INDICASAT-TIMES.ORG.PA VOL. 4 (3) 2014 ISSN 2222-7873

INDICASAT

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SENACYT
SECRETARÍA NACIONAL DE CIENCIA, TECNOLOGÍA E INNOVACIÓN

INDICASAT AIP
INSTITUTO DE INVESTIGACIONES CIENTÍFICAS Y SERVICIOS DE ALTA TECNOLOGÍA

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THE INDICASAT TIMES | VOL. 4 (3) 2014 | ISSN 2222-7873

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COMPAS

LA HISTORIA DE UN RETO CIENTÍFICO

THE STORY OF A SCIENTIFIC CHALLENGE

Por: Dra. Digna Wong

Las infecciones neumocócicas son una de las principales causas de muerte en los países en vías de desarrollo, la Organización Mundial de la Salud (OMS) estima que 1.1 millones de niños menores de cinco años mueren por causa de la neumonía cada año,

Pneumococcal infections are the major cause of death in developing countries, the World Health Organization (WHO) estimated 1.1 million children under five die from pneumonia each year, far more than AIDS, malaria and measles combined. In children

mucho más que el SIDA, la malaria y el sarampión combinados. En los niños menores de dos años, la incidencia de las infecciones neumocócicas es mayor que en cualquier otra época de la vida. La neumonía y la meningitis causadas por este patógeno, además, conllevan cifras apreciables de fatalidad y secuelas en los afectados. Estas infecciones pueden ser prevenidas mediante una oportuna inmunización, una alimentación balanceada y un control de los factores ambientales.

Ante esta condición surge la necesidad de descubrir nuevas vacunas, así como el desarrollo de combinaciones para prevenir infecciones que pueden causar enfermedades graves. El estudio Clinical Otitis Media and Pneumonia Study , mejor conocido como COMPAS patrocinado por GlaxoSmithKline, inició en nuestro país en el año 2007

under two years, the incidence of pneumococcal infections is greater than at any other time of life. Pneumonia and meningitis caused by this pathogen also carry appreciable numbers of fatality and squealed in those affected. These infections can be prevented by timely immunization, a balanced diet and control of environmental factors.

Given this condition arises the need of discovering new vaccines and developing combinations to prevent infections that can cause serious illness. The study Clinical Otitis Media and Pneumonia Study, better known as COMPAS sponsored by GlaxoSmithKline, started in our country in 2007 led by a pediatrician and infectious disease specialist Xavier Sáez Llorens, chief of Infectious Diseases Department at Children's Hospital, with

dirigido por el pediatra e infectólogo Xavier Sáez Llorens, jefe de Infectología del Hospital del Niño, con el apoyo de la Unidad Clínica del Instituto de Investigaciones Científicas y Servicios de Alta Tecnología (INDICASAT) y de la fundación Health Research Institute (HRI). Posterior a un extenso proceso regulatorio que involucró el sometimiento del protocolo a los distintos comités de ética y la autorización de las entidades de salud hasta obtener la aprobación, se puso en marcha la conducción de este ambicioso proyecto.

Durante este periodo, simultáneamente, se realizaron múltiples sesiones de estricto entrenamiento al numeroso equipo de trabajo que tendría la tarea de ejecutar todas las actividades que este estudio contemplaba. Más de 200 profesionales en el campo de la salud, entre médicos pediatras,

the support of the Clinical Unit of the Institute of Scientific Research and High Technology Services (INDICASAT) and the Health Research Institute foundation (HRI). Following an extensive regulatory process involving the submission of the protocol to the various ethics committees and entities of health to approval, was launched the conduction of this ambitious project.

During this period, simultaneously, multiple sessions of strict training was given to the team that would have the task of implementing all activities that this study contemplated. More than 200 professionals in the field of health, including pediatricians, general practitioners, ENT specialists, nurses, laboratory technicians, assistants, medical records, messengers, etc. were recruited for conducting the study, providing the

médicos generales , especialistas en otorrinolaringología, enfermeras(os), técnicos de laboratorio, auxiliares, personal de registros médicos, mensajeros, digitadores, etc. fueron reclutados para la conducción de este estudio, facilitándoles la oportunidad de enriquecer sus conocimientos en otro campo científico, de la "Investigación Clínica". Se realizó capacitación en investigación clínica a todo el personal involucrado en el estudio, aplicación y desarrollo de procedimientos operativos estándar y el uso de documentación clínica apropiada y detallada en las historias clínicas de los participantes. Se preparó a una masa crítica de profesionales de la salud en la realización de estudios clínicos siguiendo parámetros internacionales con resultados aplicables a nivel mundial.
En septiembre del 2007, comienza nuestro gran reto, la conducción del estudio COMPAS, orientado a evaluar la eficacia y seguridad de la vacuna antineumocócica conjugada 10 valente Synflorix de GlaxoSmithKline(GSK) en la prevención de la Neumonía Adquirida de la Comunidad (NAC), la Otitis Media Aguda (OMA) y la Enfermedad Invasora en niños. En este estudio fase III, doble ciego, multicéntrico participaron Argentina, Colombia y Panamá. Un total de 23,821 niños previamente sanos fueron incluidos, con edades entre 6 y 16 meses, entre los tres países. De estos niños 7,357 fueron enrolados en Panamá, 2483 en Colombia y 13, 981 en Argentina.

A todos estos niños se les realizaron evaluaciones periódicas durante 3 años, por especialistas pediatras, que incluían toma de muestras biológicas. Se les administró un curso primario de vacunación de tres dosis comenzando a los 2-6 meses y una dosis de refuerzo a los 15-18 meses de edad. Aquellos niños que durante sus visitas programadas e incluso fuera de ellas se les identificó la presencia de síntomas sospechosos de una OMA, fueron referidos a otorrinolaringólogos para una evaluación específica y realización de pruebas diagnósticas especiales (otoscopia y timpanocentesis) en caso necesario. Para abarcar la meta del estudio en

opportunity to enrich their knowledge in other scientific field, "Clinical Research". Training in clinical research was held to all staff involved in the study, application and development of standard operating procedures and the use of appropriate and detailed clinical documentation in medical records of the participants. We prepared a critical mass of health professionals in the conduct of clinical studies following international standards with globally applicable results.

In September 2007, our great challenge starts, conducting the COMPAS study aimed to evaluate the efficacy and safety of 10-valent pneumococcal conjugate vaccine Synflorix GlaxoSmithKline (GSK) in the prevention of Community Acquired Pneumonia (CAP) Acute Otitis Media(AOM) and invasive disease in children. In this phase III, double-blind, multicenter study, Argentina, Colombia and Panama participated. A total of 23,821 previously healthy children were included, aged between 6 and 16 months between the three countries. Of these 7,357 children were enrolled in Panama, 2483 in Colombia and 13981 in Argentina.

All these children underwent regular assessments for 3 years by pediatric specialists, including biological sampling. They were given a primary vaccination course of three doses beginning at 2-6 months and a booster dose at 15-18 months of age. Children who are identified the presence of symptoms suggestive of AOM during their scheduled visits and even outside them, were referred to ENT for more specific evaluation and implementation of special diagnostic tests (otoscopy and myringotomy) if necessary. To cover the study's goal in recognizing the CAP, the research team was alert for the appearance of related symptoms established per protocol, to send these children for testing image (chest radiograph) and for blood samples test(C-reactive protein and D-dimer, blood culture) that could confirm the suspected diagnosis. Additionally, in order to

Edificio de la Unidad Clínica y Medicina Traslacional

cuanto a reconocer las NAC, el equipo de investigación estuvo alerta a la aparición de síntomas relacionados y establecidos por el protocolo para poder remitir estos niños a la realización de pruebas de imagen (radiografía de tórax) y toma de muestras de sangre (proteína C reactiva, hemocultivo y dímero D) que pudieran confirmar la sospecha diagnóstica. Adicionalmente con el fin de garantizar la captación de los objetivos del estudio (NAC y OMA) se contaba en la logística con personal que diariamente revisaba largas listas de atención de sujetos en hospitales y centros de salud.

En este ensayo doble ciego, además de la vacuna en investigación, se aplicaron a los sujetos participantes todas las distintas vacunas recomendadas a nivel nacional. La vacuna en estudio fue asignada al azar y organizada en dos grupos (grupo control y grupo de estudio), sin que los tutores de los sujetos incluidos ni los médicos investigadores supieran que había recibido cada participante hasta que se completara el estudio.

En Panamá, participaron 16 sitios de atención primaria, tanto Centros de Salud como Policlínicas, pertenecientes a distintos sectores en las regiones de Salud de Panamá Oeste, Panamá Metro, San Miguelito y área metropolitana.

Un aspecto muy importante y punto de interés de este protocolo fue la seguridad de la vacuna, para lo cual se mantuvo una constante vigilancia de los eventos adversos tanto serios como no serios que presentaban los participantes. Para ello contamos con el apoyo de 6 clínicas populares y de los profesionales de Salud que laboraban en el Hospital del Niño, Hospital de Especialidades Pediátricas, Hospital San Miguel Arcángel, Hospital San Judas Tadeo y El Hospital Nicolás Solano.

Después de 7 años del inicio de la conducción del

ensure the retrieval of the objectives of the study (CAP and AOM) there were logistics personnel checking daily long lists of individuals attended in hospitals and health centers.

In this double-blind trial, in addition to the investigational vaccine, all different nationally recommended vaccines were applied to the participant subjects. The vaccine study was randomized and organized into two groups (control group and study group) without guardians of subjects included physicians and researchers knew what had received each participant until the study was completed.

In Panama, there were 16 primary care sites, both health centers and polyclinics, belonging to different sectors in the areas of Health west of Panama, Panama Metro, San Miguelito and metropolitan area.

A very important and interesting point of this protocol was the safety of the vaccine, for which a constant surveillance of both serious and non-serious adverse events was perform. For this we have the support of six popular clinics and health professionals who worked in the Children's Hospital, Hospital of Pediatrics, Hospital San Miguel Archangel, St. Jude Hospital and The Hospital Nicolas Solano.

After 7 years of the conduct of the study and a great effort by all the available human resources, on June 3, 2014 is finally achieved the results and published in the prestigious scientific journal PLOS Medicine.

It was concluded that Latin America is a region with an intermediate burden of pneumococcal disease, the vaccine 10 valent conjugate (commercial Synflorix) is effective against a wide range of pneumococcal disease that often affects

estudio y de un gran esfuerzo realizado por todo el recurso humano disponible, el pasado 3 de junio, 2014 se logra finalmente publicar los resultados en la prestigiosa revista científica PLOS Medicine.

Se concluyó que América Latina es una región con una carga intermedia de enfermedad neumocócica, que la vacuna 10 valente conjugada (nombre comercial Synflorix) es eficaz contra una amplia gama de enfermedades neumocócicas que afectan frecuentemente a los niños pequeños y que su administración puede tener un gran impacto en la salud pública, al prevenir un porcentaje significativo de NAC, OMA y enfermedad invasiva causadas por este germen.

Actualmente nos encontramos en la etapa de apertura de ciego, en la cual se notifica a los tutores de los niños participantes, cuáles fueron las vacunas administradas a sus hijos.

COMPAS fue un estudio de enorme y compleja logística, con una elevada muestra de sujetos participantes, además de objetivos científicos muy ambiciosos, que conllevó un gran esfuerzo de numerosos profesionales sanitarios, que superó nuestras expectativas iniciales y que atravesó por situaciones difíciles. Esta titánica investigación, no obstante, nos dejó una enorme experiencia y vasto conocimiento, que ahora sirve para aplicarlo a todos los proyectos que actualmente desarrollamos. Nos sentimos orgullosos de haber participado en el desarrollo de esta valiosa vacuna, la que seguramente será de gran beneficio para la población infantil de nuestro país y del mundo entero.

Contribuciones de:

Dr. Xavier Sáez Llorens, Pediatra Infectólogo HDN, Dra. Arlene Calvo, Coordinadora General HRI, Dra. Olga Tinajero, Subcoordinadora, INDICASAT-AIP.

young children and their administration can have a great impact on public health by preventing a significant percentage of CAP, AOM and invasive disease caused by this germ.

We are currently in the stage of unbinding, in which the guardians of participating children, are notify about which vaccines were administered to their children.

COMPAS was a study of huge, complex logistics, with a large sample of subjects participating, very ambitious scientific goals, which led to a great effort from many health professionals, which exceeded our initial expectations and went through difficult situations. This titanic research, however, left us a wealth of experience and vast knowledge, which now serves to apply to all projects that we are currently developing. We are proud of our participation in the development of this valuable vaccine, which will surely be of great benefit to the child population of our country and the whole world.

Contributions from:

Dr. Xavier Sáez Llorens, Pediatrician Infectologist HDN, Dra. Arlene Calvo, General Coordinator HRI, Dra. Olga Tinajero, Deputy Coordinator, INDICASAT-AIP.

Lydia Denisse Carranco, student at the University of Texas, El Paso, EEUU.

Chemical diversity and composition of *Paederus sp.* from Darien, Eastern Panama.

Lydia Denisse Carranco 1, Larissa C. Dutari 2, Gilberto Eskildsen 2, Jose R. Rovira 2, Ricardo Santamaría 2, Rolando A. Gittens 2, Jose R. Loaiza2.

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Summary

The genus *Paederus*, in the Staphylinidae Family of Coleoptera, is worldwide distributed and comprises roughly 600 species of predator beetles (Cressey & Paniz-Mondolfi, 2013). Some species of *Paederus* secrete a chemical substance in their cuticles that is enriched with the toxic molecule known as pederin. Humans suffer from a variety of vesicant lesions when they get in contact with these insects and the secreted pederin, including conjunctivitis and skin rashes. Interestingly, *Paederus* beetles do not synthesize the pederin on their own, but instead they maintain a symbiotic relationship with a *Psesudomonas* - type of bacteria, which is the one ultimately producing the toxin. Adult *Paederus* in both sexes and their offspring (e.g., eggs, larvae and pupae) use pederin to protect themselves from predators such as reptiles, amphibian and more commonly spiders.

Previous studies have demonstrated a cytotoxic effect of pederin-related compounds in cancer cells as well as antitumoral activity (Kador et al., 2011), but none has tested this chemical for bioactive activity against tropical parasites such as *Leishmania* (American Cutaneous Leishmaniasis), *Plasmodium* (Malaria) or *Tripanosoma* (Chagas disease). Despite the fact that episodes of dermatitis have been reported in Panama before and that there are five species of *Paederus* in the country (Mendez 1995), no study has ever investigated the chemical diversity and composition of the secretions produced by Panamanian *Paederus*. Moreover, until now no study in Panama has tried to confirm the presence of pederin in chemical extracts from these beetles.

During my internship in Panama on July 2014, I worked on a project aiming at investigating the chemical composition of the *Paederus* beetle from Darien, in eastern Panama, where an outbreak of dermatitis was being documented. Around forty three cases were recorded across eight different localities of the Meteti area, spanning roughly 150 kilometers. We collected 16 *Paederus* beetles using a flight intersection trap that was set up in a house with existing cases of dermatitis. These beetles were brought to the chemistry lab at INDICASAT-AIP, where organic extracts were obtained using three different solvent combinations and extraction methods. After that, I used mass spectrometry to confirm the presence of pederin and to assess the chemical diversity of these insects. The analysis of the spectra from all these different extracts demonstrated that pederin was, indeed, present in the Panamanian *Paederus*. In addition, there were other significant signals that may indicate the presence of other unknown chemical compounds. Although my limited time in Panama did not allow me to delve deeper into the chemical diversity of the beetles, I was able to confirm that pederin was present in the beetles that were etiologically responsible for the cases of dermatitis in the Meteti region. This study opens room for further studies on the chemical diversity and biological activity of chemical compounds extracted from the *Paederus* beetle from Panama.

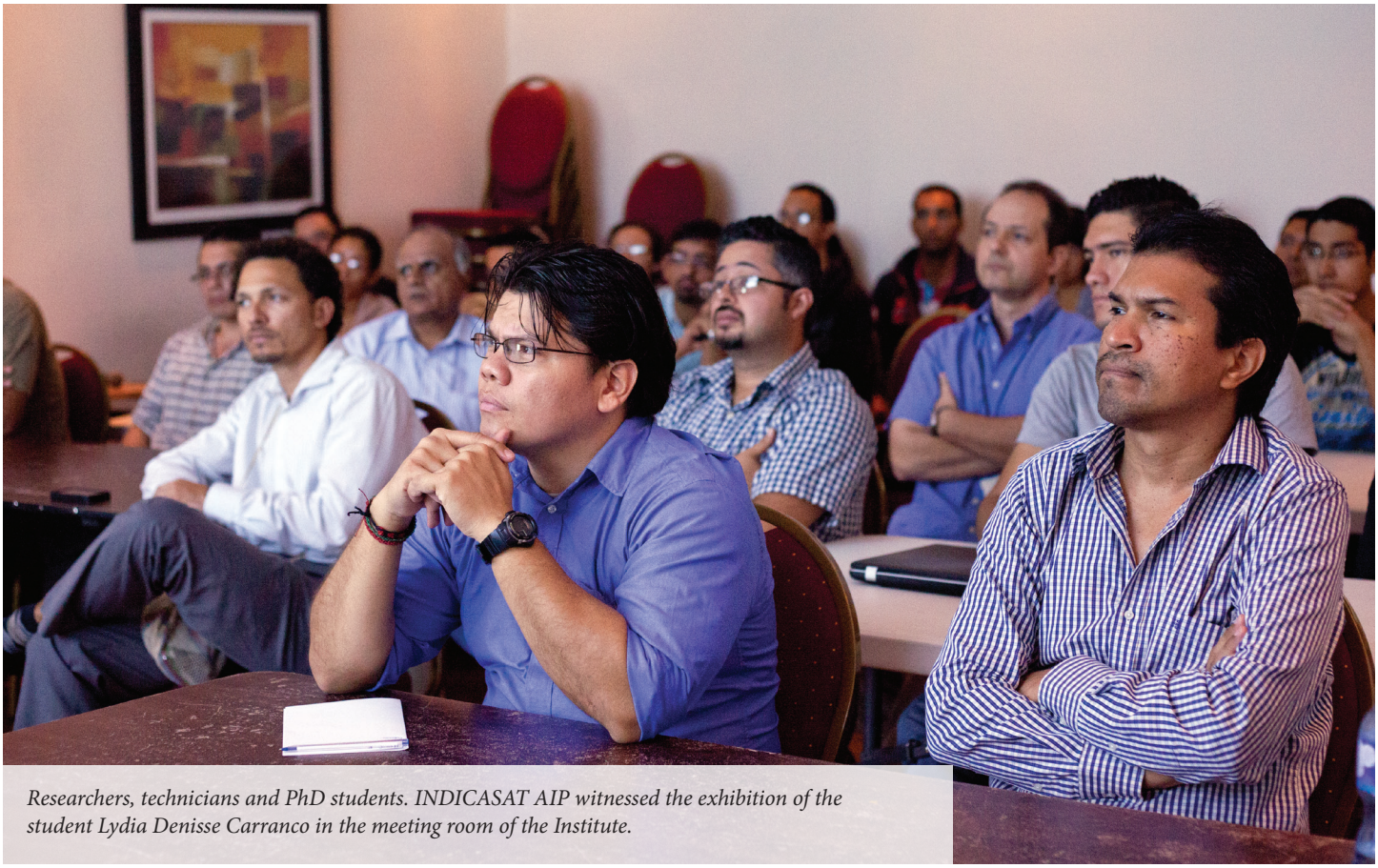
With Dr. Jose R. Loaiza and his team, I also learned field skills such as insect collection by different methods. I was also able to expand my knowledge in molecular laboratory techniques like PCR and DNA sequencing. I also got the opportunity to work with Dr. Rolando Gittens, who explained to me the concepts and the protocols used for chemical

analysis with tools such as mass spectrometry and the high performance liquid chromatography (HPLC). Overall, this was an amazing educational experience that opened my mind and introduced me to the research world that I definitely want to be a part of. I am extremely thankful to the MHIRT program of NIH supported to UT-El Paso and INDICASAT-AIP, for granting me this life changing opportunity.

With kind warmth and all my respect I would like to thank:

Dr. Jagannatha Rao, Dr. Jose R. Loaiza, Dr. Rolando Gittens, Dr. Marcelino Gutierrez, Larissa Dutari, Ricardo Santamaria, Christopher Boya. Dra. Delifina Dominguez, Dra. Kathleen Curtis, Dra. Maria Duarte, Dra. Eva Moya, Dr. Gabriel Ibarra, Melissa Parker, Letty Paez.


PEDERIN



Researchers, technicians and PhD students. INDICASAT AIP witnessed the exhibition of the student Lydia Denisse Carranco in the meeting room of the Institute.

Dr. Jagannatha Rao, Director of INDICASAT AIP, Lydia Denisse Carranco, University of Texas, El Paso, Dra. Delfina C. Dominguez, Professor at the University of Texas, El Paso, Dr. José Loaiza, Researcher INDICASAT AIP and Mrs. Yeni Morales, Manager INDICASAT AIP.

Efficacy of Pneumococcal Nontypable Haemophilus influenzae Protein D Conjugate Vaccine (PHiD-CV) in Young Latin American Children: A Double-Blind Randomized Controlled Trial

Miguel W. Tregnaghi, Xavier Sáez-Llorens, Pio López, Hector Abate, Enrique Smith, Adriana Pósleman, Arlene Calvo, Digna Wong, Carlos Cortes-Barbosa, Ana Ceballos, Marcelo Tregnaghi, Alexandra Sierra, Mirna Rodriguez, Marisol Troitiño, Carlos Carabajal, Andrea Falaschi, Ana Leandro, Maria Mercedes Castrejón, Alejandro Lepetic, Patricia Lommel, William P. Hausdorff, Dorota Borys, Javier Ruiz Guiñazú, Eduardo Ortega-Barría, Juan P. Yarzábal, Lode Schuerman on behalf of the COMPAS Group.

Abstract

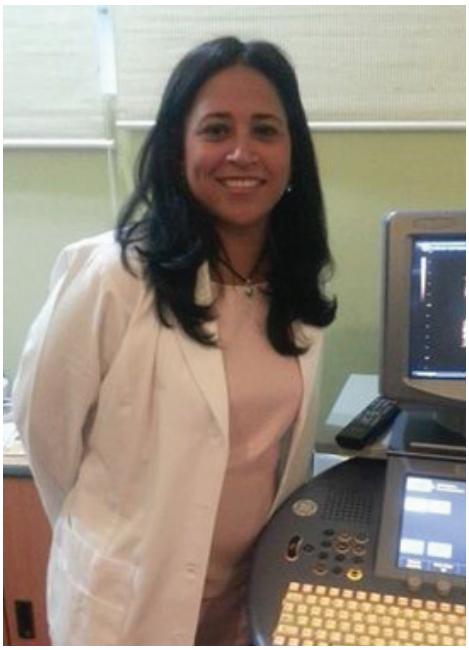
Background: The relationship between pneumococcal conjugate vaccine–induced antibody responses and protection against community-acquired pneumonia (CAP) and acute otitis media (AOM) is unclear. This study assessed the impact of the ten-valent pneumococcal nontypable *Haemophilus influenzae* protein D conjugate vaccine (PHiD-CV) on these end points. The primary objective was to demonstrate vaccine efficacy (VE) in a per-protocol analysis against likely bacterial CAP (B-CAP: radiologically confirmed CAP with alveolar consolidation/pleural effusion on chest X-ray, or non-alveolar infiltrates and C-reactive protein ≥ 40 μg/ml); other protocol-specified outcomes were also assessed.

Methods and Findings: This phase III double-blind randomized controlled study was conducted between 28 June 2007 and 28 July 2011 in Argentine, Panamanian, and Colombian populations with good access to health care. Approximately 24,000 infants received PHiD-CV or hepatitis control vaccine (hepatitis B for primary vaccination, hepatitis A at booster) at 2, 4, 6, and 15–18 mo of age. Interim analysis of the primary end point was planned when 535 first B-CAP episodes, occurring ≥2 wk after dose 3, were identified in the per-protocol cohort. After a mean follow-up of 23 mo (PHiD-CV, n = 10,295; control, n = 10,201), per-protocol VE was 22.0% (95% CI: 7.7, 34.2; one-sided p = 0.002) against B-CAP (conclusive for primary objective) and 25.7% (95% CI: 8.4%, 39.6%) against World Health Organization–defined consolidated CAP. Intent-to-treat VE was 18.2% (95% CI: 5.5%, 29.1%) against B-CAP and 23.4% (95% CI: 8.8%, 35.7%) against consolidated CAP. End-of-study per-protocol analyses were performed after a mean follow-up of 28–30 mo for CAP and invasive pneumococcal disease (IPD) (PHiD-CV, n = 10,211; control, n = 10,140) and AOM (n = 3,010 and 2,979, respectively). Per-protocol VE was 16.1% (95% CI: 21.1%, 30.4%; one-sided p = 0.032) against clinically confirmed AOM, 67.1% (95% CI: 17.0%, 86.9%) against vaccine serotype clinically confirmed AOM, 100% (95% CI: 74.3%, 100%) against vaccine serotype IPD, and 65.0% (95% CI: 11.1%, 86.2%) against any IPD. Results were consistent between intent-to-treat and per-protocol analyses. Serious adverse events were reported for 21.5% (95% CI: 20.7%, 22.2%) and 22.6% (95% CI: 21.9%, 23.4%) of PHiD-CV and control recipients, respectively. There were 19 deaths (n = 11,798; 0.16%) in the PHiD-CV group and 26 deaths (n = 11,799; 0.22%) in the control group. A significant study limitation was the lower than expected number of captured AOM cases.

Conclusions: Efficacy was demonstrated against a broad range of pneumococcal diseases commonly encountered in young children in clinical practice. **Miguel W. Tregnaghi, Xavier Sáez-Llorens, Pio López, Hector Abate, Enrique Smith, Adriana Pósleman, Arlene Calvo, Digna Wong, Carlos Cortes-Barbosa, Ana Ceballos, Marcelo Tregnaghi, Alexandra Sierra, Mirna Rodriguez, Marisol Troitiño, Carlos Carabajal, Andrea Falaschi, Ana Leandro, Maria Mercedes Castrejón, Alejandro Lepetic, Patricia Lommel, William P. Hausdorff, Dorota Borys, Javier Ruiz Guiñazú, Eduardo Ortega-Barría, Juan P. Yarzábal, Lode Schuerman on behalf of the COMPAS Group, PLOS MEDICINE, 2014 in press.**

First trimester screening using ultrasound and serum markers in Panamanians: Factors associated with adverse pregnancy outcomes

Tania T. Herrera, Scarlett Sinisterra, Alcibiades Solis, Gabrielle B. Britton.



Abstract

Background: There is no published data on the association between serum biochemical and ultrasonographic markers and adverse pregnancy outcomes. Therefore, the aim of this study was to determine the factors associated with perinatal outcomes in singleton pregnancies using ultrasound and maternal serum markers during the first trimester in Panamanians.

Materials and Methods: This was a prospective observational study of 468 first trimester singleton pregnancies conducted over a 7-year period. All women attending a prenatal screening clinic during the study period were informed of the study and the option to participate. Two maternal serum markers, free β-human chorionic gonadotropin (β-hCG) and pregnancy associated plasma protein-A (PAPP-A), and four fetal ultrasound markers, nuchal translucency thickness, nasal bone, flow across the tricuspid valve, and flow in the ductus venosus (DV), were measured by certified maternal fetal medicine specialists. Adverse outcomes included miscarriage, major structural defects, genetic disorders, and major fetal cardiac defects. Results: A total of 454 (97%) pregnancies were unaffected. Median maternal age was 31.5 years (range: 18-50). Maternal age was significantly greater in cases of adverse outcome (P = 0.007). The number of adverse outcomes associated with an absent or hypoplastic nasal bone, tricuspid valve regurgitation, and abnormal flow in the DV were significantly greater relative to unaffected pregnancies (Ps < 0.001). No differences were found in fetal crown-rump length or maternal serum levels of β-hCG or PAPP-A. Conclusion: Abnormal ultrasound markers are associated with adverse outcomes. Women with normal ultrasound and serum markers should be reassured of low risk of adverse pregnancy outcomes.

Key words: Fetal ultrasonography, nuchal translucency, panama, pregnancy outcome, prenatal screening.

Tania T. Herrera, Scarlett Sinisterra, Alcibiades Solis, Gabrielle B. Britton. Journal of Research in Medical Sciences, 2014 in press.

Progress in the Identification of Dengue Virus Entry/Fusion Inhibitors

Carolina De La Guardia and Ricardo Lleonart.

Abstract

Dengue fever, a reemerging disease, is putting nearly 2.5 billion people at risk worldwide. The number of infections and the geographic extension of dengue fever infection have increased in the past decade. The disease is caused by the dengue virus, a flavivirus that uses mosquitos *Aedes sp.* as vectors. The disease has several clinical manifestations, from the mild cold-like illness to the more serious hemorrhagic dengue fever and dengue shock syndrome. Currently, there is no approved drug for the treatment of dengue disease or an effective vaccine to fight the virus. Therefore, the search for antivirals against dengue virus is an active field of research. As new possible receptors and biological pathways of the virus biology are discovered, new strategies are being undertaken to identify possible antiviral molecules. Several groups of researchers have targeted the initial step in the infection as a potential approach to interfere with the virus. The viral entry process is mediated by viral proteins and cellular receptor molecules that end up in the endocytosis of the virion, the fusion of both membranes, and the release of viral RNA in the cytoplasm. This review provides an overview of the targets and progress that has been made in the quest for dengue virus entry inhibitors.

Carolina De La Guardia and Ricardo Lleonart.
Biomed Research International, 2014 in press.

High Diversity of Hepatitis B Virus Genotypes in Panamanian Blood Donors: A Molecular Analysis of New Variants

Alexander A. Martínez, Yamitzel Y. Zaldivar, CSS-NAT Group, Zoila De Castillo, Alma Y. Ortiz, Yaxelis Mendoza, Juan Cristina, Juan M. Pascale.

Abstract

Hepatitis B Virus (HBV) is an infectious agent that causes more than half of the cases of liver disease and cancer in the world. Globally there are around 250 million people chronically infected with this virus. Despite 16% of the cases of liver disease in Central America are caused by HBV, the information regarding its genetic diversity, genotypes and circulation is scarce. The purpose of this study was to evaluate the genetic variability of the HBV genotypes from HBV-DNA positive samples obtained from screening blood donors at the Social Security System of Panama and to estimate its possible origin. From 59,696 blood donors tested for HBV infection during 2010–2012, there were 74 HBV-DNA positive subjects. Analysis of the partial PreS2-S region of 27 sequences shows that 21% of the infections were caused by genotype A, 3% by genotype D and 76% by genotype F. In addition, we were able to confirm circulation of six sub-genotypes A1, A2, A3, D4, F3, F1 and a proposed new sub-genotype denominated F5pan. We found a confinement of sub-genotypes F1 and F5pan to the western area of Panama. The tMRCA analysis suggests a simultaneous circulation of previously described sub-genotypes rather than recent introductions of the Panamanian sub-genotypes in the country. Moreover, these results highlight the need of more intensive research of the HBV strains circulating in the region at the molecular level. In conclusion, Panama has a high HBV genotype diversity that includes a new proposed sub-genotype, an elevated number of PreCore-Core mutations, and confinement of these variants in a specific geographical location. **Alexander A. Martínez, Yamitzel Y. Zaldivar, CSS-NAT Group, Zoila De Castillo, Alma Y. Ortiz, Yaxelis Mendoza, Juan Cristina, Juan M. Pascale. PLOS ONE, 2014 in press.**

NK cells during dengue disease and their recognition of dengue virus-infected cells

Davis Beltrán and Sandra López-Vergès.

Abstract

The innate immune response, in addition to the B- and T-cell response, plays a role in protection against dengue virus (DENV) infection and the degree of disease severity. Early activation of natural killer (NK) cells and type-I interferon-dependent immunity may be important in limiting viral replication during the early stages of DENV infection and thus reducing subsequent pathogenesis. NK cells may also produce cytokines that reduce inflammation and tissue injury. On the other hand, NK cells are also capable of inducing liver injury at early-time points of DENV infection. *In vitro*, NK cells can kill antibody-coated DENVinfected cells through antibody-dependent cell-mediated cytotoxicity.
In addition, NK cells may directly recognize DENV-infected cells through their activating receptors, although the increase in HLA class I expression may allow infected cells to escape the NK response. Recently, genome-wide association studies have shown an association between *MICB* and *MICA*, which encode ligands of the activating NK receptor NKG2D, and dengue disease outcome.This review focuses on recognition of DENV-infected cells by NK cells and on the regulation of expression of NK cell ligands by DENV.

Davis Beltrán and Sandra López-Vergès. Frontiers in IMMUNOLOGY, 2014 in press.

Microbiota of Healthy Corals are Active Against Fungi in a Light Dependent Manner

Wilna J Moree, Oliver J McConnell, Don D Nguyen, Laura M Sanchez, Yu-Liang Yang, Xiling Zhao, Wei Ting Liu, Paul D Boudreau, Jayashree Srinivasan, Librada Atencio, Javier Ballesteros, Ronnie G Gavilán, Daniel Torres-Mendoza, Héctor M Guzmán, William H Gerwick, Marcelino Gutierrez, and Pieter C. Dorrestein

Abstract

Coral reefs are intricate ecosystems that harbor diverse organisms, including 25% of all marine fish. Healthy corals exhibit a complex symbiosis between coral polyps, endosymbiotic alga and an array of microorganisms, called the coral holobiont. Secretion of specialized metabolites by coral microbiota is thought to contribute to the defense of this sessile organism against harmful biotic and abiotic factors. While few causative agents of coral diseases have been unequivocally identified, fungi have been implicated in the massive destruction of some soft corals worldwide. Because corals are nocturnal feeders, they may be more vulnerable to fungal infection at night and we hypothesized that the coral microbiota would have the capability to enhance their defenses against fungi in the dark. A *Pseudoalteromonas sp.* isolated from a healthy octocoral displayed light-dependent antifungal properties when grown adjacent to *Penicillium citrinum* (P. citrinum), isolated from a diseased Gorgonian octocoral. Microbial MALDI-imaging mass spectrometry (IMS) coupled with molecular network analyses revealed that *Pseudoalteromonas* produced higher levels of antifungal polyketide alteramides in the dark than in the light. The alteramides were inactivated by light through a photo-induced intramolecular cyclization. Further NMR studies led to a revision of the stereochemical structure of the alteramides.

Alteramide A exhibited antifungal properties and elicited changes in fungal metabolite distributions of mycotoxin citrinin and citrinadins. These data support the hypothesis that coral microbiota use abiotic factors such as light to regulate the production of metabolites with specialized functions to combat opportunistic pathogens at night. **Wilna J Moree, Oliver J McConnell, Don D Nguyen, Laura M Sanchez, Yu-Liang Yang, Xiling Zhao, Wei Ting Liu, Paul D Boudreau, Jayashree Srinivasan, Librada Atencio, Javier Ballesteros, Ronnie G Gavilán, Daniel Torres-Mendoza, Héctor M Guzmán, William H Gerwick, Marcelino Gutierrez, and Pieter C. Dorrestein. ACS Chemical Biology, 2014 in press.**

Storage in ultra-low temperature decreases the levels of IgM anti-cardiolipin antibody in serum samples from Tuberculosis patients

Alexandra Ng, Cheyenne Weeks-Galindo, Amador Goodridge.

Abstract

The evaluation of novel Tuberculosis (TB) biomarkers relies on analysis of previously stored sample sets. We aimed to determine the effect of storage temperature on serum IgM anti-cardiolipin antibody levels in samples from TB patients. Ultra-low temperature decreased IgM anti-cardiolipin levels. We recommend against using ultra-low temperature storage when investigating IgM anti-cardiolipin biomarker-based tests.

Alexandra Ng, Cheyenne Weeks-Galindo, Amador Goodridge. Therapeutic Advances in Respiratory Diseases , 2014 in press.

Enzymatic and endpoint methods yield comparable adenosine deaminase activity in pleural fluid samples

Musharaf Tarajia, Emines Salas, Jacobus De Waard, Amador Goodridge.

Abstract

The biomarkers available for extrapulmonary tuberculosis diagnosis are limited. Adenosine deaminase (ADA; EC.3.5.4.4) has been employed extensively to diagnose pleural tuberculosis (PT). Similarly, ADA-2 isoenzyme activity also serves to increase the sensitivity and specificity of PT diagnosis. However, the use of different methods to measure ADA and ADA-2 without standardization between laboratories could cause differences in ADA activity values, thus affecting PT diagnosis cut-off values. In the present study, we aimed to depict the correlation between the Diazyme® ADA assay and the Giusti-Galanti method for measuring total ADA and ADA-2 isoenzyme in pleural fluid.

Musharaf Tarajia, Emines Salas, Jacobus De Waard, Amador Goodridge. Clinical Chemistry Laboratory Medicine, 2014 in press.

Sensibilidad y especificidad de la prueba simple de tuberculina e interferón-gama (BOVIGAM®) para el diagnóstico de tuberculosis bovina

Cecilia Escobar, Jacobus H. de Waard, Amador Goodridge.

Abstract

El uso de la prueba de tuberculina comparativa mejora la especificidad. Esta prueba comparativa consiste en aplicar la prueba de tuberculina con una PPD bovina y una PPD aviar. Se considerará reactor positivo aquel animal con 4 mm o más de respuesta a la PPD bovina que a la PPD aviar. La prueba de tuberculina tiene varios inconvenientes de logística dentro de la finca. Los animales deben ser inmovilizados en dos ocasiones: una vez para la aplicación de la prueba y luego 72 horas después para la lectura de la prueba. Otra desventaja es la desensibilización a la prueba intradérmica PPD; la repetición de la prueba de tuberculina solamente se recomienda después de un lapso de 60 días.

La prueba de interferón gamma (IFN-gamma) o BOVIGAM® (nombre comercial) es una nueva prueba de laboratorio para el diagnóstico de tuberculosis bovina. Esta prueba fue introducida en el año 1988 y actualmente es utilizada alrededor del mundo como prueba principal o auxiliar en el diagnóstico de la enfermedad del ganado. La prueba se basa en la detección de la secreción de la citoquina IFN-gamma por las células del sistema inmunológico del animal. El BOVIGAM® requiere de sangre completa heparinizada de los animales sospechosos. Esta sangre se incuba con los antígenos altamente específicos de tuberculina PPD bovina y PPD aviar. A continuación, un ELISA de captura determina la cantidad de IFN-gamma en el plasma. La infección de tuberculosis reflejará una secreción de IFN-gamma en respuesta al antígeno de PPD bovina mayor que a la PPD aviar. El presente estudio experiencia previa y datos de sensibilidad y especificidad de ambas pruebas. **Cecilia Escobar, Jacobus H. de Waard, Amador Goodridge. Actualidad Agropecuaria, 2014 in press.**

Mitochondrial genome organization of the Ochre-bellied Flycatcher, *Mionectes oleaginous*.

Jose R. Loaiza, Celestino Aguilar, Luis Fernando De Leon, W. Owen McMillan, and Matthew J. Miller.

Abstract

We sequenced and compared the mitogenome organization of two specimens of suboscine tyrant flycatcher *Mionectes oleagineus* from western and eastern Panama, representing distinct mtDNA clades. These samples show identical gene arrangement and vary in size by less than 5 base pairs. Both depict a non-standard avian gene order with an extra non-coding region (e.g. the remnant CR2), which differs in one base pair between them. Small size differences are also found on the control region and the 16S rRNA. Average uncorrected pairwise divergence among protein-coding genes (PCGs) was 2.8, ranging from 1.9% for COXIII and ND6 to 3.2% for ND2 and ATP6, respectively. These mitogenomes may be useful for understanding the evolutionary dynamics of gene order in bird mitochondrial genomes.

Jose R. Loaiza, Celestino Aguilar, Luis Fernando De Leon, W. Owen McMillan, and Matthew J. Miller.
Mitochondrial DNA, 2014 in press.

Polyphenols as Therapeutic Molecules in Alzheimer ’s Disease Through Modulating Amyloid Pathways.

Johant Lakey-Beitia, Ruben Berrocal, K. S. Rao, Armando A. Durant.

Abstract

Alzheimer’ s disease (AD) is a complex and multifactorial neurodegenerative condition. The complex pathology of this disease includes oxidative stress, metal deposition, formation of aggregates of amyloid and tau, enhanced immune responses, and disturbances in cholinesterase. Drugs targeted toward reduction of amyloidal load have been discovered, but there is no effective pharmacological treatment for combating the disease so far. Natural products have become an important avenue for drug discovery research. Polyphenols are natural products that have been shown to be effective in the modulation of the type of neurodegenerative changes seen in AD, suggesting a possible therapeutic role.

The present review focuses on the chemistry of polyphenols and their role in modulating amyloid precursor protein (APP) processing. We also provide new hypotheses on how these therapeutic molecules may modulate APP processing, prevent Aβ aggregation, and favor disruption of preformed fibrils. Finally, the role of polyphenols in modulating Alzheimer’s pathology is discussed.

Johant Lakey-Beitia, Ruben Berrocal, K. S. Rao, Armando A. Durant, Molecule Neurobiology 2014. DOI 10.1007/s12035-014-8722-9

Environmental variables, habitat discontinuity and life history shaping the genetic structure of Pomatoschistus marmoratus.

González-Wangüemert M., Vergara-Chen C.

Abstract

Background
Coastal lagoons are semi-isolated ecosystems exposed to wide fluctuations of environmental conditions and showing habitat fragmentation. These features may play an important role in separating species into different populations, even at small-spatial scales. In this study, we evaluate the concordance between mitochondrial (previous published data) and nuclear data analyzing the genetic variability of *Pomatoschistus marmoratus* in five localities, inside and outside the Mar Menor coastal lagoon (SE Spain) using eight microsatellites. High genetic diversity and similar levels of allele richness were observed across all loci and localities, although significant genetic and genotypic differentiation was found between populations inside and outside the lagoon. In contrast to the FST values obtained from previous mitochondrial DNA analyses (control region), the microsatellite data exhibited significant differentiation among samples inside the Mar Menor and between lagoonal and marine samples. This pattern was corroborated using Cavalli-Sforza genetic distances. The habitat fragmentation inside the coastal lagoon and among lagoon and marine localities could be acting as a barrier to gene flow and contributing to the observed genetic structure. Our results from generalized additive models (GAMs) point a significant link between extreme lagoonal environmental conditions (mainly maximum salinity) and *P. marmoratus* genetic composition. Thereby, these environmental features could be also acting on genetic structure of coastal lagoon populations of P. marmoratus favoring their genetic divergence. The mating strategy of *P. marmoratus* could be also influencing our results obtained from mitochondrial and nuclear DNA. Therefore, a special consideration must be done in the selection.
González-Wangüemert M., Vergara-Chen C.. Helgoland Marine Research 68(2): 357-371.

New Perspectives on Oxidized Genome Damage and Repair Inhibition by Pro-Oxidant Metals in Neurological Diseases

Joy Mitra, Erika N. Guerrero, Pavana M. Hegde , Haibo Wang, Istvan Boldogh , Kosagi Sharaf Rao , Sankar Mitra and Muralidhar L. Hegde.

Abstract

The primary cause(s) of neuronal death in most cases of neurodegenerative diseases, including Alzheimer's and Parkinson's disease, are still unknown. However, the association of certain etiological factors, e.g., oxidative stress, protein misfolding/aggregation, redox metal accumulation and various types of damage to the genome, to pathological changes in the affected brain region(s) have been consistently observed. While redox metal toxicity received major attention in the last decade, its potential as a therapeutic target is still at a cross-roads, mostly because of the lack of mechanistic understanding of metal dyshomeostasis in affected neurons. Furthermore, previous studies have established the role of metals in causing genome damage, both directly and via the generation of reactive oxygen species (ROS), but little was known about their impact on genome repair. Our recent studies demonstrated that excess levels of iron and copper observed in neurodegenerative disease-affected brain neurons could not only induce genome damage in neurons, but also affect their repair by oxidatively inhibiting NEIL DNA glycosylases, which initiate the repair of oxidized DNA bases. The inhibitory effect was reversed by a combination of metal chelators and reducing agents, which underscore the need for elucidating the molecular basis for the neuronal toxicity of metals in order to develop effective therapeutic approaches. In this review, we have focused on the oxidative genome damage repair pathway as a potential target for reducing pro-oxidant metal toxicity in neurological diseases. **Joy Mitra, Erika N. Guerrero, Pavana M. Hegde , Haibo Wang, Istvan Boldogh , Kosagi Sharaf Rao , Sankar Mitra and Muralidhar L. Hegde, Biomolecules 2014, 4, 678-703.**

α-Synuclein misfolding versus aggregation relevance to Parkinson's disease: critical assessment and modeling

Ruben Berrocal, Velmarini Vasquez, Sambasiva Rao KR, Bharathi S Gadad, Rao KS .

Abstract

α-Synuclein, an abundant and conserved presynaptic brain protein, is implicated as a critical factor in Parkinson's disease (PD). The aggregation of the α-synuclein is believed to be a critical event in the disease process. α-synuclein is characterized by a remarkable conformational plasticity, adopting different conformations depending on the environment. Therefore, it is classified as an 'intrinsically disordered protein'. Recently, a debate has challenged the view on α-synuclein intrinsically disordered behavior in the cell. It has been proposed that α-synuclein is a stable tetramer with a low propensity for aggregation; however its destabilization leads to protein misfolding and its aggregation kinetics. In our critical analysis, we discussed about major issues: i) why α-synuclein conformational behavior doesn't fit into the normal secondary structural characteristics of proteins?, ii) Potential amino acids involved in complexicity of misfolding in α-synuclein that leads to aggregation, and iii) Role of metals in misfolding and aggregation. To evaluate the above critical issues, we developed bioinformatics models related to secondary and tertiary conformations, Ramachandran plot, free energy change, intrinsic disordered prediction, solvent accessibility, and FoldIndex pattern. To the best of our knowledge, this is a novel critical assessment to understand the misfolding biology of Synuclein and its relevance to Parkinson disease.

Ruben Berrocal, Velmarini Vasquez, Sambasiva Rao KR, Bharathi S Gadad, Rao KS. Molecular Neurobiology, 2014 in press.

Complete mitochondrial genomes of the New World jacanas: *Jacana spinosa* and *Jacana jacana*

Matthew J. Miller, Celestino Aguilar, Luis Fernando De León, José R. Loaiza, and W. Owen McMillan.

Abstract

The New World jacanas, *Jacana spinosa* (Mexico to Panama and also the West Indies) and *Jacana jacana* (Panama and South America), are polyandrous freshwater waders that are common throughout the Neotropics. These two species hybridize narrowly at their contact zone in Panama, and as part of a study of the hybrid zone dynamics, we present complete, annotated mitochondrial genomes for both species. The two species have very similar mitochondrial genomes, showing identical gene orders, and differing in size in only two RNA features and the control region, and among protein-coding genes, the two genomes had average uncorrected pairwise divergence of 1.8%, ranging from 0.7% for ND4L and 3.6% for ATP8. However, control region divergence is high (16%). These mitochondrial genome sequences may be useful tools for understanding jacana hybridization dynamics, especially regarding potential mitonuclear incompatibilities.

Matthew J. Miller, Celestino Aguilar, Luis Fernando De León, José R. Loaiza, and W. Owen McMillan. Mitochondrial DNA, 2014 in press.

Guidelines for Documenting and Reporting Tree Allometric Equations

Cifuentes Jara, M., Henry, M., Réjou-Méchain M., Wayson, C., Zapata-Cuartas M., Piotto, D., López, O.R., et al.

Abstract

Tree allometric equations area critical tools to quantify tree volume, biomass and carbon stocks for climate change mitigation. Despite their importance, a lack of consistency in the way allometric equations are reported in the literature complicates choosing the most appropriate models for any given site. This paper addresses that need by providing standard guidelines for publishing allometric equations worldwide. We focus on 6 main areas: information on definitions and concepts, description of the target population and environmental conditions where the study was carried out, sampling details and scope of the study, methods used for data analysis and calculations, model fitting and uncertainty, and metadata and information on raw data. We believe these rules should be applied systematically and be part of a shared responsibility among authors, journal editors and reviewers, and users to improve reporting and use of allometric equations.

Cifuentes Jara, M., Henry, M., Réjou-Méchain M., Wayson, C., Zapata-Cuartas M., Piotto, D., López, O.R. et al, Annals of Forest Science, 2014 in press.

Extreme sequence divergence between mitochondrial genomes of two subspecies of White-breasted Wood-wren (*Henicorhina leucosticta*, Cabanis, 1847) from western and central Panama

Celestino Aguilar, Luis Fernando De León, José R. Loaiza, W. Owen McMillan, and Matthew J. Miller.

Abstract

Prior studies of mitochondrial variation in White-breasted Wood-Wrens (*Henicorhina leucosticta*) have suggested that populations in South American and Mesoamerica might represent multiple species. Here we report the complete mitochondrial genomes from two individuals of *H. leucosticta*, representing the Panamanian subspecies *pittieri* and *alexandri*. The two sequences were 16,721 and 16,726 base pairs in size with both genomes comprised of the usual 22 tRNA genes, 2 rRNA genes, 13 protein-coding genes, and one displacement loop region in the standard avian order. Uncorrected pairwise divergence between mitogenome features was high, with the highest divergence occurring in protein-coding genes (average =8.2%), followed by control region (6.7%). RNA features had lower pairwise divergences (average tRNA=4.3%, average rRNA=2.3%). The protein-coding ATPase 6 gene had a different stop codon between these two specimens. The high level of sequence variation between these subspecies suggests that Mesoamerican *H. leucosticta* might be comprised of multiple species. We urge a full phylogeographic survey of this widespread Neotropical forest bird.

Celestino Aguilar, Luis Fernando De León, José R. Loaiza, W. Owen McMillan, and Matthew J. Miller. Mitochondrial DNA, 2014 in press.

Influence of cyclodextrin derivatives on *in vitro* release of cyclosporine A from Poly (anhydre) nanoparticles.

Marisín Pecchio, Mª Jesús Renedo, Patricia Sanz-Ramos, Juan Manuel Irache, Mª del Carmen Dios-Viéitez.

Abstract

Conventional formulation of CsA in the market presents poor solubility and bioavailability of the drug. Nowadays nanoparticles are an alternative to solve this kind of trouble, but get a new nanoformulation loaded with CsA is a big challenge. This work describes preparation and characterization of PVM/MA nanoparticles loaded with CsA and *in vitro* release studies of drug from nanoparticles. Derivatives cyclodextrin was used in the process of manufacture in order to improve the loaded of drug in PVM/MA nanoparticles and modulate the release profile of drug. Nanoparticles were prepared by a solvent displacement method and characterized by particle size, zeta potential, encapsulation efficiency, product yield, ray-x and thermal analysis. Nanoparticles displayed a size of about 100-243 nm and the amount of CsA loaded was higher when the nanoformulation contain hydroxypropyl-β-cyclodextrin than hydroxypropyl-α-cyclodextrin. Nanoparticles showed biphasic release behaviour in physiological mediums; this pattern is according with drug delivery systems as nanoparticles. Also this biphasic profile could indicate that the CsA was released from nanoparticles by diffusion in the initial phase and the subsequent time-period. Besides, *in vitro* release profile of CsA from nanoformulation with hydroxypropyl-α-cyclodextrin showed higher initial burst effect in all simulated physiological medium used. Results suggest that using nanoformulation with hydroxypropyl-β-cyclodextrin on posterior *in vivo* studies could improve bioavailability of CsA. **Marisín Pecchio, Mª Jesús Renedo, Patricia Sanz-Ramos, Juan Manuel Irache, Mª del Carmen Dios-Viéitez. Journal of Nanopharmaceutics and Drug Delivery. 2014 in press.**

Dr. Louise Rollins-Smith collaborative visit to INDICASAT-AIP to work with Dr. Armando Durant's group

Interview by Dr. Rolando Gittens

Dr. Louise Rollins-Smith, Ph.D., of Vanderbilt University School of Medicine recently visited INDICASAT to collaborate with Anette Garrido (Biology student), Luis Barahona (Chemistry student, and technician of the project), and Dr. Jock Chichaco Kuruc, M.D., who are supported by Dr. Armando Durant, Ph.D., of INDICASAT.

The main focus of Dr. Rollins-Smith's research is developmental and comparative immunology

using amphibian model systems. Currently, her laboratory is pursuing a number of questions concerning the development of the immune system and the nature of innate and adaptive immune defenses in frog skin. One of those questions involves the study of antimicrobial peptides in frog skin in defense against bacterial, viral, and fungal pathogens. Understanding the immune defense mechanisms of amphibians has taken on increased importance in recent years because of the urgent problem of global amphibian declines.

With Dr. Roberto Ibañez, Ph.D., of the Smithsonian Tropical Research Institute, Dr. Durant and Dr. Rollins-Smith plan to study the skin secretions of a number of unique endemic Panamanian amphibians to search for natural chemicals with pharmacological, anti-cancer, or antimicrobial properties. In many cultures, amphibian skin has a history of use in folk medicine. More than 2500 antimicrobial host defense peptides have previously been isolated from amphibian skin including from the skin of the lemur leaf frog *(Hylomantis lemur)* of Panama and the mountain chicken frog *(Leptodactylus fallax)* found on the island of Dominica. The amphibians of Panama will likely reveal many additional molecules of potential value for human medicine.

Questions & Answers

How many years have you been working in the field of amphibian immunology?

About 39. I started working with frogs about 1975, and my Ph.D. on corticosteroid inhibition of an allograft response was granted in 1977.

Of the different research projects you have been involved with, which one has been the most exciting for you and why?

The most exciting are always the current ones. The studies of amphibian skin peptides with possible therapeutic potential are exciting. We are also looking for molecules produced by the amphibian chytrid fungus which inhibit lymphocytes and leukemia cell lines. They could have potential value as anti-cancer agents.

What is your opinion about the future of amphibians, and in the same lines the field of drug discovery using this threatened endemic biodiversity?

Amphibians are facing multiple threats including habitat destruction, pesticides, and disease. If we are able to discover valuable therapeutic products from amphibians, it will demonstrate their great value for ecosystem and human health. Perhaps, they will be given greater attention and respect. The drug discovery studies being done by Armando and Roberto Ibanez collect samples and return the frogs to nature. If useful products are found, they will be chemically synthesized. Thus, frog populations will be preserved.

1er TALLER ESPECIALIZADO EN REDACCIÓN DE ARTÍCULOS CIENTÍFICOS SOBRE MEDICINA TROPICAL Y SALUD PÚBLICA:

ECO-EPIDEMIOLOGÍA DE ENFERMEDADES TRANSMITIDAS POR ARTROPODOS VECTORES

7-10 de Oct. de 2014

LUGAR: Hotel Holiday Inn
Ciudad del Saber,
Clayton, Panamá

ORGANIZADO POR:
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INDICASAT AIP

SENACYT
SECRETARÍA NACIONAL DE CIENCIA, TECNOLOGÍA E INNOVACIÓN

XV CONGRESO NACIONAL DE CIENCIA Y TECNOLOGÍA

Simposio: Herramientas científicas para combatir la TUBERCULOSIS humana y animal en Panamá.

EXPOSITORES :

Jorge Victoria
Organización Panamericana de la Salud

Cecilia Arango
Ministerio de Salud

Laura Flores
University of California at Berkeley, USA

Samantha Rosas
Laboratorio Central de Referencia ICGES

Jacqueline Achkar
Albert Einstein School of Medicine, NY, USA

Cecilia Escobar
Instituto de Investigaciones Agropecuarias de Panamá

Amador Goodridge
INDICASAT AIP

Viernes 17 de octubre del 2014
Centro de Convenciones de Ciudad del Saber, Panamá
8:00 a.m a 12:00 m.d

Costos antes del 8 de octubre
$70 No Socios
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Costo después del 8 de octubre
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RSVP e inscripciones con Dr. Musharaf Tarajia al mtarajia@indicasat.org.pa. ó www.apanac.org.pa

BY: MARIA CELESTE ROJAS.

Over the course of my vacation I did a two-week internship at the INDICASAT lab in Clayton. The only previous laboratory experience I have had is the small lab experiments I've done at school, so my views on the lab environment were based on TV shows and small scale experiments done on my own and at school.
I expected the lab to have strict rules, tight regulations and an even tighter schedule. I wasn't exactly wrong. Though the lab had all of these three things they were not as strict as I thought. What I mean is that there is an unspoken exception to all of these that give space to human error.

I think this is what made me realize it was okay if I messed up or made a mistake once in a while. Since I had expected a hermetic set of rules; sanitary ones included, I was never scared or worried about catching a disease or getting an infection, but I was quite taken back with the reactions that came from telling other people what I worked with in the lab (I had been handling parasites such as malaria and chagas or even cancer cells). People often said things like: "Wow! That is so dangerous!", or "Wow! Now I'm sort of scared of being within 50 feet of you". I was really impressed by the measures the people in the lab take to keep their samples from contaminating others and themselves, starting from long sleeve lab coats, gloves and safety goggles, to always- at -hand sterilizing chemicals and hazardous material disposal bins, also close by. I had learnt all about gel electrophoresis at school and even did an online experiment, but there was nothing more incredible than actually performing it legitimately. I had the opportunity to separate solvent and also erythrocytes from freshly extracted blood. I thought it was really cool when one of the lab members taught me how to count the parasites in the sample and how to calculate the percentage of parasites, too.

One of the reasons why I first wanted to take this internship at INDICASAT lab is because I am sure that in the future I will study science, but I was not sure of which area of science to focus on. Do I want to become a molecular biologist? A chemist? A doctor? All of the above? Being at this lab for two weeks not only broadened my perspective of science and provided more experience and insight to my favor but also gave more life to my thirst for knowledge.
I want to thank all of the people who in those two weeks not only made me feel like part of the team but also instructed and enlightened me with their own experiences, advices and knowledge. I also want to mention a special thanks to Dr. Carmenza Spadafora for allowing me to step in and for giving me that opportunity.

Por: Adilia Tristán

Hacer mi pasantía final para obtener el título en biotecnología en INDICASAT-AIP ha sido una de las experiencias más enriquecedoras de mi vida, tanto a nivel profesional como académico. Además, me hizo crecer como persona, aprendí muchos valores. La relación que se tiene con las personas del equipo de trabajo y la infinidad de conocimientos académicos que se adquieren son sorprendentes.

Al principio pensé que adaptarme a la mecánica de trabajo sería muy difícil ya que no contaba con ningún tipo de experiencia en el área de biología celular, pero sí había trabajado un poco en biología molecular. Además, tampoco había usado muchos de los equipos que hay en el instituto. Venía medio asustada o presionada de no dañar nada ni quebrar nada, porque la mayoría de los equipos y materiales de laboratorio tienden a ser muy costosos.

Pero cuando entré y me entrenaron, todo fue diferente. Tuve excelentes tutores que me enseñaron minuciosamente todos los procedimientos.
Me enseñaron a ser muy cuidadosa y en caso de que llegara a pasar algo, ya sabía cómo debía actuar y qué debía hacer, ya que en definitiva nadie está exento de accidentes.

La cantidad de personas que pasan por el instituto es impresionante, uno llega a compartir con otros pasantes ya sean nacionales o internacionales y se aprende aún más. Cada día es diferente en el laboratorio, no hay una rutina específica, solo hay que saber organizarse bien y llevar a cabo todos los experimentos necesarios para sacar adelante el proyecto.

Hice muchas amistades, todos hicieron que mi trabajo fuera más llevadero entre risas y apoyo. Estoy muy agradecida con todos, en especial con Deborah Doens, ya que con ella aprendí todo lo que sé ahora. Puedo decir que valió la pena todo el esfuerzo y las muchas horas de trabajo.

If gene regulation fails what happens?

By Velmarini Vasquez

Gene regulation takes place at different stages at which the genetic information is processed. Failure at any of these stages (transcriptional, RNA splicing, translational, etc.) may present detrimental damages to normal cellular processes. Gene expression programs that establish and maintain specific cell states in humans are controlled by thousands of transcription factors, cofactors, and chromatin regulators. Many diseases and syndromes are associated with mutations in regulatory regions [1].
Further mutations at this regions can contribute to first stage of gene regulation and takes place during transcription of the genetic material.

Recent advances in our understanding of the transcriptional process have provided new insights into transcriptional misregulation in diseases such as cancer. For instance, potential mechanisms on how elevated levels of c-Myc reprograms cells to promote the cancer state. In normal cells, c-Myc links growth factor stimulation and cellular proliferation [2]. Elevated expression of c-Myc occurs through multiple mechanisms in tumor cells, including gene amplification, chromosomal translocation, single nucleotide polymorphism in regulatory regions, mutation of upstream signaling pathways, and mutations that enhance the stability of the protein [2]. Despite considerable study, it is not yet clear how elevated levels of c-Myc reprograms cells to promote the cancer state. However studies done by Lin *et al.* address this problem by showing that Myc acts to amplify the output of existing transcriptionally active genes [3]. They reported that in tumor cells expressing high levels of c-Myc the transcription factor accumulates in the promoter regions of active genes and causes transcriptional amplification, producing increased levels of transcripts within the cell's gene expression program. Thus, rather than binding and regulating a new set of genes, c-Myc amplifies the output of the existing gene expression program. These results provide an explanation for the diverse

effects of oncogenic c-Myc on gene expression in different tumor cells and suggest that transcriptional amplification reduces rate-limiting constraints for tumor cell growth and proliferation [3].

Further gene regulation post-transcriptionally in the nucleus also presents failures in relation to alternative splicing process. In this process, particular exons of a gene may be included within, or excluded from, the final, processed messenger RNA (mRNA) produced from that gene[4]. There are several genetic diseases in which a mutation disrupts the machinery of splicing, either the constitutive components of the spliceosome. Familial isolated growth hormone deficiency type II (IGHD II) is caused by mutations in the growth hormone gene (GH-1). 5 ss indicates 5 splice site [4]. Frasier syndrome is caused by mutations in theWT-1 gene. Frontotemporal dementia and Parkinsonism linked to Chromosome 17 (FTDP-17) are caused by mutations in the MAPT gene [4].

Post-transcriptional modifications outside the nucleus can end up in misregulation of non-coding gene that can affect the proper development and function of tissues where intended to express [5]. Dysregulation of micro RNAs (miRNA) is an important example of post-transcriptional gene regulation outside the nucleus. miRNA are encoded by non-coding genes in the nucleus and are then exported into the cytoplasm where they regulate coding gene expression by translational repression or transcript degradation. Thus, miRNAs control complex biological processes.
The discovery of microRNAs in recent years has made it evident that these RNA molecules have an important function in regulation of heart function [5]. The miRNA expression levels have been linked to deregulation of developmental pro- cesses and disease states, such as cardiac hypertrophy and failure. Cardiac hypertrophy in humans is a major determinant of mortality and morbidity in cardiovascular diseases [6]. Because miRNAs are important regulators for the differentiation and growth of cardiac cells, they are hypothesized to have an important role in cardiac hypertrophy and heart failure [5]. The investigation into the role of miRNAs as a novel class of gene regulators in cardiovascular disease is a new frontier for research and it is hoped that the next decade will bring a greater understanding to their functions in cardiovascular biology.

Gene Regulation Failures caused Epigenetics Changes. What is the outcome?

An epigenome consists of a record of the chemical changes to the DNA and histone proteins of an organism. Changes to the epigenome can result in changes to the structure of chromatin and changes to the function of the genome. According to Zucchi *et al.* Epigenetic regulation modulates gene expression without altering the DNA sequence to facilitate rapid adjustments to dynamically changing environmental conditions. The formation of an epigenetic memory allows passing on this information to subsequent generations [7].

But how do we know that these changes may not disturb functional gene regulation programs and lead to the expression of dysfunctional proteins? For instance, environmental factors such as viruses are known to trigger cancer. After infecting a host cell, viruses hijack the cellular machinery to replicate their DNA [8]. This is often accompanied by the induction of cell division in the host cell, because DNA replication is a key component of the cell cycle. In this way, some viruses are able to promote cellular

transformation, which causes cancer because these viruses are able to encourage a cell to divide when it normally would not.

Further recent studies have demonstrated that life environment epigenetically shapes the stress response later in life in mammals. Maternal care, for instance, influences hypothalamic-pituitary-adrenal (HPA) function in rats through epigenetic programming of glucocorticoid receptor expression [9]. High levels of circulating glucocorticoids raise the body's alertness and increase the stress response, while lower levels result in a more "relaxed" behavior and attenuate the stress response [10]. Study done by Weaver *et al.* demonstrated that in rats, low maternal care, and in humans, parental abuse, lead to increased DNA methylation in the promoter region of the glucocorticoid receptor (GR) gene which impinges on its gene expression in the hippocampus, a brain area implicated in the stress response [11]. In humans, the behavioral consequences of low versus high GR promoter methylation are related to suicidal behavior. McGowan *et al.* found decreased levels of glucocorticoid receptor (NR3C) mRNA between postmortem hippocampus obtained from suicide victims with a history of childhood abuse and those from either suicide victims with no childhood abuse or controls.

In summary, failure of gene regulation machinery during the management of genetic information at a nuclear and cytosolic stage can lead to various disorders. Cancer, developmental syndromes, neurological disorders, cardiovascular disease, among others diseases are results of instabilities within the gene regulation machinery. Research evidence also suggests that there is a relationship between epigenetic regulation and gene expression that may enhance some disorders such as cancer and suicidal behavior.

References

1. Lee TI, Young R a (2013) Transcriptional regulation and its misregulation in disease. Cell 152:1237–51. doi: 10.1016/j.cell.2013.02.014

2. Littlewood TD, Kreuzaler P, Evan GI (2012) All things to all people. Cell 151:11–3. doi: 10.1016/j.cell.2012.09.006

3. Lin CY, Lovén J, Rahl PB, et al. (2012) Transcriptional amplification in tumor cells with elevated c-Myc. Cell 151:56–67. doi: 10.1016/j.cell.2012.08.026

4. Faustino NA, Cooper T a (2003) Pre-mRNA splicing and human disease. Genes Dev 17:419–37. doi: 10.1101/gad.1048803

5. Ardekani AM, Naeini MM (2010) The Role of MicroRNAs in Human Diseases. Avicenna J Med Biotechnol 2:161–79.

6. Small EM, Olson EN (2011) Pervasive roles of microRNAs in cardiovascular biology. Nature 469:336–42. doi: 10.1038/nature09783

7. Zucchi FCR, Yao Y, Metz G a (2012) The secret language of destiny: stress imprinting and transgenerational origins of disease. Front Genet 3:96. doi: 10.3389/fgene.2012.00096

8. Ralston A.; Hoopes L. & Shawk. Environmental Factors Like Viral Infections Play a Role in the Onset of Complex Diseases. http://www.nature.com/scitable/topicpage/environmental-factors-like-viral-infections-play-a-996.

9. McGowan PO, Sasaki A, D'Alessio AC, et al. (2009) Epigenetic regulation of the glucocorticoid receptor in human brain associates with childhood abuse. Nat Neurosci 12:342–8. doi: 10.1038/nn.2270

10. Gräff J, Kim D, Dobbin MM, Tsai L-H (2011) Epigenetic regulation of gene expression in physiological and pathological brain processes. Physiol Rev 91:603–49. doi: 10.1152/physrev.00012.2010

11. Weaver ICG, D'Alessio AC, Brown SE, et al. (2007) The transcription factor nerve growth factor-inducible protein a mediates epigenetic programming: altering epigenetic marks by immediate-early genes. J Neurosci 27:1756–68. doi: 10.1523/JNEUROSCI.4164-06.2007

Gene regulation concepts in Eukaryotes

By Cely T. González

Basic Structures, central dogma, cell cycle, transcription, post-transcription.

The heritage represent an enigmatic target for scientist, the basic nature of heredity brings a number of interesting questions such as: how our bodies read the instructions stored in our genetic material? Or more specific, how can the eukaryotic cells, that have the exact same DNA in the nucleus, have very different functions? These involve complex mechanisms inside our bodies (7).

However, the answer to those, might improve our understanding of complex patterns of gene expression and regulation which have as result the specific cellular phenotypes of our body, for example the complex organism are influence by this interactive regulation of genes even we would management some genetic, degenerative human diseases.

Meanwhile, to find these answers contributes to new research´s areas as the human genome which began since early in 2000, but with Francis Crick and his central dogma proposed, the expected genes that will would be found 50,000 to 100,000, instead of 25,000 genes that were found, really (4). So the central dogma was considered over simplistic, because explain only the DNA transcription through RNAm result in protein, now, we know that is more than this.

The central dogma is over simplistic, in order to illustrate the several functions of proteins.

In early cells development begin to have specific functions, during these process genes turning genes on and off called gene regulation, which ensures that the correct genes would be expressed at the right time. In this sense gene regulation also influences the organism responses to the environments these regulatory mechanisms involves chemically modifying genes (5) for example, is very known that the insulin is only expressed in pancreatic β-cells that was gene regulated mechanism inside of this specific cells.

The gene regulation process heads what stages of gene, how long and when genes should be expressed, during these mechanisms differentiated cells know what proteins they have to manufacture. On the other hands, gene regulations in eukaryotes are different and complicated compared with their prokaryotic counterpart, which have one gene coding for one protein thus, this is the reason, why the hypothesis to found most genes of first genome, was wrong.

Today, scientists know that beyond the three types of RNA that make the central dogma possible (mRNA, tRNA, rRNA), one of the most important RNAs are the miRNA identified in Caenorhabditis elegans (timed regulation of developmental events) whose discovery represent a new dimension to our understanding of gene regulation. These are distinct species from a specific precursor that is encoded in the genome (1).

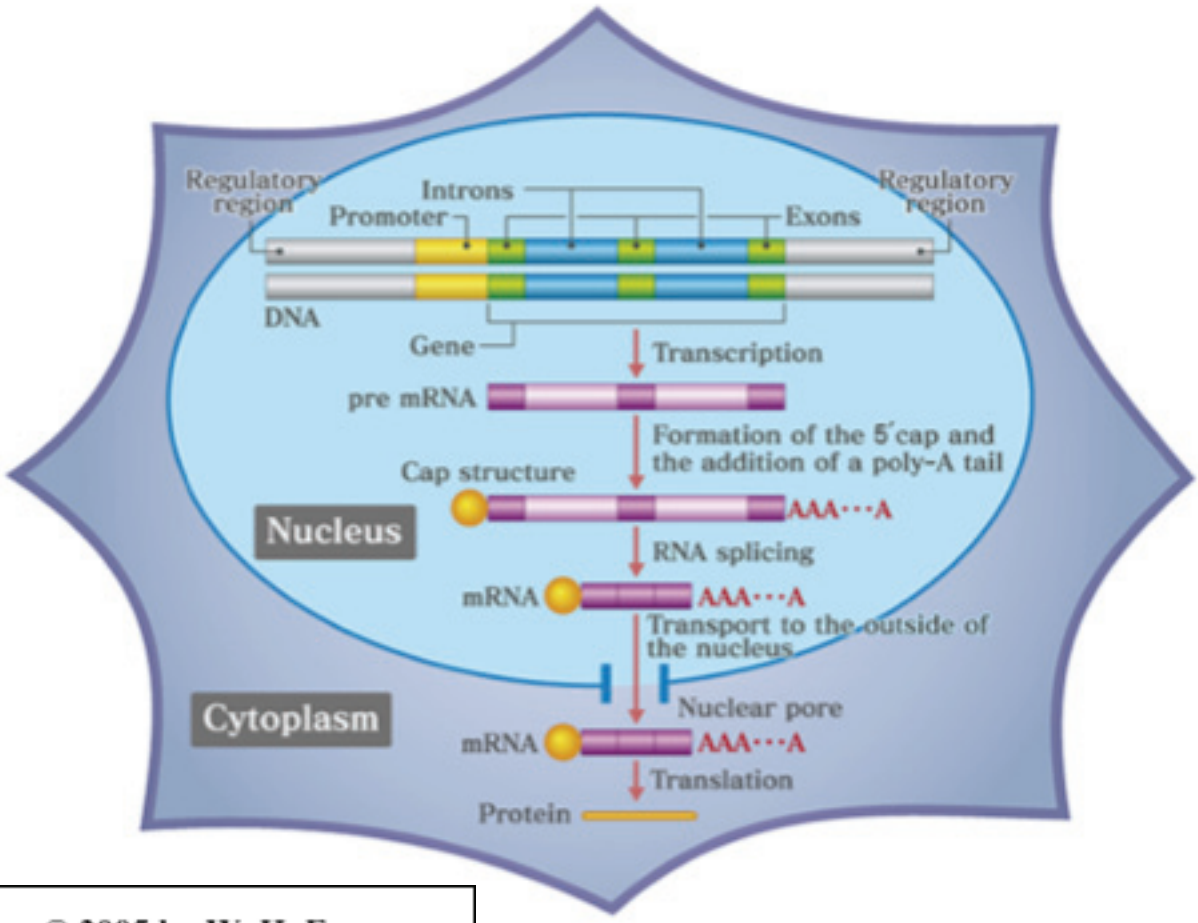
Within the Eukaryotic cells there are different stages to gene regulation and gene expression, the may occur as following:

1. Chromatin condensation´s changes cause turned gene on or off, the DNA is organized at chromatin in which the genes that can be expressed are located in regions where chromatin is loosely packed, whereas genes that are never expressed are often concentrated in regions where chromatin is tightly (6).

Expression regulation by enhancers or silencers is sometimes accompanied by changes in chromatin structure (chromatin remodeling).

2. Transcription by definition is the process which the genetic information is transcribed into mRNA (2) resulting in proteins. Additionally, the double strands of DNA, the one complementary to the template strand for RNA synthesis is called the sense strand which is the same except for replacing the Uracil base, the result from these reactions is the first amino acid methionine.
3. Post-transcriptional modification, it also called splicing where only introns are removed from the pre-mRNA and the exons remaining are connected to form mRNA, as a result of this mechanism one gene can produce several protein types, thus functioning as if it were several genes (3).
4. Translation is the process by which a protein is synthesized from the information contained in a molecule mRNA. Translation occurs in a structure called the ribosome, which is a factory for the synthesis of proteins.

Gene's regulations stage inside the eukaryotic cells.



References

1. He, L., & Hannon, G. J. (2004). MicroRNAs: small RNAs with a big role in gene regulation. Nature Reviews Genetics, 5, 522-531.
2. Hoopes, L. (2008) Introduction to the gene expression and regulation topic room. Nature Education 1,160
3. Phillips, T. (2008) The role of methylation in gene expression. Nature Education1. 1-116
4. Ralston, A. & Shaw, K. (2008) Reading the genetic code. Nature Education 1:120
5. Talking Glossary of Genetic Terms, from the National Human Genome Research Institute. http://www.genome.gov/glossary/
6. http://csls-text.c.u-tokyo.ac.jp/active/04_03.html
7. http://www.nature.com/scitable/topic/gene-expression-and-regulation-15

Houston Methodist scientists receive $250,000 to learn why ALS nerve cells die

HOUSTON -- (July 1, 2014) -- Houston Methodist Research Institute scientists will receive about $250,000 from the Muscular Dystrophy Association to determine whether an absence of the protein TDP-43 in the cell nucleus causes nerve cells to die.

The three-year project is an investigation of how TDP-43's expression and location within nerve cells contributes to errors in DNA repair. Researchers will also see whether the resulting accumulation of DNA damage is responsible for the loss of brain cells during the progression of

amyotrophic lateral sclerosis (ALS), a neurodegenerative disorder sometimes called Lou Gehrig's disease.

"We hope to learn how important this protein is in the development of a terrible disease," said neuroscientist and radiation oncologist Muralidhar L. Hegde, Ph.D., the project's principal investigator. "What we learn may lead to new drugs and therapies that slow or stop the disease's progression."

TDP-43 (or TARDBP) is a versatile protein that helps regulate protein expression. Hegde's own recent work suggests TDP-43 has another function -- it may be needed to help repair double-stranded breaks in chromosomal DNA. For all these reasons, TDP-143 is usually found only in the cell nucleus.

Studies by others have shown that in the brain cells of dementia and ALS patients, TDP-43 is usually found outside the nucleus. In some ALS patients, TDP-43 was only found outside the nucleus in brain cells, where it accumulates.

"Based on strong preliminary data, we will examine previously unexplored area of ALS research that could lead to a major paradigm shift in our understanding of the molecular pathogenesis of not only ALS, but also other TDP-43-associated neurodegenerative diseases," Hegde said.

ALS affects about 2 of every 100,000 people worldwide. It is usually diagnosed between the ages of 40 and 75. Disease progression is fairly rapid; 50 percent are alive two years following diagnosis, with only 10 percent surviving more than 10 years. Effective drug therapies have so far proven elusive.

The Muscular Dystrophy Association is a major nonprofit health agency dedicated to finding treatments and cures for muscular dystrophy, amyotrophic lateral sclerosis (ALS) and other neuromuscular diseases.

Also participating in the project are Sankar Mitra, Ph.D., Pavana Dixit, Joy Mitra, Ph.D., and Haibo Wang, Ph.D. (Houston Methodist Research Institute), Ralph Garruto, Ph.D. (Binghamton University - SUNY), Ping Wu, M.D., Ph.D. (University of Texas Medical Branch at Galveston), Brain Kraemer, Ph.D. (University of Washington), Erika Guerrero and K. S. Jagannatha Rao, Ph.D. (INDICASAT, Panama).

(News courtesy from David Bricker, Houston Methodist)

El Dr. Rao es elegido como Miembro del Consejo Editorial de Patentes recientes sobre CNS Drug Discovery, Bentham Press Journal.

DNA similarities help choose friends

New York, July 15, 2014, IANS:

Friends are family and you choose them because they share many common genes with you.

According to an interesting study, people choose friends who have some DNA sequences in common with them. “Humans are unique in that we create long term connections with people of our species. Why do we do that? Why do we make friends? Not only that, we prefer the company of people we resemble,” said Nicholas Christakis, a social scientist at Yale University in Connecticut. To reach this conclusion, researchers compared gene variations between 2,000 people who were not biologically related.

After analysing almost 1.5 million markers of gene variations, they found that pairs of friends had the same level of genetic relation as people did with a fourth cousin - or a great-great-great grandfather - that translates to about one percent of the human genome. “Most people do not know who their fourth cousins are, yet we are somehow, among a myriad of possibilities, managing to select as friends the people who resemble our kin,” Christakis contended.

The most common gene shared by friends was the “olfactory” gene - involved in the sense of smell.

The results suggest that choosing friends who share similar genes is a behavior that may have contributed to human evolution.

The study appeared in the journal Proceedings of the National Academy of Sciences.

The iPhone Effect

The Quality of In-Person Social Interactions in the Presence of Mobile Devices

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Abstract

This study examined the relationship between the presence of mobile devices and the quality of real-life in-person social interactions. In a naturalistic field experiment, 100 dyads were randomly assigned to discuss either a casual or meaningful topic together. A trained research assistant observed the participants unobtrusively from a distance during the course of a 10-min conversation noting whether either participant placed a mobile device on the table or held it in his or her hand. Using Hierarchical Linear Modeling, it was found that conversations in the absence of mobile communication technologies were rated as significantly superior compared with those in the presence of a mobile device, above and beyond the effects of age, gender, ethnicity, and mood. People who had conversations in the absence of mobile devices reported higher levels of empathetic concern. Participants conversing in the presence of a mobile device who also had a close relationship with each other reported lower levels of empathy compared with dyads who were less friendly with each other. Implications for the nature of social life in ubiquitous computing environments are discussed.

Being overweight may be better for your heart: study

PTI | July 17, 2014, 16.07 pm IST

Representational photo - visualphotos.com

Washington: Being overweight may protect people from cardiovascular mortality, researchers, including one of Indian-origin, have claimed.

High body mass index (BMI) is associated with multiple cardiovascular diseases. However, emerging data suggest that there is an "obesity paradox" - that being overweight may actually protect patients from cardiovascular mortality.

Investigators have confirmed that the risk of total mortality, cardiovascular mortality, and

myocardial infarction is highest among underweight patients, while cardiovascular mortality is lowest among overweight patients, according to two reports published in the journal Mayo Clinic Proceedings.
Abhishek Sharma, Cardiology Fellow at the State University of New York Downstate Medical Center in Brooklyn, New York, and colleagues conducted a meta-analysis of 36 studies.

They determined that low BMI (less than 20 kg/m2) in tens of thousands of patients with coronary artery disease who underwent coronary revascularisation procedures was associated with a 1.8- to 2.7-fold higher risk of myocardial infarction and all-cause and cardiovascular mortality over a mean follow up period of 1.7 years.

Conversely overweight and obese patients had more favourable outcomes. Cardiovascular mortality risk was lowest among overweight patients with a high BMI (25-30 kg/m2) compared to people with a normal BMI (20-25 kg/m2).

In obese and severely obese patients with a BMI in the 30-35 and over 35 kg/m2 range, all-cause mortality was 27 per cent and 22 per cent lower than people with normal BMI.

"At this stage we can only speculate on the reasons for this paradox. One explanation may be that overweight patients are more likely to be prescribed cardioprotective medications such as beta blockers and statins and in higher doses than the normal weight population," Sharma said.

In the second study, investigators led by Carl Lavie, Medical Director of Cardiac Rehabilitation and Preventative Cardiology at the John Ochsner Heart & Vascular Institute, Ochsner Clinical School, at the University of Queensland School of Medicine in New Orleans examined the "obesity paradox" from another perspective.

They evaluated the effects of body composition as a function of lean mass index (LMI) and body fat (BF) on the correlation between increasing BMI and decreasing mortality.

They estimated BF and LMI in nearly 48,000 people with a preserved left ventricular ejection fraction of more than 50 per cent and examined the survival advantages of obesity across strata of these body compositions.

This large observational study showed that higher lean body mass was associated with 29 per cent lower mortality, and while higher fat mass also exhibited survival benefits, this advantage disappeared after adjustment for lean body mass, suggesting that non-fat tissue bears the primary role in conferring greater survival.

Una cena de electrones

El ATP o adenosín trifosfato es considerada una de las moléculas más importante de la naturaleza. Esto se debe a que el ATP almacena la energía que obtenemos de los alimentos, y permite las funciones básicas de los organismos. Ahora bien, ¿imagínate que en vez de obtener nuestra energía de los alimentos y el ATP, fuésemos capaces de alimentarnos de energía pura?. Es decir, ¿que fuésemos capaces de comer electricidad? Estudios recientes muestran que ciertas bacterias pueden alimentarse directamente de electrones y aparentemente estas bacterias son más comunes de lo que se pensaba.

Ver reporte en:

http://www.newscientist.com/article/dn25894-meet-the-electric-life-forms-that-live-on-pure-energy.html?full=true#.U9wWGta0LiV

Evolución humana

Un estudio reciente publicado en la revista Nature nos muestra más evidencia de la historia evolutiva de nuestra especie. Los humanos que habitan en el Tíbet, poseen ciertos genes (únicos de la población) que les permite adaptarse a las bajas concentraciones de oxígeno de las alturas extremas de esta región (por encima de 4000 m). En este estudio encontraron que estos genes no aparecieron por milagro; sino que fueron adquiridos a través del entrecruzamiento con otra especie de homínido (Denísova) que habitaba en las regiones de Siberia.

Ver artículo completo en:
http://www.nature.com/nature/journal/vaop/ncurrent/full/nature13408.html
Huerta-Sánchez, E., et al. Nature 2014:Altitude adaptation in Tibetans caused by introgression of Denisovan-like DNA.

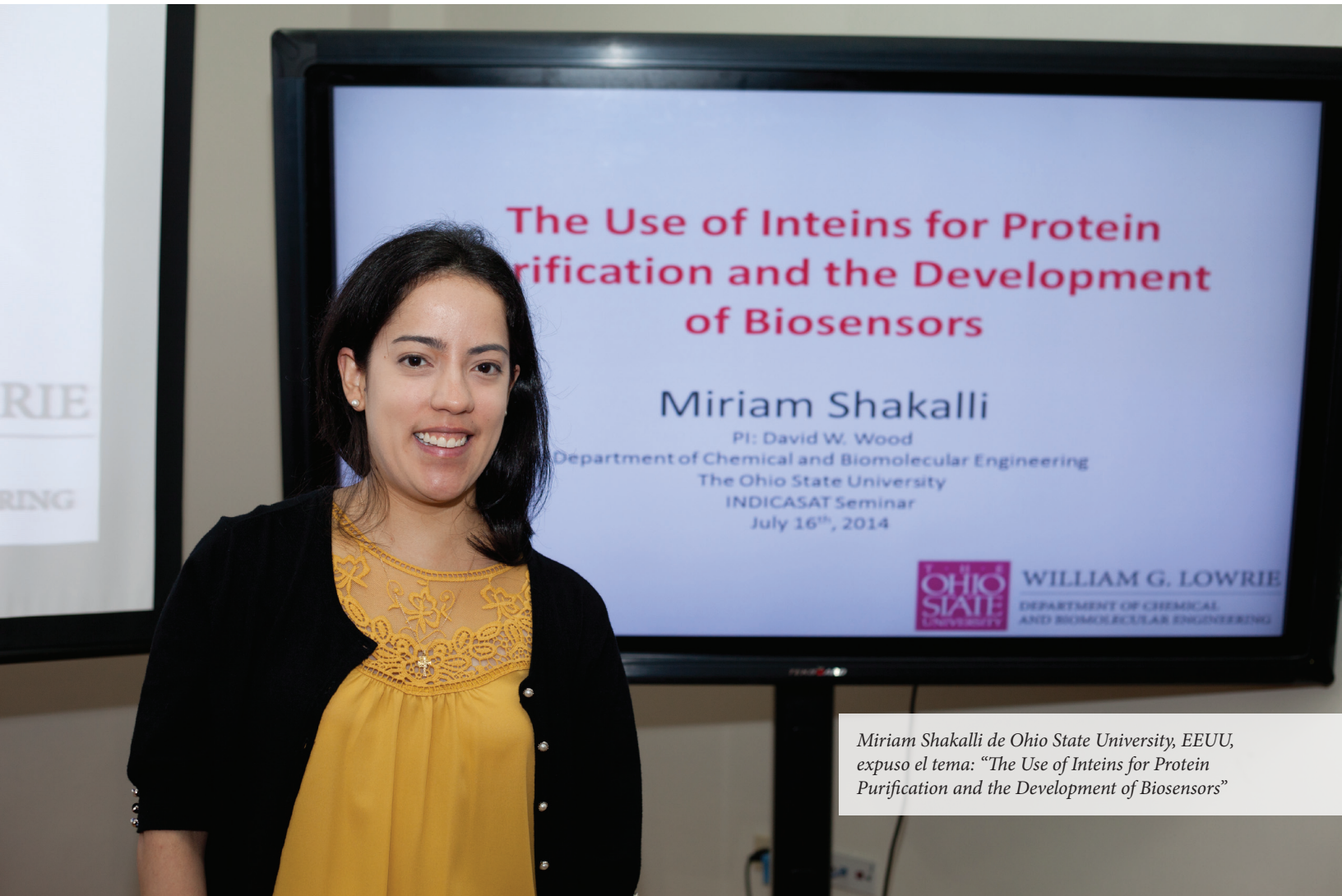
¿Cómo reducir el impacto al ambiente a través de la dieta?

Análisis recientes publicados en la revista PNAS confirman que la producción de carne roja es al menos un orden de magnitud más dañina para el embiente que el resto de la industria de producción de alimentos. Esto significa que disminuir el consumo de carne roja podría ser tan beneficionso para el ambiente como dejar de conducir los automóbiles a base de combustible fósiles.

Ver artículo original:
http://www.pnas.org/content/early/2014/07/17/1402183111
Eshel, Gidon, Alon Shepon, Tamar Makov, and Ron Milo. 2014. “Land, Irrigation Water, Greenhouse Gas, and Reactive Nitrogen Burdens of Meat, Eggs, and Dairy Production in the United States.” Proceedings of the National Academy of Sciences, July. doi:10.1073/pnas.1402183111.

El Dr. Rolando A. Gittens ofreció, el jueves 31 de julio de 2014, un seminario para el Capítulo Profesional de la Sociedad de Ingeniería en Medicina y Biología (EMBS, por sus siglas en inglés) del Instituto de Ingenieros Eléctricos y Electrónicos (IEEE), Sección Panamá. Su charla, titulada "Actualización en Biomateriales para el Avance de la Medicina Regenerativa: Ingeniería de los Tejidos" se enfocó en el dinámico campo de los biomateriales, cubriendo desde los biomateriales clásicos y el ejemplo de los implantes de titanio hasta el paradigma de los nuevos biomateriales que combinan materiales estructurales con factores biológicos y células madre.

Conferencias



Miriam Shakalli de Ohio State University, EEUU, expuso el tema: "The Use of Inteins for Protein Purification and the Development of Biosensors"

"Taller para Escritura de Artículos Científicos"

Entre el 23 y el 27 de Junio se realizó en la Universidad de Panamá el "Taller para Escritura de Artículos Científicos", en las Instalaciones de la Vicerrectoría de Investigación y Postgrado del Campus Octavio Méndez Pereira de la Universidad de Panamá. Este tipo de capacitaciones es liderado a lo largo y ancho del país por la Dra Gabrielle Britton (INDICASAT-AIP), en el marco de su Proyecto PENCYT, el cual es financiado por SENACYT. Para este taller actuaron también en la coordinación del evento los Doctores Omar Lopez (INDICASAT-AIP) y Armando Durant (INDICASAT-AIP), y la Lic. Shantal Grajales. Por parte de la Universidad de Panamá el evento fue coordinado y organizado por el Dr. Tomás Diez (Direc-

Conferencias

tor de Investigación), el Dr. Juan Gómez (Vicerrector), la Magister Matilde Rojas, por parte de la Vicerrectoría de Investigación y Postgrado, y por el Dr. Carlos Ramos (Decano) por parte del Decanato de la Facultad de Ciencias Naturales, Exactas y Tecnología y el Departamento de Bioquímica de esta Facultad.

Los temas del taller fueron dictados y desarrollados, los dos primeros días, por el Dr. Abdiel Pino (Universidad Tecnológica de Panamá) y la Dra. Louise Rollins Smith (Vanderbilt University, USA) a profesores y estudiantes de las áreas de las Ciencias de la Salud, Ciencias Naturales y Exactas de la Universidad de Panamá.

Los estudiantes mostraron su satisfacción por el taller, e indicaron que el mismo les permitió aclarar dudas, y aprender cosas novedosas que les servirán en sus investigaciones científicas. Al final del taller, se le otorgaron certificados a cada uno de los participantes firmados por el Dr. Jagannatha Rao por parte de INDICASAT-AIP, y el Dr. Juan Gómez por parte de la Universidad de Panamá. Mediante este tipo de actividades la familia de INDICASAT-AIP contribuye al avance y desarrollo de la ciencia en el país.

Dr. Jorge Motta, National Secretary, SENACYT and Dr. Diego L. Chou, Ambassador of Taiwan Embassy to Panama.

Dr. Diego L. Chou, Ambassador of Taiwan Embassy to Panama, visited the buildings of SENACYT, INDICASAT-AIP and CENAMEP-AIP accompanied by Dr. Jorge Motta, National Secretary, SENACYT, Republic Panama, on wednesday July 30, 2014. They discussed about the possible collaborations between Panama and Taiwan in the area of Science, Engineering and Innovation.

Claudia Guerrero, SENACYT, Dr. Jorge Motta, National Secretary, SENACYT, Ing. Javier Arias Real, CENAMEP AIP Director, Dr. Jagannatha Rao, INDICASAT AIP Director and Dr. Diego L. Chou, Ambassador of Taiwan Embassy to Panama.

Vistazo

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Presentation on "Panama Aging Research Initiative (PARI)" by Alcibiades Villarreal and Diana Oviedo

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U.S.M.A.

Rubén Solís
Estudiante Practicante de Psicología
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Comunicación científica en Panamá

Cortesía de Ciudad del Saber

La Fundación Ciudad del Saber, junto con el Instituto de Investigaciones Científicas y Servicios de Alta Tecnología AIP (INDICASAT AIP), llevó a cabo en días pasados el conversatorio: Comunicación científica en Panamá, en su Centro de Formación y Negocios.

El conversatorio inició con palabras de bienvenida por parte del Dr. Guillermo Castro, Vicepresidente de Investigación y Formación de la Fundación Ciudad del Saber, quien relató cómo aprendió que la ciencia es una actividad costosa y compleja que requiere del respaldo público. El Dr. Castro explicó que la ciencia es una actividad necesaria para el desarrollo social y de esa necesidad surge el proyecto Ciudad del Saber destinado, entre otras cosas, a facilitar nuestra interacción en terrenos como la investigación científica. Mencionó además la riqueza de biodiversidad, de posición y demográfica de Panamá, y cómo se debe trabajar aprovechando estas cualidades para fomentar la competitividad del país. Finalizó expresando que la ciencia debe colaborar de mejor

manera con los medios de comunicación del país, ofreciéndoles entrenamiento para poder hacer llegar mejor el mensaje científico a la población.

Amador Goodridge, del Instituto de Investigaciones Científicas y Servicios de Alta Tecnología AIP (INDICASAT AIP), habló sobre la "Importancia de la comunicación científica a la sociedad". El Dr. Goodridge explicó que ha notado una deficiencia con respecto a lo que se transmite en los medios de comunicación en contraste con el trabajo que realizan los científicos, y resaltó la desinformación que existe en temas de enfermedades. Lo que se busca es transmitir la información a la sociedad de una manera eficiente para que la ciencia se entienda en un contexto de ayuda al país.

Dr. Amador Goodridge

La clave recae en saber comunicar los hallazgos científicos y lograr que los investigadores sean más conocidos en la sociedad. Para el Dr. Goodridge el comunicar los avances tecnológicos y científicos ayuda a que la sociedad avance.

Por su parte el Dr. Rolando A. Gittens, del Colegio Nacional de Periodistas, realizó su ponencia sobre la "Técnica de comunicación en los medios". En ella explicó que el problema de la comunicación es un problema antiguo, puesto que no es nada sencillo narrar de manera eficiente lo que está ocurriendo. El Dr. Gittens mencionó los elementos que tiene en cuenta el periodista al realizar una noticia, como la inmediación, proximidad, consecuencia, prominencia, suspenso, rareza, conflicto, sexo y la emoción; y lo necesario que es para el científico entender que así trabaja el periodista.

Una vez terminado el conversatorio se realizó una discusión abierta donde se dejó claro que la comunicación científica es básica en el mundo en el que vivimos ya que sin esta no se podrían transmitir todos los avances que hay en la vida científica, por ello representa una necesidad social. Para la sociedad en su conjunto se hace necesario comprender de manera sencilla y didáctica los avances y explicaciones que puede brindar la ciencia en cualquiera de sus manifestaciones.

http://ciudaddelsaber.org/es/sala-prensa/noticias/comunicacion-cientifica-panama/1731

Con dinero de su cuota de Investigadora del Sistema Nacional de Investigación, la Dra. Carmenza Spadafora adquirió un microscopio de luz simple capaz de magnificar con objetivos de 4X, 10X y 40X. El microscopio viene equipado con una cámara de 5 Megapixels que puede acercar hasta 40X para imágenes estáticas, y hasta 400X para vídeo. La resolución de la cámara, a color, permitiría un agrandamiento de hasta 1600X de la imagen.

El objetivo de esta adquisición es el de facilitar la visualización de imágenes de células y parásitos a los estudiantes que visitan frecuentemente en grupos el Centro de Biología Celular y Molecular de Enfermedades (CBCMe), los cuales podrán observar las imágenes en el monitor del microscopio o agrandado en un monitor externo. También los estudiantes de éste y otros centros podrán utilizar el microscopio para discusiones o presentaciones grupales pequeñas.

Visitas Recientes

El sábado 28 de junio de 2014, estudiantes de la carrera de psicología de la Universidad de Panamá visitaron las instalaciones del Centro de Neurociencias de INDICASAT AIP.
Los estudiantes, bajo la guía del Dr. Rigoberto Salado, presentaron diversos anteproyectos de investigación, y posteriormente se llevó a cabo una sesión de preguntas y respuestas en torno a los anteproyectos presentados y las actividades neurocientíficas realizadas en INDICASAT. La visita fue de gran utilidad para promover el interés en la investigación en neurociencias y desarrollar lazos de futura colaboración entre ambos grupos.

Dr. José Loaiza, Investigador en INDICASAT AIP, Sarah Nelly Jallad, Adam Vera y Lydia Denisse Carranco, estudiantes de la Universidad de Texas, El Paso, EEUU.

Visitas Recientes

Grupo de la U.S.M.A sede de Azuero visitó las instalaciones de INDICASAT AIP y conoció el trabajo que desarrolla el área de Biología Molecular y Celular de Enfermedades .

Los estudiantes Houbergt Miranda, Esteban Franco y Luis Vélez de la Universidad Técnológica de Panamá con el apoyo del Dr. Rolando Gittens visitaron las instalaciones del Instituto para desarrollar un proyecto sobre biomateriales.

Visitas Recientes

Estudiantes de Farmacia de la Universidad Latina de Panamá, Sede de David, Chiriquí, visitaron las instalaciones del Instituto donde les mostraron los proyectos e investigaciones que se están desarrollando, además de conocer todos los equipo con que contamos para llevarlos a cabo.

Visitas Recientes

Estudiantes del King School visitaron las instalaciones de INDICASAT AIP, y recibiron un pantallazo de los proyectos que se llevan a cabo y que actualmente desarrolla cada área de investigación.

La Sra. Carmen Arias junto al equipo de Texas Christian University en Estados Unidos, se reunieron con el Dr. Jagannatha Rao, Director de INDICASAT AIP para conocer mas a fondo el trabajo que se desarrolla en el Instituto.

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