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Sr. Sachin Pilot, Ministro de Estado para las Comunicaciones y Tecnología de la Información, del gobierno de la India junto al Dr. Rubén Berrocal, Secretario Nacional de la SENACYT.

Portada



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De derecha a izquierda: Dr. Rubén Berrocal, Secretario Nacional de la SENACYT junto al Sr. Sachin Pilot, Ministro de Estado para las Comunicaciones y Tecnología de la Información, del gobierno de la India. *Foto por Rita Marissa Giovani Lee*.

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Indian Minister meets with Dr. Rubén Berrocal



r. Ruben Berrocal, National Secretary, SENACYT, Government of Panama meeting with Mr. Sachin Pilot, Minister of state for Communications and Information Technology, Government of India on April 11, 2012 in Republic Panama. Mr. Sachin Pilot is accompanied by Mr. Yogeshwar Varma (Indian Ambassador for Panama), Dr. Anita Bhatnagar Jain (joint Secretary), Mr. Hitesh Rajpal (Second Secretary, Indian Embassy) and Mr. Joseph Manoharan (Assistant Private Secretary). Dr. Ruben Berrocal feels that Panama has greater opportunity for Information Technology (IT) Education, Research and Innovation in Panama to become leader in Latin America and also Dr. Ruben highlighted that Panama in looking for International Cooperation in Information

technology.

Also, Dr. Ruben highlighted that, His Excellency Mr. Ricardo Martinelli has increased the investment in business, academics, science and technology, medical tourism, model transport system, biodiversity conservation, energy management and opens the country for International Collaboration.

Panama has reached with GDP: \$ 32 billion (2010 est), with annual growth rate: 10.6 % (2011) and projected 9% (2012). Recent survey showed that Panama has strong economy and also the safest living place in Latin America. Dr. Ruben Berrocal also highlighted that SENACYT is increasing IT awareness among school children, developing bioinformatics capabilities for research and health sector and innovation in IT research.





José Stoute, M.D.-Microwaving Malaria

By Hannah Ross-Suits (Class 012015) Global Health Newsletter

he Gates Foundation announced in 2008 their new grant program, Grand Challenges Explorations, and Dr. José Stoute called his colleague, Dr. Carmenza Spadafora, to bounce around ideas related to malaria. After deciding several ideas wouldn't work, Dr. Spadafora asked exasperatedly, "What do you want, a ray gun?!" to which Dr. Stoute replied. "Yes!" The idea of using microwaves to kill malaria was born. The first phase was funded for \$100,000. Based on successful initial results in test tubes, the project received an additional \$1 million over a twoyear period. Current studies are looking at in vivo microwave radiation in mice. The current project is in its second year and results look promising. Dr. Stoute and his colleagues will travel to Panama in june to present these results to The Gates Foundation Program Officer.

With his busy schedule Dr. Stoute was able to give me a few minutes to tell me about his research and to answer a few other questions:

Since it isn't probable to stick people in giant microwaves, how can your research in mice translate to treatment in humans? Our goal is to develop a device that is safe, effective, and noninvasive.

It would ideally be battery powered-a car battery or maybe smaller-and would be portable and made from inexpensive but durable materials. Because the body circulates about 5 liters of blood per minute, we could have someone expose an arm or a leg to the microwave device set at the right power and frequency to destroy the parasites that are traveling in the blood. Plasmodium likes to hide out in specific organs, like the liver, but eventually it has to get back into the bloodstream, and that's when we can kill it with the microwave radiation. Do you see any other applications of microwaves to other parasites or bacteria? Yes, we're actually planning to expand the research to Trypanosoma cruzi, (the parasite that causes Chagas disease) which has enzymes that iron in a state similar to that found in the War. hemozoin of Plasmodium. Microwave radiation could also be used to sterilize donated blood, or to help treat cutaneous leishmaniasis (an ulcerative disease that can cause disfigurement if left untreated). Why Plasmodium? Why not another parasite? Malaria is the most important

parasite in terms of morbidity and

mortality. The organism is intriguing and the history to how we've learned about malaria is fascinating.

Who/What is your inspiration? My mother. I grew up in Panama, and she was a nurse at one of the hospitals. She would come home and tell me stories about her work. I also was accident-prone as a kid. and I often had to spend time in the ER. I enjoyed seeing the dedication of the hospital workers while I was there.

Do you have any favorite books or movies? For movies, my favorites are Out of Africa, Forrest Gump, and Saving Private Rian. For books, I love history, so my favorite book is The Path Between the Seas by David McCullough, which is about the creation of the Panama Canal. I also enjoy books about the Civil War.

Do you have any advice for medical students?

Well, sometimes not knowing as much can be an advantage; being naïve can open you up to more innovative ideas. Follow your dreams as far as they can go, and there's always a way to make them happen.







TALLER DE ESCRITURA DE
ARTÍCULOS CIENTÍFICOS I:CÓMO FUNCIONAN LAS REVISTAS INDEXADAS
Y EL PROCESO DE PUBLICACIÓN CIENTÍFICA
2, 3 y 4 de Julio de 2012



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First evidence for Aluminum-maltol driven B to Z-DNA conformational transition in Poly d(GC). d(GC): relevance to Alzheimer's disease

By M. Govlndaraju1, Monica FS, Berrocal R, Sambasiva Rao KRS and Rao KS.



Dr. Rubén Berrocal, National Secretary of the SENACYT, Dr. Jagannatha Rao, Director of INDICASAT AIP and Dr. Sambasiva Rao KRS.

ABSTRACT

Higher concentration of Aluminum (AI) has been observed in Alzheimer's, Parkinson's, and Amyotrophic lateral sclerosis and there was an apparent localization of the AI in chromatin in the brain cells. Studies of AI-DNA interaction showed that cross-linking occurs in DNAs of all base ratios, including poly d(AT).d(AT) and poly d(GC).d(GC). In the present investigation, interaction of AI with poly d(GC).d(GC) and poly d(AT).d(AT) was studied using AI-maltol, a hydrolytlcally stable AI-compound, at neutral pH. We found that AI at micromolar level caused conformational transition from B-DNA to Z-DNA in poly d(GC). d(GC). Chelation by EDTA could reverse the Z-DNA caused by AI-maltol back to B- DNA. We propose that AI(mal)2+ and AI(mal) 2+, major cationic species of AI-maltol at neutral pH are involved in the above transition in poly d(GC).d(GC). The biological relevance of DNA transition in Alzheimer's disease is discussed.

M. Govindaraju1, Monica F.S., Berrocal R., Sambasiva Rao KRS and Rao K.S. Current Trends in Biotechnology and Pharmacy 6 (2), 204-209, 2012.

PUBLICACIONES DE INDICASAT

New evidence on -synuclein and Tau binding to conformation and sequence specific GC* rich DNA: Relevance to neurological disorders

By P. Vasudevaraju, Erika Guerrero, Muralidhar L. Hegde, T. B. Collen, Gabrielle B. Britton, K. S. Rao.



Erika Guerrero Estudiante de Ph.D. de INDICASAT AIP



Dr. Hegde, Muralidhar L.



Dra. Gabrielle Britton Investigadora de INDICASAT AIP



Dr. Jagannatha Rao Director de INDICASAT AIP



Colleen Timmons B.

ABSTRACT

DNA topology plays a critical role in maintaining the integrity of the genome and cellular functions. Although changes in DNA conformation and structural dynamics in the brain have been associated with various neurological disorders, its precise role in the pathogenesis is still unclear. Previous studies from our laboratory have shown that there is a conformational change in the genomic DNA of Parkinson's disease (PO) (B to altered B-DNA) and Alzheimer's disease brain (B to Z-DNA). However, there is limited information on the mechanism on DNA dynamics changes in brain. **Objective:** In the present study, we have investigated the DNA conformation and sequence specific binding ability of a-Synuclein and Tau with reference to B-DNA and Z-DNA using oligonucleotide (CGCGCGCG)₂ as a novel model DNA system. This sequence is predominantly present in the promoter region of the genes of biological relevance. Materials and Methods: Natively, (CGCGCGCG)₂ sequence exists in B-DNA conformation, but in the presence of high sodium concentration (4 M NaCI). the oligo converts into Z-DNA form. We used circular dichroism, melting temperature and fluorescence studies to understand protein-DNA interactions. Results: CD studies indicated that both a-Synuclein and Tau bind to

B-DNA conformation of (CGCGCGCG)₂ and induce altered B-form. Further, these proteins increased the melting temperature and decreased the number of EtBr molecules bound per base pair of DNA in B-form indicating that DNA stability is favored to alter B-DNA conformation, which could be an intermediate form favoring Z-DNA conformation. Moreover, both a-Synuclein and Tau also bound to disease-linked Z-DNA conformation of (CGCGCGCG)₂ and further stabilized the Z-conformation. **Conclusions:** The present study provides vital mechanistic information on synuclein and tau binding to DNA in a conformation-specific manner causing conformational transition. Furthermore, both the proteins stabilize Z-DNA conformation. These have altered minor and major groove pattems and thus may have significant biological implications in relevance to gene expression pattern in neurodegeneration. We discuss the implications of a-Synuclein/Tau binding to DNA and stabilizing the altered conformations of DNA in neuronal cell dysfunction.

P. Vasudevaraju, Erika Guerrero, Muralidhar L. Hegde, T. B. Collen, Gabrielle B. Britton, K. S. Rao, Journal of Pharmacy and Bioallied Sciences 4(2), 132-137, 2012.

Reduction of inflammatory pain in female rats after NR2B NMDA cortical antagonism

By Carol Vásquez, Melany Sanchez, Jairo Herrera and Gabriel Quintero.

ABSTRACT

Reducción del dolor inflamatorio en ratas hembras tras el antagonismo cortical de NR2B NMDA. Estudios han demostrado que los receptores de N-methyl-D-aspartato (NMDA) participan en el procesamiento del dolor en diferentes niveles del SNC. Este estudio empleó ratas hembras adultas Wistar para evaluar el antagonismo de la subunidad NR2B de NMDA en los procesos de dolor fásico y tónico.

Se implantaron cánulas corticalmente con la cirugía estereotáxica y tras una semana de recuperación se realizaron pruebas conductuales. Se evaluaron los efectos del fármaco en la coordinación motora en el aparato de barra giratoria. Además, las ratas realizaron la prueba de latencia de retirada de la pata a un estímulo termal nocivo. Posteriormente, las ratas realizaron la prueba de formalina. Las ratas hembras que recibieron el antagonista de NR2B, Ro 25-6981, antes y después de la inyección de formalina denotaron respuestas de dolor significativamente menores en comparación con los controles (p<0.05). En contraste, no se encontraron diferencias significativas en la prueba de dolor fásico (Hargreaves) y la prueba de barra giratoria. En conjunto, estos resultados sugieren que el antagonismo cortical de la subunidad NR2B de los receptores NMDA es capaz de reducir los niveles de dolor inflamatorio, antes y después de la invección de formalina en las distintas fases del ciclo estral.

Carol Vásquez, Melany Sanchez, Jairo Herrera and Gabriel Quintero. Psicothema 24(2), 296-301, 2012.



Estudiante de Ph.D. de INDICASAT AIP

PUBLICACIONES DE INDICASAT

Recent advances in a-Synuclein functions, advanced glycation and toxicity: implications for Parkinson's disease

By Erika Guerrero, P. Vasudevaraju, Muralidhar L. Hegde, Britton G.B. and Rao KS.

ABSTRACT

The toxicity of a-synuclein in the neuropathology of Parkinson's disease which includes its hallmark aggregation has been studied scrupulously in the last decade.

Although little is known regarding the normal functions of a-synuclein, its association with membrane phospholipids suggests its potential role in signaling pathways.

Following extensive evidences for its nuclear localization, we and others recently demonstrated DNA binding activity of a-synuclein that modulates its conformation as well as aggregation properties. Furthermore, we also underscored the similarities among various amyloidogenic proteins involved in neurodegenerative diseases including amyloid beta peptides and tau. Our more recent studies show that a-synuclein is glycated and glycosylated both in vitro and in neurons, significantly affecting its folding, oligomeric and DNA binding properties. Glycated a-synucelin causes increased genome damage both via its direct interaction with DNA and by increased generation of reactive oxygen species as glycation byproduct. In this review, we discuss the mechanisms of glycation and other posttranslational modifications of a-synuclein, including phosphorylation and nitration, and their role in neuronal death in Parkinson's disease.

Erika Guerrero, P. Vasudevaraju, Muralidhar L. Hegde, Britton G.B. and Rao KS. Molecular Neurobiology (2012, in press)



Erika Guerrero Estudiante de Ph.D. de INDICASAT AIP



Curso de Capacitación sobre "Extraction and modification of bioactive components and specialty chemicals from plants", realizado del 23 al 27 Abril.

Alcibiades Villarreal estudiante de Ph. D. de INDICASAT AIP es el primer panameño en ser aceptado a participar en el taller "Cognitive Aging", que se llevará a cabo desde el 13 al 17 de junio en Cold Spring Harbor, New York, Estados Unidos. Éste taller proporcionará más comprensión en el campo del envejecimiento cognitivo, además ofrecerá diversas perspectivas biológicas en la investigación en neurociencias y el envejecimiento.



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Rathnam Chaguturu – SRI International Epidemiology of infectious diseases

Walderez Dutra – SRI International Control of vector population and disease eradication

Steve Cresawn – SRI International Phage therapy and pandemic Influenza

Lee Riley - University of California at Berkeley Antibiotic resistance and vaccine

Laura Flores – University of California at Berkeley Serological antigen detection and novel diagnostics

Wilbur Milhouse – University of South Florida Clinical trials, prevention and treatment logistics

Ibis Serrano-Sanchez - Global Health Consultant Funding sources issues and neglected infectious diseases

James Herrick – James-Madison University Ecology and evolution of infectious diseases

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Application deadline is June 15th. More information and submission materials available at www.indicasat.org.pa Contact: dbarranco@indicasat.org.pa





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Dr. Juan Miguel Pascale Instituto Conmemorativo Gorgas

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Curso de Investigación y Buenas Prácticas Cínicas 19 y 20 de abril







Seminario Taller USO DE AGUA EN PLANTAS TROPICALES EN EL MARCO DEL CAMBIO CLIMÁTICO: UNA VISIÓN ECOFISIOLÓGICA

A realizarse del 23 al 27 de Julio de 2012 Cupos limitados Organiza: INDICASAT-AIP Mayor Información y aplicación: olopez@indicasat.org.pa

Instructores:

Dr. Louis Santiago Department of Botany U.C. - Riverside, California

Dr. Omar R. López Alfano INDICASAT-AIP, Panamá

Profesores Invitados: Dra. Mónica Mejía-Chang Universidad Autónoma de Barcelona

Dra. Katia Silvera Smithsonian Tropical Research Institute Costo de Inscripción:

Estudiantes B/. 25.00

Profesionales B/. 50.00



NOTABLE ABSENCES, DISHONEST TACTICS AND LAZY REPORTING, BUT GOOD PANELISTS AND A COMPETENT MODERATOR KEPT THE TUPPER CENTER DISCUSSION FROM BEING A FARCE

by Eric Jackson The Panama News - Online Newspaper

n medical research involving human subjects, the well-being of the individual research subject must take precedence over all other interests. ... In medical practice and in medical research, most interventions involve risks and burdens. ... Medical research is subject to ethical standards that promote respect for all human subjects and protect their health and rights. Some research populations are particularly vulnerable and need special protection. These include those who cannot give or refuse consent for themselves and those who may be vulnerable to coercion or undue influence....

Appropriate caution must be exercised in the conduct of medical research that may harm the environment. ...

Participation by competent individuals as subjects in medical research must be voluntary. Although it may be appropriate to consult family members or community leaders, no competent individual may be enrolled in a research study unless he or she freely agrees. ...

In medical research involving competent human subjects, each potential subject must be adequately informed of the aims, methods, sources of funding, any possible conflicts of interest, institutional affiliations of the researcher, the anticipated benefits and potential risks of the study and the discomfort it may entail, and any other relevant aspects of the study. The potential subject must be informed of the right to refuse to participate in the study or to withdraw consent to participate at any time without reprisal.

> Special attention should be given to the specific information needs of individual potential subjects as well as to the methods used to deliver the information. After ensuring that the potential subject has understood the information, the physician or another appropriately qualified individual must then seek the potential subject's freely-given informed consent, preferably in writing. If the consent cannot be expressed in writing, the non-written consent must be formally documented and

Declaration of Helsinki on Ethical Principles for Medical Research

witnessed...

A private company founded on Oxford University research and the Panamanian government are contemplating the release of genetically modified mosquitoes in parts of Arraijan. Fears of swarms of mutant killer mosquitoes spreading horrible new diseases to humanity are probably far-fetched, but some unpredictable consequences are predictable and some of the intuitively obvious hazards are out there and yet to be answered. So whats obvious? Forget any concerns about genetic engineering for a moment and think about any anti-dengue program based on the specific elimination of the Aedes aegypti mosquito from the environment, when we also have the Aedes albopictus mosquito here, which is also a dengue vector and which might just move into the eradicated insects niche.

In March 21, after two press conferences and a meeting in 2011 wherein the British company Oxitec and the Gorgas Memorial Institute for Health Studies (the latter a Panamanian government medical research center) promoted a plan to fight dengue fever by releasing genetically modified mosquitoes, opponents of the idea --- people from the Third World Network (TWN) and GeneWatch UK came from Malaysia, Chile and England to the University of Panama. Although there were defenders of the plan at the university forum, Oxitec wasnt there and they were annoyed by that. Another forum was organized to take place on May 16 at the Smithsonian Tropical Research Institute (STRI), in what has become Panamas principal venue for high-level scientific debate, that institutions Tupper Auditorium. This time TWN and GeneWatch were invited but begged off, citing scheduling and travel expense problems.

The organizational sponsors at the top of the announcement for the event were STRI, the Gorgas Institute and the University of Panama. The rules for the forum were not like the STRI Tuesday talks in that same room, in which world-class scientists in different fields sharpen their wits on each other. Here people submitted written questions on cards, which the moderator posed, didnt pose, or changed. But before any of that there were presentations by several people and a panel discussion.

The better media people stayed to hear the presentations, but the most influential media --the television stations and most of the daily newspapers--- came long enough to gather comments from the Gorgas Institute or the government but did not stay for the presentations. The best mainstream coverage was by the AFP news service, which still didnt get into many of the details that need to be in the public mind for any worthwhile debate.

The proceedings, partly in Spanish and partly in English, were moderated by José Loaiza, who has his licenciatura (bachelors degree) in biology and masters in medical entomology from the University of Panama, and whose association with STRI includes some significant discoveries about the changing ranges of certain insects. He did not have to deal with screaming protesters, fistfights among panelists or anything remotely like it, but he did bring up subjects that those advocating the mosquito release had omitted from their presentations, and did pose questions about conflict of interest that some may have taken as rude. He kept the discussion from being as simplistic and one-sided as was reported in most of the local press.

A number of other people went on stage later for the question and answer period, but the main presentations were by the Gorgas Institutes general director Néstor Sosa, who has led the institute for several years in which it has won some prestigious international awards (including a share of last years Gates Award for its work on tropical infectious diseases); and Oxitecs chief scientific officer and the inventor of its RIDL insect genetic modification technology Luke Alphey --- both strong supporters of the proposed release of genetically modified mosquitoes --- along with José Luis San Martín, a Panamanian who heads the Pan-American Health Organizations (PAHOs) anti-dengue effort; Jennifer Kuzma, an associate professor of in the Science, Technology, and Environmental Policy program at the Humphrey School at the University of Minnesota and veteran of the US governments risk assessment and regulatory efforts with respect to new technologies and study director for US National Academy of Sciences for reports on bio-terrorism and other cutting-edge topics; and North Carolina State University entomology professor Fred Gould, who this year was honored by the North Carolina public higher education system as the one professor at its 17 colleges and universities who has made "the greatest contribution to the welfare of the human race." It was a distinguished panel, as one expects when events are held at STRI.

Meanwhile, on this particular day the left wing of

Panamas medical profession was on strike against the Ministry of Health and the Social Security Fund, which activity was among the factors keeping critical thinkers in the local medical profession away; and local environmentalists, who also did not have much of a presence at the earlier forum at the University of Panama, have other pressing priorities like destructive strip mines, hydroelectric dams and coastal developments and were not well represented at this forum either. And what about STRI scientists? The proceedings were largely in Spanish, which may have been a difficulty for some of the newer Smithsonian staff. This was about something that the Panamanian government wants to do, which is historically a bigger problem for STRI. Local politicians could do grave damage to STRI by, for example, kicking them off of Barro Colorado Island. The Smithsonian, a US government institution, gives great deference to the Panamanian government, even from time to time giving the appearance of expert scientific endorsements for controversial Panamanian government policies. Thus, probably in part for overtly political considerations, there was not a cadre of skeptical STRI scientists asking hardball questions and making skeptical observations at these event, as happens at STRIs own gatherings.

Before the main presentations began, when people from the various sponsoring institutions were making opening remarks, Néstor Sosa struck a low blow that would probably not go unchallenged at a STRI Tuesday talk. He generically accused "a group" of "disinformation." He did not identify what the supposed misrepresentation was, or who he was accusing of doing it.

"Misinformation" is erroneous data, but "disinformation" is a deliberate lie. Its a severe charge to make in an academic gathering. At most worthy academic institutions around the world, propagating "disinformation" is scholarly misconduct that gets a person fired, notwithstanding any tenure. Sosa was director of the Gorgas Institute before President Martinelli took office, and cant be fairly accused of being a Martinelli creation. However, the unspecified allegation of lying is the same sort of unethical argument that the president and his minions --including his notorious "call center" organized commentators on the mainstream media websites --repetitiously make against the Panamanian press in general. So has the Gorgas Institute now been debased into something like a Martinelista propaganda outlet?

The unspecified allegation of lying is an old and disreputable tactic. The Nazi railings against the "lying Jewish press" without pointing out any specific lies, the right-wing US vilification of "the liberal media" and the past decade of endless repetitions of unspecified "slander" charges against The Panama News by a far-right clique in the Panamas American community are all variations on the theme. The common denominator is an attack on someones honor without any offer of particulars, and whenever thats done its an unethical argument.

This was the director of the Gorgas Institute making the unspecified allegation of fraud in the company of some distinguished scientists. If Sosa has a clarification to make, The Panama News will publish it, but this reporters formal education --- the law --specializes in the recognition and exposure of dishonest arguments, and this one was newsworthy because of the person who made it and because it set the initial tone for discussion at the forum.

However, Sosa was not the only scientist in the room.

The first speaker was Dr. San Martín, who heads anti-dengue efforts for the Pan-American Health Organization, which is the Western Hemispheres affiliate of the World Health Organization. He acknowledged the concerns of the skeptics as legitimate, and proceeded to lay out the history and complexity of the the problems posed by the Aedes aegypti mosquito and dengue fever. Those, he opined, are separate if related questions, and that species of mosquito can carry other diseases.

Drawing a general picture of dengue and measures taken to control it, he noted that the Aedes aegypti is "almost the only dengue vector," and that there have been largely effective eradication and control programs in the past that have seen their progress reversed when countries have cut their vector control budgets. Now, he said, a set of circumstances is making dengue control more difficult: -Populations are moving;

-There is increased urbanization, which sprawls into formerly wild areas and concentrates people so as to ease the spread of diseases;

-There is increased poverty in urbanized areas, which tends to create conditions for infectious diseases to spread;

-Environmental protection laws are inadequate; and

-Climate change is moving the ranges of medically important species and altering the conditions in which people live.

Thus, Dr. San Martín characterized dengue as "one of the gravest and most complex problems in the Americas."

However, he also noted that Panama has substantially less of a problem with dengue than its neighbors, although the percentage of severe cases is higher here than in some of those places. He described a dengue cycle that runs three to five years, involving four different strains of the disease, and warned that just because our incidence has been low in recent years does not mean that it will be so in future cycles.

There is no separate disease as "hemorrhagic dengue" as is sometimes reported or believed, but rather severe effects of the known strains on certain individuals. The occasions for alarm, he noted, are when dengue causes a severe loss of plasma, when there is hemorrhaging, or when there is damage to organs.

When any of those things start happening, the illness has become life-threatening.

How to improve matters? San Martín urged recycling of discarded tires, which collect rainwater and breed mosquitoes, various sorts of insect traps and public education campaigns to improve sanitation. He noted that its hard to find funding for such things until its too late and there is an epidemic underway.

He raised the possibility of a vaccine, noting that there is one under development, with effectiveness trials that started last year.

Oxitecs RIDL modified Aedes aegypti mosquitoes were viewed by San Martín as one possibly useful approach to dengue control. However, he warned that "for PAHO there is no unique solution."

The next presentation was by Oxitecs Luke Alphey. He has a PhD in biochemistry from the University of Dundee and invented the RIDL technique for the genetic engineering of insects with repressible, dominant and lethal genes. Although the genetically modified Aedes aegypti mosquitoes that Oxitec, in conjunction with the Gorgas Institute, proposed to release into the Panamanian environment are sometimes described as "sterile" they are not precisely that. They are male (biteless) insects with a fatal gene that can be suppressed by feeding those possessing it the antibiotic tetracycline, but which in the absence of this drug causes death in the vast majority of cases. These males mate with wild females and their offspring inherit the fatal gene and die before adulthood unless they are fed tetracycline. Its a condition Alphey described as being "genetically sterile." There are a couple of strategies, one of which is lethal to offspring of both genders, the other just to females (which are the mosquitoes that bite).

At the University of Panama forum and in the literature about the RIDL-altered Aedes aegypti mosquitoes, is was said that in one test, insects fed a chicken-based cat food had a higher than projected survival rate and it was believed that this was due to the common practice of including tetracycline in the feed for industrial-raised chickens. However, the specific dosages of tetracycline to effectively suppress the fatal genes in Oxitecs mosquitoes had not been published at the time of the university forum and the warnings and hypotheses raised about the tetracycline issue by activists who oppose the propagation of genetically engineered species were based upon scant knowledge. There do not appear to have been more data published on the subject since then. However, Alphey said that the tetracycline that pervades the human environment in low dosages --sewage generated by people who have taken prescribed tetracycline as a drug or who have eaten chicken raised on tetracycline --- is not enough to significantly affect his companys insects. He also noted that Aeded aegypti do not generally breed in sewage but instead prefer small bodies of clear water --- something that is the generally accepted belief, but contrary to what Ministry of Health vector control inspectors say when making residential inspections of homes with septic tanks. Alphey said that even the sewage running off from chicken farms is not enough to suppress the fatal genes in RIDL mosquitoes.

Alphey also broached the topic of informed consent, although he did not use that term as such, which has specific legal and ethical meanings. He showed a map of an urban area in Brazil into which his companys mosquitoes were released, with most residences filled in as blue and quite a few in red. He claimed that in the Brazilian study, the red houses were the ones where no adult was home and the blue ones were where the residents approved of the study, and that nobody denied permission to conduct the experiment. He did, however, note that there were some objections to the release of the mosquitoes in Brazil, and that there had also been in another Oxitec experiment in the Cayman Islands.

Missing from Alpheys presentation, however, was specifically what the Brazilians whose neighborhood was infested with Oxitec mosquitoes had been told about what had been proposed, and what risks the experiment carried.

Ethical questions were raised by implication, and by omission, in Alpheys presentation. This forum, after all, was billed as a part of the public disclosure of Oxitecs plans and neither the company representative nor the representatives of its research partner, the Gorgas Institute, of their own accord raised the matter of two mosquito species that are dengue vectors being present in Panama, and the risk that the suppression of the most common one might merely lead to its ecological niches being taken over by the presently less common and more recent invasive species. It might be that the worst risk would be a matter of concern to taxpayers, as Oxitec also has an RIDL version of the second species, Aedes albopictus, which it could then sell to Panama if a sale of its modified Aedes aegypti just results in a switch in dengue vectors. But the two species apparently have differerent ranges of habitat preferences and differences in how efficiently they transmit dengue fever. In any case, if this was how Panama was to be informed of the Oxitec - Gorgas Institute proposal, there was less than full disclosure.

Next came Dr. Gould, who doesnt have a product to

sell or government funding to secure as the result of Panamas decisions. He talked about a range of alternative technologies and strategies that might be used against dengue or its vectors.

Gould pointed out that one of the problems with the fight against dengue by the use of laboratory-raised mosquitoes that affect the gene pool or infect the population of wild stocks is that the effective release of mosquitoes into a city is a complicated matter, with many variables.

One of the genetic engineering strategies on which Gould has worked, theoretically and in experiments with other insects, is "the Medea element," named after the legendary ancient Greek woman who killed her children to spite her husband, wherein a genetic inability to spread disease is inserted into the females of a wild insect population in such a way that only those offspring with the desired trait are able to survive. It is calculated that because the male and female offspring carrying the trait would in turn breed and further spread the desired genes, this would be a faster way of spreading the trait through an insect population than the repeated mass releases of male carriers.

Gould also discussed Wolbachia, an infectious rather than a genetic modification approach. Wolbachia are a genus of bacteria that infect the reproductive organs of insects and other arthropods. They may be the most common infectious microbes among insects, but are in some cases symbionts rather than parasites. Certain Wolbachia infections prevent or hinder the insect hosts' transmission of viruses --- like the dengue virus. Experiments are underway about using Wolbachia to infect mosquito populations so that they can't transmit dengue, but they don't seem ready to be deployed as a disease control strategy at this time, given, as Gould put it, "all questions of how good this is."

The next presentation, by Dr. Kuzma, may have been by someone who now works at the University of Minnesota, but the knowledge on which she draws is derived more from long years in the US federal government's regulatory agencies than from academia. At the US Department of Agriculture, she was one of the people who developed the regulations for genetically modified crops. She has worked with rules for nano-technology, strategies to fight bioterrorism and the general philosophies and hierarchies of considerations that go into the setting up of regulatory schemes in general. Her specialty has been risk analysis, but that involves many fields, including ethics.

"Risk analysis is not strictly science-based," Kuzma explained. Basic questions like "What is harm?" are informed by science, but get into philosophical and social factors as well. Moreover, she pointed out, when doing risk analysis for regulatory purposes, judgments tend to be made on short time scales. (That's why, for example, certain food additives, medicines and pesticides will get approved in good faith by government agencies, but later, after long-term studies that were not possible in the time frames to make the original decisions establish formerly unknown facts, these products get taken off of the market by regulators.)

In charts outlining considerations that vary among different sorts of regulatory decisions in the United States, Kuzma noted that for genetically modified organisms there is essentially no informed consent. There, it's illegal to label food by whether it's genetically modified or not, so as to give consumers a choice, and if a new gene-spliced crop with pollen that sets off hay fever in someone who lives downwind gets planted, that neighbor has no choice in the matter. Generally, she said, the decisions with greater risks call for more widespread social input before they are made, even if it may not be practical or desirable to submit them to a public vote.

The shortcomings of traditional regulatory approaches, Kuzma noted, have given rise to the notion of "postnormal science," when decisions about regulations, a course of medical treatment, a longterm investment, or so on carry high stakes, are being viewed through lenses of conflicting values and key facts are unknown and in the near term unknowable. In those cases the concept advocates extending the pool of expertise beyond the bounds of scientists narrowly in the field to include people from other relevant discipline --- ethicists in some cases --- and in others to include those who are going to be directly affected by a decision. In US law and regulatory agencies, where there are constant battles between interest groups' hired experts, the whole notion quickly becomes a political minefield.

After the main presentation José Loaiza summed up, added obervations and raised issues that had not been part of the main presentations. One of these was the presence of Aedes albopictus in Panama. He asserted that, while the Oxitec mosquitoes are billed by some as the answer to dengue, there is a lack of scientific evidence as to their effectiveness, in themselves and in comparison to other strategies. He identified the question of why Panama has a lower incidence of dengue than its neighors as important. He showed a map that indicated the incidence of dengue in this country largely running along the major roads (could it be all that trash strewn along them, particularly the bottles and cans?), and compared it the much different geographical distribution of malaria and the Anopheles mosquitoes that are its vectors. Then, taking and filtering written questions from the audience, he moderated a discussion among the presenters and several others onstage.

Some of the question-and-answer period, which ran well past the advertised end of the forum, was repetitious. One of the first things the Loaiza got into was the matter of financial stakes. Néstor Sosa denied that there is a contract between the Gorgas Institute and Oxitec. He said that the only agreement between them was one about the exchange of biological materials. This, notwithstanding declarations like this one in Oxitec's online newsletter:

In preparation for laboratory and field trials, the GCIHS and Oxitec have taken important steps towards obtaining the regulatory clearance for the project, as well as building the human and physical infrastructure required by an enterprise of this magnitude.

Left unstated, but clear to most of the people in the room, is that if this project goes ahead it will mean more money coming in, whether from grants, contracts or government funding, for the Gorgas Institute.

For Oxitec's part, Luke Alphey said that the company is looking to make money from the application of its technologies and is interesting in a longer-term sale of its technology and services to Panama. "We are a commercial company," he said. Fred Gould expanded on his earlier presentation, both from the regulatory perspective and taking into account both the Aedes albopictus and other "moving targets" in the environment.

He noted that the Wolbachia strategy has an advantage over genetic engineering approaches because regulators consider it a biological control that would be a better known and less controversial issue. He opined that Aedes albopictus does not transmit dengue as well as Aedes aegypti, but also noted that evolution will be at work both in the strains of the dengue virus and in the insects, especially if you have the albopictus moving into new niches where the aegypti has been reduced or eradicated, so that relative properties we know or suspect today may be altered by a natural process of genetic mutations. There followed a discussion among Alphey, Gould and Kuzma about the possibilities of niche replacement.

That led to Jennifer Kuzma calling for more transparency in this decisionmaking process, and risk studies and fault-tree analyses about the possibilities of one dengue vector replacing another. Alphey responded that "We work with the rules of the countries

where we work" --- a statement that

does little to refute the Third World Network's charge that Oxitec cherry-picks jurisdictions where regulations or their enforcement are lax --- and Gould noted and

approved of an Australian method, not legally required, in which raw research data are regularly published as the come in, whether or not they meet the predictions of the researchers.

The transparency and ethics debate moved on to the matter of informed consent, and on the social realities of that the American panelists were surely not ignorant but also could not be expected to pronounce upon the specifics of Panama. Sosa said that everything is ready for the mosquitoes' released in Arraijan, and Alphey gave his anecdotal reassuarance

that he and others working at Oxitec have been bitten by the gene-spliced females, with no ill effects. But the questions about informed consent continued --maybe because there has been no specific disclosure of what people in the areas where Oxitec's experiments are conducted have been or are being told to get their purported approval. And this led to Dr. Sosa's pronouncements on the subject: "It is impossible and inconvenient to get individual consent." Why is that? "Some person might be negative," he said. And what was the alternative he proposed? It was "community consent." Not that there would be a fully informed debate in the communities to be affected. Not that all of the area's elected officials would have to approve. Sosa noted that the mayor of Arraijain (Manolith Samaniego a member of the president's Cambio Democratico party) had been consulted, as well as certain identified "community leaders." But most Panamanians,

even relatively uneducated ones, know who does and who does not get identified as a "community leader" by any governmental institution under the current administration. What is proposed here is a medical experiment by a private company and a medical research institution, one with known

and but mostly unknown risks, with the things that could go wrong probably not catastrophic. It is an experiment that affects the environment. It probably is impractical to get the informed consent of everyone who would be affected because for one thing a portion of the population would be scientifically illiterate to the point of being unable to understand what is involved. The dilemma Panama faces may point to the inadequacies of the Declaration of Helsinki, which surely Oxitec and the Gorgas Institute would argue by definition does not apply.

And were there more candor and transparency coming from the project's proponents, there might be the basis for an interesting discussion of THAT.

ARAS NUEVAS DE INDICASAT AIP



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VISTAZO

BIOTERIO

Por René Rivera

ara algunas personas la Palabra BIOTERIO no está bien clara o no saben su significado realmente es por eso que lo definiré en un pequeño párrafo.

La palabra bioterio viene del griego " bios" que significa vida y " teiron" que significa conservar por tan el bioterio se define como:

"El bioterio es el lugar donde se alojan animales que cuentan con una calidad genética y microbiológica definida. Dichos animales son reactivos biológicos generalmente utilizados en investigación o para producción." Un bioterio debe contar con un ambiente estandarizado, lo que significa que se controla la calidad de la luz, las renovaciones de aire por hora, la temperatura y la humedad entre otros factores, y estos serán acordes a las necesidades de la especie que allí se aloje.

Un bioterio es el lugar físico donde se crían, mantienen y utilizan animales de laboratorio. Un bioterio es un lugar donde generalmente está compuesto por múltiples jaulas, donde se da ingreso a un animal para su estudio, previo y debidamente etiquetado, fichado, etc.

El lugar debe brindar un adecuado macroambiente y microambiente, acorde a la especie animal que se esté alojando. Podemos decir que un perro no tendrá las mismas necesidades que un ratón, ni que un loro, por lo tanto los bioterio deberán adaptarse a los requerimientos y necesidades de la especie alojada.

Los animales de experimentación se definen como reactivos biológicos, cuya pureza debe ser vigilada, controlada y contrastada al igual que cualquier otro reactivo biológico, sin olvidar su posible contaminación biótica.



REUNIÓN PARA REVISIÓN DEL SUBSIDIO OTORGADO POR MELO ACERCA DEL ENVEJECIMIENTO CEREBRAL







Erika Guerrero Estudiante de Ph.D. de INDICASAT AIP



Estudiantes de la Universidad de Panamá en visita guiada por la Licda. Marla Ramos en el Área de Biología Celular y Molecular de Enfermedades en INDICASAT AIP.



Estudiantes de la Universidad de Panamá en visita guiada por el Lic.Ricardo Santamaría en el Área de Descubrimiento de Drogas en INDICASAT AIP.



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