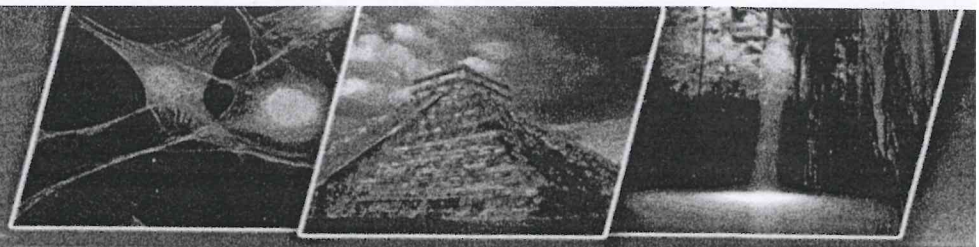
Cell Signaling Networks 2011



Mérida, Yucatán, México. October 22nd-27th, 2011

Chichen Itza

Picture by Ismael Bracho Valdés

OPENING CEREMONY

Saturday, 16:30-18:30

Followed by short talk on

Maya culture

given by

Barbara Blaha Degler Pfeiler

CEPHCIS, UNAM

Followed by Opening Lecture

Joan Massagué

PLENARY SYMPOSIA

Protein phosphorylation and other postranslational modifications

PLENARY LECTURE

Sunday, 9:00-12:10

Tony Hunter

George Thomas

Federico Mayor Jr.

Gerald Hart

10 min break

Gokhan Hotamisligil

PLENARY SYMPOSIA

Signaling Pathways Update

PLENARY LECTURE

Monday, 9:00-12:10

Roger Davis

Angela Nieto

Silvio Gutkind

Xi He

10 min break

Manel Esteller

PLENARY SYMPOSIA

Visualizing Signaling in Live Cells

PLENARY LECTURE

Tuesday, 9:00-12:10

Michiyuki Matsuda

Tamás Balla

Luis Vaca

Philippe Bastiaens

10 min break

Richard Flavell

PLENARY SYMPOSIA

Bacterial usurping of mammalian signaling

PLENARY LECTURE

Wednesday, 9:00-12:10

Fernando Navarro

Neal Alto

John Leong

Vanessa Sperandio

10 min break

Rafael Radi

PLENARY SYMPOSIA

Structural basis of signaling

PLENARY LECTURE

Thursday, 9:00-12:10

Heidi Hamm

Susan Taylor

Hao Wu

Ann Marie Pendergast

10 min break

Scott Lowe

channel in human spermatozoa. Acknowledgments: DGAPA/UNAM IN211907, IN221110 (to TN), IN211809 (to AD), DGAPA/IXTDGAPA/UNAM IN211907, CONACyT-Mexico 56660 (to TN) 128566 (to AD and TN)

S124

ROLE OF NF-KB IN HUMAN MONOCYTES/MACROPHAGES INFECTED WITH DENGUE VIRUS VIA ADE

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Dengue virus is a single stranded positive-polarity RNA virus. There are four distinct serotypes of dengue viruses (DV) causing 50 to 100 millions infections annually in tropical and subtropical regions. Antibody-dependent enhancement (ADE) of DV infection is often implicated in the pathogenesis of dengue hemorrhagic fever and dengue shock syndrome. The pathogenesis of DV infection is not clearly understood but viral, host, and immune factors influence disease severity. We are interested in studying how dengue virus is able to hijack cellular signaling pathways and transcription factors for their own advantage. In this work the role of the nuclear factor-kB (NF-kB) and the synthesis of interferon beta (IFNβ) were analyzed in primarymonocytes-derived macrophages isolated from healthy human volunteers.Monocytes-derived macrophages were cultured for 3,7,9 and 11days,and treated with lipopolisaccharide before infection with dengue virus via ADE and non-ADE.The synthesis of IFNβ, activation and translocation of NF-kB were analyzed at different times of infection. Synthesis of IFNβ was detected by ELISA whilst activation and nuclear translocation of NF-kBRelA in the human monocytes/macrophages were observed by confocal immunofluorescence microscopy. Results showed that macrophages DV infection was higher via ADE compared with non-ADE, but IFNβ was abrogated in monocytes/macrophages infected with DV in both ADE and non ADE infection. It is interesting that this IFNβ abrogation is not related to NF-kB inhibition, since an elevated NF-kB activation and nuclear translocation was observed in human monocytes/macrophages infected with dengue virus. Acknowledgments: CONACYT Scholarship to SELA and FMCJ (349574/423764). SELA, FMCJ&MAMMB are supported by COFAA-PIFI and grant SIP (20110780)

S125

OXIDATIVE STRESS AND AN AUTOCRINE SIGNALLING MECHANISM CAN INDUCE CELLULAR DIFFERENTIATION IN A HUMAN PARASITE

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The unicellular organisms have developed different strategies of cell differentiation in response to environmental changes. There are theories about the implication of oxidative stress in the regulation of this process. Thus, under normal conditions, organisms will be in a stable oxidative state, where cell do not requires great efforts to survive, but under oxidative stress, a hyperoxidation state is reached, making necessary the organization of cell harm protection mechanisms to prevent irreversible damage. On the other hand, is well known that in some unicellular beings there are cell signaling mechanisms that trigger a concert response to adverse environmental pressures, in such a way that ensure the population survival, and enable an efficient adaptation. Based on this, we study the effect of hydrogen peroxid-mediated stress in the cell morphology of *Entamoeba histolytica*, a human parasite that develops into two stages: cyst and trophozoite; whose mechanisms of cell differentiation remain unclear. A solution of peroxide enriched with divalent cations, that aid in the parasitic metabolism, where tested in trophozoites cultures. We found that treatment with [2mM] of H_2O_2 by 4 to 6 hs was capable to induce morphologic changes resulting in cyst-like structures (CLS). These cellular forms had particular characteristics of a mature cyst: tetranucleation, chitin cell wall, size reduction, and round shape. To test the maturity of CLS we performed intestinal infection assays in mice, in which we obtained mobile trophozoites. In order to analize the possibly autocrine communication between CLS and trophozoites, we put them in chemical contact trough a nitrocellulose membrane, so that the cells were unable to pass to the other compartment. Noteworthy, we found that this simple chemical interaction promotes differentiation of trophozoites to CLS, with chitin walls and even multinucleation. Taken together, our results suggest that hydrogen peroxide stress is sufficient to trigger a complete cell differentiation in *Entamoeba histolytica*. The cyst-like structures obtained are infectious, and moreover, able to transmit this condition to trophozoites by chemical signaling.

We thank to: Instituto de Investigaciones Biomédicas, Licenciatura en Investigación Biomédica Básica and Universidad Nacional Autónoma de México.

S126

IDENTIFICATION OF GENES INVOLVED IN DESSICATION TOLERANCE FROM A RESURRECTION MEXICAN PLANT

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Centro de Investigación en Biotecnología Aplicada-Tlaxcala (CIBA-IPN). alarroyo@ipn.mx

Drought severely limits plant growth and development; however, in nature exist plant species capable of tolerating extreme water deficit (desiccation), known as resurrection plants. Desiccation tolerance mechanisms are still poorly known, in part because of the very few desiccation tolerant plant models. In this work, we carried out morphological, physiological and molecular approaches in order to study the desiccation tolerance phenomenon of the Mexican lycophyte *Selaginella sartorii*, identified in our group as a resurrection plant. Hydration and dehydration kinetics were followed at colony and individual levels, and the results show that colonies desiccated for 2 years keep the capacity of up taking the highest water level in just 5 minutes, and losing it during dehydrating conditions in 5 hours. At individuals level we observed that water gain is lower and fluctuating with a dramatic reduction in water content under dehydration conditions. Comparative studies indicate that *S.sartorii* resists water loss better than the studied resurrection plant *Selaginella lepidophylla*. In order to identify genes involved in desiccation tolerance from *S. sartorii* resurrection Mexican plant, we have generated a PCR based cDNA substraction library from tissues dehydrated for short (minutes) and long (hrs) periods of time. Initial analysis of this library show the presence of genes with no homology to sequence data bases as well as others with homology to predicted coding sequences from *Selaginella moellendorfi* (not a resurrection plant) and *Physcomitrella pantens* (a desiccation tolerant bryophyte). These results suggest the existence of unknown water deficit mechanisms and encourage us to use *S. sartorii* as a model system to study desiccation tolerance.

* We thank CONACyT and SIP for research grants.

S127

Analysis of the synthesis of poly-β-hydroxybutyrate under different growing conditions in *Azospirillum brasilense*.

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Azospirillum brasilense is a Gram negative, α-proteobacteria cosmopolitan living in the rhizosphere, diazotrophs and produces siderophores, contains a polar flagellum and lateral is plant growth promoting (PGPR), biocontrol of pathogenic organisms (PGPB), regulating the homeostasis plant abiotic stress conditions (PSHR) synthetize poly-β-hydroxybutyrate known as PHB.

The PHB is polyester of microbial origin, intracellular synthesized in unbalanced growth conditions, with an excess of carbon source and a limitation on the nitrogen. The PHB accumulates in the cytoplasm as a carbon and energy (electron acceptor) source. This polymer is a thermoplastic, biodegradable and biocompatible, and is considered good substitute for petrochemical plastics (Catalan *et al.* 2007).