
Creating
in MEXICO
CONACYT

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A Living Laboratory, "like the Galápagos Islands"

Cuatro Ciénegas is located in the midst of the Coahuila desert (northern Mexico) where it hosts 70 endemic species of aquatic vertebrates in an ecosystem made up by marshes, ponds, water springs, creeks, pools and dune fields.

Conditions of extreme temperature, lack of nutrients and salinity originate such species. In order to preserve them, the Mexican government decreed this place to be a "National Protected Area" in the flora and fauna category in 1994.

"The Cuatro Ciénegas ponds (water springs) exhibit a combination of fresh and brackish waters in what is known as a cappuccino model (in an allusion to the coffee): the former, at the surface and the latter, kept in deep aquifers up to 1000 meters underground, "explains ecologist Dr. Valeria Souza.

WHAT BACTERIA SAY

In 2002, at NASA's invitation, this National Autonomous University of Mexico (UNAM) researcher initiated the study of the microbial communities of this oasis in the desert.

In order to do this, she used two molecular methods, in addition to the classic ones: "Terminal Restriction Fragment Light Polymorphism," or TRFLP, to rapidly obtain a picture of the community, that is, getting to know what bacteria are there and in what quantities, and the gene 16s clone library, used to rapidly compare the sequence diversity of these unicellular organisms.

"With TRFLP we detected 136 species in the extremely oligotrophic water (with no nutrients). We only counted the ones with large population sizes; however, there must be hundreds of low abundance groups."

Valeria Souza also collected water samples from Cuatro Ciénegas's neighboring valleys, el Hundido and Calaveras, finally concluding that the three are interconnected.

AN ANCIENT SEA

The molecular data indicated the existence of a sea hidden since the Cretaceous period. "We discovered the sea of Cuatro Ciénegas with the clones library because 50% of our sequence corresponds to marine bacteria, which is strange, for we obtained our samples some 435 miles away from the sea."

The finding explains the diversity of live stromatolites, which, in addition to being the basis of the food chain, coexist with fish, snails and crustaceans.

Stromatolites are laminated structures formed by bacteria mats dominated by *cyanobacteria* (which invented photosynthesis and, therefore, are the generators of a breathable atmosphere).

At present, Dr. Souza and her working team are analyzing nitrogen's cycle in Cuatro Ciénegas as they believe it is central to all other biogeochemical cycles. Thus, they lean on a data base and the DNA samples provided by the Craig Venter Institute, thanks to a collaboration agreement.

Cuatro Ciénegas has attracted numerous Mexican and foreign researchers, interested in producing an ecological model of the valley, studying various microorganisms and even sequencing a bacteria genome: *Bacillus aquamaris*.

This place is a living laboratory, "just like the Galápagos Islands were for Darwin," says Souza. "There we can obtain keys of biological diversity and evolution."

DR. VALERIA SOUZA SALDIVAR obtained her BA, MD and ecology doctorate at the UNAM's College of Sciences. She did a postdoctoral stay at Michigan State University. Her line of work is the study of population genetics, ecology and bacteria evolution.

She is a member of the Mexican National Researchers System, Level III. Currently, Dr. Valeria Souza is the Academia Secretary of UNAM's Ecology Institute.

Searching for Teotihuacan Lords

Teotihuacan was a city of colors and murals, cosmopolitan and flamboyant, housing all of the Mesoamerican ideologies of the time. Many languages — like Zapotec and Maya — were spoken. As far as its urban traces, one can readily see that it was well-planned and even had services such as sewage, with parallel and perpendicular streets and structures made with quite uniform building blocks. However, important questions remain unanswered. Nothing is known about its government system.

Dr. Linda Manzanilla Naim, from the Anthropological Research Institute of the National Autonomous University of Mexico (UNAM), thinks that Teotihuacan had a different kind of political structure, not centered on one individual, like in the Maya zone, but one having a government shared by two or four Lords.

"My four Lord hypothesis," says Dr. Manzanilla, "stems from the fact that the city seems to be divided into four large areas that look like the four-petal flower that probably is the city's glyph, as suggested by Alfredo López Austin. The Xalla compound, possibly dedicated to government and religious events, is located north of the Pyramid of the Sun and has a central plaza with four structures of the same caliber pointing to the four cardinal points. In addition, the Pyramid of the Sun has a pre-Columbian tunnel terminating in a tetra-lobulated chamber."

To discard the possibility of unexplored chambers a "muon" detecting apparatus will be installed in the pyramid. Cosmic radiation measured during a one-year period will probably reveal the existence of any unexplored hidden chambers so that archeologists may look for remains of the first rulers of the city. Thus, Dr. Manzanilla's hypothesis may be corroborated or discarded.

The apparatus detects muons, cosmic particles characterized by their penetrating capabilities of up to 200 meters of matter. The pyramid absorbs a certain quantity of muons proportional to the thickness of the material it had to get through. If more particles than expected are detected in a certain section, one may infer the existence of an empty space.

The project stems from some restlessness Dr. Manzanilla felt as far back as 1978: "I had read an article by Dr. Luis Álvarez, the Nobel physics laureate who used a muon detector to explore the Pyramid of Khephren. I then asked Dr. Álvarez if the same could be done in the Pyramid of the Sun, and he told me it was possible, as long as an empty space existed below and near the center." The tetralobulated chamber of the pre-Columbian tunnel is quite close to the projection of the center of the pyramid to the underground.

DR. LINDA MANZANILLA NAIM obtained her BA and MA at the National College of Anthropology and History and her PhD at the University of Paris IV, Sorbonne, France, where she was awarded a *Mention Très Bien*. In 2003, she was elected as a foreign associate of the United States National Academy of Sciences, making her the first Mexican woman so honored. "I'm very proud of this recognition," she says.

She has been a member of the Mexican National Researchers System, Level III, since 1985, and was awarded prizes by the Academy of Scientific Research and the National Institute of Archeology and History, conferred for Best Research in Archaeology. She has also won the Presidential Award of the Society for American Archaeology.

Manzanilla Naim has developed a line of multi-disciplinary research. Archaeology, the science studying behavioral patterns of past societies, now looks for support in the findings of sciences such as chemistry, physics, geophysics, geology, paleobotany or paleozoology, among others, in order to find out how civilizations rose, collapsed and/or changed.

Searching for the origin of Stars and Galaxies in the Universe

Radio astronomy studies celestial phenomena by measuring the characteristics of radio waves emitted by the physical processes that take place in space. Radio astronomy faces important challenges such as understanding the origin of galaxies and how stars and planets are made.

One of the research lines of Dr. Luis Felipe Rodríguez, from the National Autonomous University of Mexico's (UNAM) Radio Astronomy and Astrophysics Center, is the formation of large stars in the universe.

Stars are gigantic spheres of gas in whose centers pressure and temperature conditions are sufficiently high for thermonuclear reactions to occur. These reactions are responsible for the heat and energy emitted by these stars that, in the case of the Sun, produce Earth temperatures that allow life.

The formation of solar-type stars takes place inside large clouds of cosmic gas and dust existing in space. The gravitational contraction and rotation of such clouds generates a nucleus surrounded by a disk expelling jets perpendicular to the disk's plane.

To understand deeply how very large stars are born has become a challenge for radio astronomy. Studies made by this discipline show that in the case of the formation of a star having a mass approximately one-hundred times the mass of our Sun, a continuously growing protostellar nucleus is needed. In growing, it becomes so bright that its own light stops the fall-in of more gas.

In principle, the star should not grow more than ten times the mass of the Sun, although we know of stars having a mass one-hundred times that of the Sun. In this respect, some scientists have speculated that many stars, each with a mass ten times that of the Sun, later fuse to form a single, large star. Other scientists prefer to point out that these large stars are formed the same way as solar stars, but the difference lies in the mass available. Either of these two hypotheses has yet to be proven, so that the formation of large massive stars continues to be an enigma.

This is why Dr. Rodríguez underscores the need to build highly powerful instruments such as the Atacama Large Millimeter Array (ALMA), which will be located in the Chajnantor Scientific Reserve in Chile. Three earlier projects to install radio observatories of the same magnitude now converge on this facility the MilliMeter Array (MMA), the European Large Southern Array (LSA) and the Japanese Large Millimeter and SubMillimeter Array (LMSA), which have merged into the Atacama Large Millimeter/Submillimeter Array (ALMA), making it the largest radio astronomical project of the century, to which Mexican radio astronomers will have access through an agreement with the American party.

DR. LUIS FELIPE RODRÍGUEZ is head researcher of UNAM's Radio Astronomy and Astrophysics Center. He was recognized with the Rossi Prize in Astronomy for his discovery of micro-quasars and super-luminal sources in the Galaxy. The Prize was granted by the American Astronomical Society and he shares it with his colleague Félix Mirabel, of the University of Saclay, France. Dr. Rodríguez is the first Latin American scientist recognized by this association founded in 1899. He has been recognized with several national and international prizes including Mexico's National Prize in Sciences and the Robert J. Trumpler Award of the Astronomical Society of the Pacific.

New Alternative Against Cirrhosis

During 1997, around 20,400 Mexicans died due to cirrhosis of the liver. The future is even more discouraging, as an increase of 223% in the number of Mexican deaths is predicted for 2008. Even more alarming, an increase in deaths of 360% is anticipated for 2008 throughout the world.

Researchers of the National Autonomous University of Mexico (UNAM) have developed a medicine, IFC-305, that in its experimental phase has shown the ability to halt the progress of fibrosis in people suffering from cirrhosis of the liver and to regenerate the tissue of the liver.

IFC-305 has been tested at the "20 de Noviembre" National Medical Center, with promising results: the 30 volunteers in various stages of the disease showed improvement some cirrhosis effects even disappeared due to the recovery of the liver function. No one suffered any adverse effects.

A SILENT DISEASE

"Cirrhosis is a disease characterized by chronic and irreversible damage of the tissue of the liver, showing diffuse fibrosis that distorts its lobular and vascular architecture, which in turn provokes the loss of the liver functions", explains Dr. Victoria Chagoya, leader of the project carried out at UNAM.

Fibrosis results from the loss of a balance between the synthesis and degradation of proteins of the extra-cellular matrix, primarily the collagen, the most abundant component of this structure. Dr. Chagoya reports, "this accumulation turns out to be self-perpetuating and irreversible."

The most frequent causes of this illness are alcoholism and chronic viral hepatitis (types B and C); however, it may also be triggered by illnesses such as congestive and secondary bilious attacks as well as various metabolic alterations.

A GOOD OPTION

The researcher from the Cellular Physiology Institute mentions that "there is no treatment offering a cure. At the moment, the only effective one is a liver transplant, with its inherent limitations."

In this context, IFC-305 is a therapeutic alternative; a chemical derivative (6-ARP) that is rapidly metabolized in the liver and shows no secondary effects with the administered dosage.

It has been shown that 6-ARP reduces the deposits of collagen fiber by 50%, while increasing the activity of the enzyme that degrades it, along with the proliferating actions of the liver, furthering recuperation of the structure and overall liver function.

This was confirmed using an experimental model of cirrhosis infused with carbon tetrachloride (CCL_4), by now-Dr. Rolando Hernández while working on his doctoral thesis.

Additionally, a case of established experimental cirrhosis was reversed 70% by reducing the enzyme inhibitors that degrade collagen, thus recovering the liver's function — primarily its capacity for self-regeneration.

These results offer a good option for cirrhosis stricken patients. "Today, the pharmaceutical development of the compound and the experimental clinical protocols necessary to allow the use of this medicine in cirrhosis therapies are in progress," she concludes.

DR. VICTORIA CHAGOYA HAZAS
obtained her BS in chemical pharmaceutical biology at UNAM's College of Chemistry. Her postgraduate work, in the area of physiological chemistry, was completed at the University of Wisconsin. She later attended the University of St. Louis, Missouri to study the regulation of the biosynthesis of deoxyribonucleic acid (DNA). Today, she is a member of the Mexican National Researchers System, Level III, working at UNAM's Physiology Institute.

Mexican Biotechnology

Spearheaded by Dr. Luis Herrera Estrella, Mexico is building the National Laboratory of Genomics for Biodiversity, the first one of its kind in the country. It is expected that several Mexican research groups in the area of biotechnology will undertake genomic projects involving organisms inhabiting Mexico's territory.

The idea of building facilities of this kind stems from the need to take advantage of Mexico's biodiversity. The goal for the near future is to make Mexico highly competitive and take huge strides in economic and scientific areas.

Mexico is considered one of the most biologically diverse nations in the world, with at least 10% of the land-dwelling diversity on earth. Its hosts 26,000 plant species, 282 amphibian species, 707 types of reptiles and 439 species of mammals.

INITIAL PROJECTS

Although the construction of the laboratory is still in its initial phase, Dr. Herrera Estrella and his staff, Drs. Jean Philippe Vielle, Alfredo Herrera and Octavio Martínez, have begun sequencing the genome of several organisms, including corn.

The Mexican scientist does not intend to fully sequence the grain's genome. He intends to sequence only its functional units in order to understand the processes by which some varieties of the grain can grow in acid or alkaline soils — where the availability of nutrients is very low — and toxic compounds, such as aluminum, may be found. The objective of this work is to create corn varieties capable of making better and more efficient use of soil nutrients.

Another one of Dr. Herrera's projects is sequencing the bacteria *Bacilus aquamaris,* located in Cuatro Ciénegas, Coahuila. This prehistoric organism may, on a short-term basis, help Mexican researchers explain the evolution of today's marine bacteria and, in the future, may illuminate the biologic diversity and evolution of life in our planet.

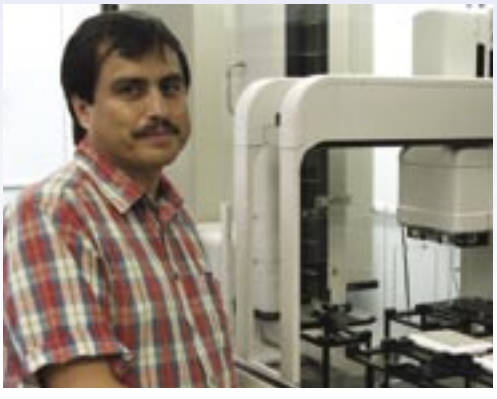
In addition to these two projects, specialists are studying the genomic sequence of the chile and agave plants and are evaluating the possibility of sequencing other species, such as the bacterias living in the salt mines of Guerrero Negro, Baja California, along with the peje lagarto or alligator, and the jaguar.

THE LABORATORY

Fifty million dollars will be invested to build the National Laboratory of Genomics for Biodiversity, which will be located on the campus of the Center for Research and Advanced Studies (CINVESTAV) in the City of Irapuato, Guanajuato. The funds were provided by the government of the State of Guanajuato, the Ministry of Public Education (SEP), the Ministry of Agriculture, Rural Development, Fisheries and Food (SAGARPA) and Mexico's National Council of Science and Technology (CONACYT).

The laboratory will occupy an area of 9,800 square meters (105,000 square feet) where it will house high-capacity genomic sequencing equipment, research laboratories, classrooms, a library, a 350-seat auditorium and administrative offices.

The design of the laboratory is the work of the renowned Mexican architect Enrique Norten, winner of the 2005 "Leonardo da Vinci" World Prize of Arts and of the open bid to build the Guadalajara Guggenheim Museum.



DR. LUIS RAFAEL HERRERA ESTRELLA is the Director of the Center for Research and Advanced Studies (CINVESTAV), Irapuato Unit. He obtained his BS degree in Biochemical Engineering at the National Polytechnic Institute (IPN), and completed his doctoral and postdoctoral studies at Rijksuniversiteit Gent, Belgium. He is a member of the Mexican National Researchers System, Level III.

He was awarded Mexico's National Prize of Science and Arts by the Office of the President in 2002. He was elected as a foreign associate of the United States National Academy of Sciences in 2003.

Chicken Pox and Multiple Sclerosis, a Close Relationship

Multiple sclerosis (MS) is an illness caused by the destruction of myelin, a protein that guards neurons and allows adequate communications between them. The disease is incurable and its exact cause is unknown. Although it is not directly life threatening, it seriously affects the patient's health, causing various kinds of incapacities. Existing treatments are expensive and ineffective.

With all of this in mind, Dr. Julio Sotelo, researcher and Director General of the National Institute of Neurology and Neurosurgery, has been working for the past 20 years to determine the possible origin of the disease.

His research project began with a nutritional type hypothesis, derived from a study of the feeding habits of MS patients and comparing them with those of healthy people. Such analysis was completed by a profile of the illnesses and allergies suffered by patients during their youth.

As a result of the research, which lasted three years, Mexican scientists found out that practically 100% of the patients had contracted chicken pox when they were children, in contrast to about 50% for the population as a whole.

The finding forced Dr. Sotelo's task force to trace, using molecular techniques, the chicken pox virus in a group of 15 patients diagnosed with MS. The test performed showed that in 85% of the patients the virus was present in peripheral blood at the moment of the sclerosis outbreak, a circumstance that did not occur in patients with no clinical symptomatology.

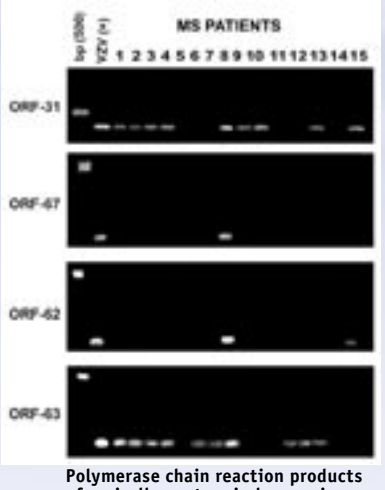
The results of this small study merited embarking on a larger study, sponsored by the National Council of Science and Technology (CONACYT). This new analysis included 130 patients. Its findings were virtually the same as the those observed in the study with 15 patients: at the time of a sclerosis outbreak, chicken pox virus was found to be active in the bloodstream.

THE POSSIBLE EXPLANATIONS

According to Dr. Julio Sotelo, the relationship between sclerosis and the chicken pox virus has two possible explanations: the first, that the virus causes the disease. The other is that when the sclerosis outbreak presents itself, it somehow activates a latent virus, in this case, chicken pox.

In order to arrive at the right explanation, patients with similar illnesses (autoimmune illnesses) have been evaluated to find out if the chicken pox virus is reactivated while suffering the crisis associated with their disease, or if their treatment brings about the same effect. However, in all cases, neither the treatment nor the illnesses themselves caused the chicken pox virus to become active again. These results support the idea that the phenomenon is unique to people suffering with MS.

If it can be confirmed that indeed sclerosis is caused by the same virus as chicken pox, this can lead to the design of new ways to attack the disease and possibly find a cure or even a preventive vaccine.



Polymerase chain reaction products of varicella-zoster viral genes in peripheral mononuclear cells from 15 patients with multiple sclerosis (MS) studied within the first week of acute disease relapse; only patients 5 and 14 tested negative for all 4 viral DNAs. VZV indicates varicella-zoster virus; bp (500), 500 base pairs amplified.

DR. JULIO SOTELO earned his MD degree at the National Autonomous University of Mexico (UNAM), specialized in Neurology at Mexico's Institute of Neurology and Neuroscience and pursued post-graduate studies in Neuroimmunology and Neurovirology, at the University of London and at the US National Institutes of Health, respectively.

Currently, Dr. Julio Sotelo is the Director General of the Institute of Neurology and Neuroscience and his research work, has been cited 3,133 times in international scientific literature, as of 2002. He is the 5th most cited Mexican author during the 1980-1990 decade and the third most cited Latin American author in medical sciences (ISI 1994).

He belongs to the Mexican National Researchers System, Level III. His country's government has recognized his scientific contributions and has granted him the "Eduardo Liceaga" Award for meritorious work in medicine (1992) and Mexico's National Sciences and Arts Prize, 2001.

Discovering the Brain's Language

Perception is a complex operation through which we process the information picked out by our senses. Dr. Ranulfo Romo, of the National Autonomous University of Mexico's (UNAM) Institute of Physiology, and his staff identified — after four years of research — that the task takes place in the frontal lobe of the brain and not in the cerebral cortex, as was believed for over a century.

In order to understand these processes, they started to collect and interpret the neuronal language of the rhesus monkey, chosen because of the similarities between their brains and those of humans.

To do this, they first trained the monkeys in very precise perception tasks. Next, they performed a small surgical procedure and, without causing pain to the animals, introduced seven or eight catheters to various zones of the brain. These guided a system of microelectrodes that collected electrical pulses in response to sensorial stimuli of the monkeys. The signals were simultaneously and immediately fed directly to a computer where the electrical impulses sent by the live neurons were codified and analyzed as the monkeys reacted to their own perceptions.

"For a long time it was thought that the primary sensory areas are the substrate of our perceptions, because the information picked up by our senses goes there. Our job was to test this theory. We found out that these brain zones simply generate representational maps of the sensorial information and — although these respond to stimuli — they are not responsible for sensorial perceptions. We hypothesized that the primary substrate of our conscious and subjective perceptual experience might be occurring in certain zones of the frontal lobe (the part that developed most recently in the evolution of the brain), and it was so. We found that neurons combine sensory information with memory information in that zone; perception results from this."

The partnership between perception and memory that results in obtaining an answer or making a movement occurs at a speed of 200 milliseconds. "We believe that we are looking at something right at this moment, when in truth, we do it with a delay of some 200 milliseconds. That is, we look at everything in the past."

Romo Trujillo says that "although we have located and studied the dynamics of the neurons on each of the zones where sensorial perception occurs, we have been unable to answer how — in the coordinated activity of all these neural territories — perception itself, decision making and memory occur."

Brain research is of utmost importance for Dr. Romo Trujillo, "because in studying and understanding how it works lies the key to understanding ourselves." In addition, it allows us to have a new perspective on the decoding of sensorial processes. These findings will eventually have some influence in the treatment of neurodegenerative processes and open the possibilities for advancement in mind-machine interface technologies.

This frontier research is a part of the "Millennium Projects" financed by the World Bank, the Howard Hughes Foundation and CONACYT. The work was published in the international scientific journal *Nature Neuroscience*.

EXPLORING THE BRAIN IN SEARCH FOR ANSWERS

Neuroscience is a field of biology, of neurology in particular, that studies the brain, the neuron circuits, the behavior, the biochemistry of neurons, medicines and their effects on the brain. Dr. Romo's line of research is neurophysiology, the branch of science that studies the activity of neurons and their relationship with sensory perception: how the brain interprets the information received through the senses, how it stores it in memory and uses it to produce our voluntary actions.

DR. RANULFO ROMO TRUJILLO obtained his MD at UNAM's College of Medicine. He obtained a PhD in Sciences (state doctorate) at the University of Paris. He has been recognized many times for his work in neuroscience, including being designated a Distinguished Young Academic by UNAM, and was awarded the Miguel Alemán Valdez Prize and the Manuel Noriega Morales Science and Technology Prize granted by the Organization of American States (OAS). He is a recipient of Mexico's National Prize of Sciences and Arts, 2000. Last year, the US National Academy of Sciences elected him as a member. He currently works at UNAM's Institute of Cellular Physiology. He is a member of the Mexican National Researchers System, Level III.

Anti-venoms, Made in Mexico

Mexico's considerable clinical experience in handling antibodies in poisoned patients has been instrumental in creating anti-venoms for scorpion stings and spider and snake bites that will soon be commercialized throughout the world.

In Mexico, these products are a part of the essential drugs and medicines list of the health sector. In Arizona, they are distributed under a research protocol and in France, the regulatory agency has already requested them.

The anti-venoms for scorpion stings *(Alacramyn)*, spider bite *(Aracmyn plus)*, snake bite *(Antivipmyn)* and coral snake bite *(Coralmyn)* are the results of a collaboration between the National Autonomous University of Mexico (UNAM) and the Bioclón Institute, a Grupo Silanes enterprise.

THE UNIVERSITY-PRIVATE ENTERPRISE RELATIONSHIP

Bioclón has been in the business of producing serums since 1995. While they possessed the necessary variety of antibodies required to neutralize the various toxic elements present in a poison, many were not considered safe and were quite variable. Bioclón decided to seek the assistance of Dr. Alejandro Alagón Cano of UNAM's Institute of Biotechnology, (IBT).

At the Institute, Dr. Lourival Domingos Possani had already discovered that the scorpion venom contains 70 toxins capable of being distributed through the bloodstream. These affect the cellular channels that transport sodium, calcium chloride and potassium in the organisms which in turn regulate the proper operation of vital organs such as the lungs. This information was used to create *Alacramyn,* the first anti-venom produced by the UNAM-Bioclón relationship.

HOW DO ANTI-VENOMS WORK?

These substances possess the necessary mix of antibodies to neutralize the various toxic components found in the venom. "If an animal is immunized with a toxin, it will develop antibodies capable of combining with and neutralizing it, i.e., it will render it non-toxic," says Dr. Alagón.

Serums made with such antibodies are called antitoxins – antitetanic serum, for example – but those made with antibodies aimed against the various toxic components of animal venoms are called anti-venoms.

Doctor Alagón has conducted clinical testing with various types of antibodies resulting in the formulation of anti-venoms such as *Alacramyn* that "contain the active part of the highly purified (F(ab')2 fragments) antibodies and are free of the rest of the serum's proteins that — in addition to being unnecessary — cause unwanted secondary reactions."

The Mexican Institute for Social Security (IMSS) administered antigen-binding fragment-based anti-venoms such as *Alacramyn* and *Antivipmyn* to over 250,000 patients and found no major acute reactions, even among the numerous patients receiving several doses or the many that were treated several times during a one year period.

Bioclón's CEO, Juan López de Silanes, plans to commercialize *Alacamyn* in the United States beginning in 2007, with the other anti-venoms introduced in 2008. This will augment Bioclón's present coverage: 65% of the Mexican anti-venoms market and 7% of the world's market, which are covered by its present production of 400,000 doses per year.

In addition, the institute will continue to train 10,000 doctors per year to administer the anti-venoms. Bioclón also plans to continue its research aimed at creating effective anti-venoms for the African and European markets.

DR. ALEJANDRO ALAGÓN CANO ***(left)*** **is a researcher of UNAM's Biotechnology Institute and a member of the Mexican National Researchers System, Level III. In 2005, he was awarded Mexico's National Sciences and Arts Prize.**

DR. LOURIVAL DOMINGOS POSSANI ***(right)*** **Brazilian-born, later adopting Mexican nationality, he earned his BS degree in biology (natural history) at the Federal University of Rio Grande del Sur, Porto Alegre, Brazil and his doctorate in molecular biophysics at the University of Paris, France. He has been based at UNAM's Biotechnology Institute since 1970, where he studies scorpion venoms. He is a member of the Mexican National Researchers System, Level III.**

MR. JUAN LÓPEZ DE SILANES **Bioclón Institute's CEO and Vice President of Laboratories in Silanes.**