasts, providing the parasite with a mechanism to resist ionic fluctuations and, potentially, regulate protein trafficking.

THOMSON ISI SCOPUS

doi

Completo

MARIA E FRANCIA

Toxoplasma gondii sequesters centromeres to a specific nuclear region throughout the cell cycle.. Proceedings of the National Academy of Sciences of the United States of America, 2011

Areas del conocimiento: *Ciencias Naturales y Exactas / Ciencias Biológicas / Bioquímica y Biología Molecular / Parasitologia*

Medio de divulgación: *Internet* ; *ISSN:* *00278424* ; *DOI:* *10.1073/pnas.1006741108*

http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3048097/?tool=pubmed

Brooks CF, Francia ME, Gissot M, Croken MM, Kim K, Striepen B. Abstract Members of the eukaryotic phylum Apicomplexa are the cause of important human diseases including malaria, toxoplasmosis, and cryptosporidiosis. These obligate intracellular parasites produce new invasive stages through a complex budding process. The budding cycle is remarkably flexible and can produce varied numbers of progeny to adapt to different host-cell niches. How this complex

process is coordinated remains poorly understood. Using Toxoplasma gondii as a genetic model, we show that a key element to this coordination is the centrocone, a unique elaboration of the nuclear envelope that houses the mitotic spindle. Exploiting transgenic parasite lines expressing epitope-tagged centromeric H3 variant CenH3, we identify the centromeres of T. gondii chromosomes by hybridization of chromatin immunoprecipitations to genome-wide microarrays (ChIP-chip). We demonstrate that centromere attachment to the centrocone persists throughout the parasite cell cycle and that centromeres localize to a single apical region within the nucleus. Centromere sequestration provides a mechanism for the organization of the Toxoplasma nucleus and the maintenance of genome integrity.

Completo

MARIA E FRANCIA

The plasma membrane of bloodstream-form African trypanosomes confers susceptibility and specificity to killing by hydrophobic peptides. Journal of Biological Chemistry, 2010

Areas del conocimiento: Ciencias Naturales y Exactas / Ciencias Biológicas / Bioquímica y Biología Molecular / Parasitologia

Medio de divulgación: Internet ; *ISSN:* 00219258 ; *DOI:* 10.1074/jbc.M110.151886 jbc

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Harrington JM, Widener J, Stephens N, Johnson T, Francia M, Capewell P, Macleod A, Hajduk SL Abstract Trypanosoma brucei is the causative agent of both a veterinary wasting disease and human African trypanosomiasis, or sleeping sickness. The cell membrane of the developmental stage found within the mammalian host, the bloodstream form (BSF), is highly dynamic, exhibiting rapid rates of endocytosis and lateral flow of glycosylphosphatidylinositol-anchored proteins. Here, we show that the cell membrane of these organisms is a target for killing by small hydrophobic peptides that increase the rigidity of lipid bilayers. Specifically, we have derived trypanocidal peptides that are based upon the hydrophobic N-terminal signal sequences of human apolipoproteins. These peptides selectively partitioned into the plasma membrane of BSF trypanosomes, resulting in an increase in the rigidity of the bilayer, dramatic changes in cell motility, and subsequent cell death. No killing of the developmental stage found within the insect midgut, the procyclic form, was observed. Additionally, the peptides exhibited no toxicity toward mammalian cell lines and did not induce hemolysis. Studies with model liposomes indicated that bilayer fluidity dictates the susceptibility of membranes to manipulation by hydrophobic peptides. We suggest that the composition of the BSF trypanosome cell membrane confers a high degree of fluidity and unique susceptibility to killing by hydrophobic peptides and is therefore a target for the development of trypanocidal drugs.

Artículos aceptados

Formación de RRHH

Tutorías en marcha

Posgrado

Tesis de doctorado

Generación de nuevas herramientas para el control de Neospora caninum a partir de un enfoque epidemiológico y genómico , 2016

Tipo de orientación: *Cotutor en pie de igualdad*

Nombre del orientado: *Andres Cabrera*

Institut Pasteur de Montevideo , Uruguay , PEDECIBA

Palabras clave: *Neospora; Genomica*

Areas del conocimiento: *Ciencias Naturales y Exactas / Ciencias Biológicas / Biología Celular, Microbiología / Parasitologia Molecular*

Pais/Idioma: *Uruguay/Español*

Otros datos relevantes

Premios y títulos

2012 Travel grant by the University of Georgia Graduate School (Nacional) University of Georgia

Awarded a merit-based travel grant by the University of Georgia Graduate School to attend the Gordon Research Conference at Newport, RI. May 2012

2011 Short-term research fellowship (Internacional) European Molecular Biology Organization (EMBO)

Awarded a short-term fellowship by the European Molecular Biology Organization (EMBO) to carry out experiments in collaboration with Dr. Jean -Francois Dubremetz at the Universite Montpellier II. Montpellier, France. February-May, 2011

2009 " Presidential Fellowship" (Nacional) Graduate School at the University of Georgia
Awarded a " Presidential Fellowship" by the Graduate School at the University of Georgia for the duration of four years, to complete the doctoral program offered by the Cellular Biology Department. Georgia, USA. August 2009-2013

2009 "Best Master's Student" (Nacional) University of Idaho
Awarded "Best Master's Student" award for the year of 2009. Department of Microbiology, Molecular Biology and Biochemistry. University of Idaho. May 2009

2014 Long Term PostDoctoral Fellowship (Internacional) European Molecular Biology Organization

Presentaciones en eventos

Congreso

Gordon Research Conference. , 2012

Tipo de participación: Expositor oral,
Referencias adicionales: Estados Unidos; *Nombre del evento:* Gordon Research Conference. Biology of Host-Parasite Interactions; *Nombre de la institución promotora:* Salve Regina University
Areas del conocimiento: Ciencias Naturales y Exactas / Ciencias Biológicas / Bioquímica y Biología Molecular / Parasitologia/Microbiologia/Genetica/Microscopia
Biology of Host-Parasite Interactions. Poster Presentation / abstract selected for Oral presentation. "Apicomplexa division is hard wired through multiple tethers." Maria E. Francia

Congreso

Molecular Parasitology Meeting , 2012

Tipo de participación: Expositor oral,
Referencias adicionales: Estados Unidos; *Nombre del evento:* Molecular Parasitology Meeting; *Nombre de la institución promotora:* Marine Biological Laboratories
Oral presentation. "Apicomplexa divisio is hard wired through multiple tethers." Maria E. Francia, Carrie Brooks, Carly Jordan, Jay Patel, Lilach Sheiner , Justin Fellows, Jessica de Leon, Naomi Morrissette, Jean-François Dubremetz and Boris Striepen .

Congreso

Molecular Parasitology Meeting , 2011

Tipo de participación: Expositor oral,
Referencias adicionales: Estados Unidos; *Nombre del evento:* Molecular Parasitology Meeting; *Nombre de la institución promotora:* Marine Biological Laboratories
Areas del conocimiento: Ciencias Naturales y Exactas / Ciencias Biológicas / Bioquímica y Biología Molecular / Parasitologia/Microbiologia/Genetica/Microscopia
September 11st thru 15th, 2011. MBL Annual Molecular Parasitology Meeting. Woods Hole, MS. Oral Presentation: 'Toxoplasma gondii centrosomes control chromosome dynamics throughout the cell cycle and daughter cell assembly during mitosis' Maria E. Francia, Carrie Brooks, Carly Jordan, Jay Patel, Lilach Sheiner , Jessica de Leon, Naomi Morrissette, Kami Kim, Jean-François Dubremetz and Boris Striepen

Simposio

Center for Tropical and Global Emerging Diseases , 2012

Tipo de participación: Poster,
Referencias adicionales: Estados Unidos; *Nombre del evento:* Center for Tropical and Emerging Diseases Research Symposium; *Nombre de la institución promotora:* University of Georgia
May 1st, 2012. Center for Tropical and Emerging Diseases Research Symposium. University of Georgia. Athens, GA. Poster Presentation. "Two cetrosome tethers coordinate daughter cell assembly and chromosomes in Toxoplasma gondii." Maria E. Francia, Carrie Brooks, Carly Jordan, Jay Patel, Lilach Sheiner , Justin Fellows, Jessica de Leon, Naomi Morrissette, Jean-François Dubremetz and Boris Striepen

Indicadores de producción

Producción bibliográfica	*11*
Artículos publicados en revistas científicas	*11*
Completo (Arbitrada)	11
Artículos aceptados para publicación en revistas científicas	*0*
Trabajos en eventos	*0*
Libros y capítulos de libros publicados	*0*
Textos en periódicos	*0*
Documentos de trabajo	*0*
Producción técnica	*0*
Productos tecnológicos	*0*
Procesos o técnicas	*0*
Trabajos técnicos	*0*
Otros tipos	*0*
Evaluaciones	*0*

Formación de RRHH	*1*
Tutorías/Orientaciones/Supervisiones concluidas	*0*
Tutorías/Orientaciones/Supervisiones en marcha	*1*
Tesis de doctorado	1

Sistema Nacional de Investigadores