NATIONAL INSTITUTE FOR TRANSLATIONAL RESEARCH ON HEALTH AND ENVIRONMENT IN THE AMAZON REGION- INPeTAm

INPeTAm

Pesquisa Translacional em Saúde e Ambiente na Região Amazônica

2009

ENVIRONMENTAL HEALTH

HUMAN HEALTH

EDUCATION, SCIENTIFIC DIFUSION AND COMMUNICATION

MISSION

The main objective of the Institute is to generate knowledge and technological skills related to anthropogenic impacts on biological systems, and to convert this knowledge in contributions to the medical assistance of the local population and to the mitigation of environmental impacts. This requires the gathering of different leading scientific groups and their infrastructure, and innovative communication and collaboration among a network of different disciplines, to reach the objectives of training highly qualified human resources and contributing to the local socio-economic development.

LETTER FROM THE COORDINATOR

At the end of 2008, we were told the great news that the proposal for INPeTAm had been approved. The scientific team responsible for INPeTAm is split mainly between Rio de Janeiro and Porto Velho, Rondônia. For scientists at Carlos Chagas Filho Institute, it was the occasion to witness the launch of a large group devoted to multidisciplinary research in environmental health. We at the Institute are committed that this initiative will extend beyond the period of INCT financing and will help to define the very profile of our own institution in the near future. In order to fulfill its goals, the INPeTAm relies on our partnerships with both UNIR and IPEPATRO, institutions located in the Amazon region, and with long and successful experience in field work.

Carlos Chagas Filho Institute of Biophysics has a long standing tradition in two major areas of research: environmental and health sciences. In this context, the INPeTAm proposal brings together groups that are located close to each other, but that did not collaborate, or collaborated very little in the past. Second, the INPeTAm proposal is making an effort to recruit scientific leaderships with clinical and epidemiological experience, in order to establish an excellent level of translational research devoted to the Amazon region. In this regard, IPEPATRO has a record of contributions in basic and applied research on tropical diseases that is recognized, both in Brazil and abroad. UNIR has a long history of collaboration with the Institute of Biophysics in the study of environmental impacts in the Amazon region. During the year 2009, new collaborative studies with UNIR have been advanced, and have already established parameters regarding pollution and contamination of water resources.

It is important to note that INPeTAm did not exist before, for example, as a Millenium Institute. Therefore, one major challenge for us is to extend our network of collaborations. During the year 2009, we organized a workshop in Porto Velho, to introduce and exchange ideas, and some new collaboration have already started. At present, we are acting on

multiple areas - including chemistry, biochemistry, immunology, pharmacology, toxicology, molecular biology, experimental medicine, clinical research and epidemiology – to attack health and environmental problems of the Amazon region. We have also started teaching and other educational activities aimed at increasing public awareness regarding environmental health problems in the region.

I am honored to work with a great team of scientists and health professionals, which are so deeply devoted to the cause of the Amazon region. For now and for the near future, the management committee and I are devoted to put in place a new operational structure for the collaborating laboratories and to foster the development of the new possibilities of basic and applied research offered by INPeTAm.

George A. DosReis
Coordinator - INPeTAm

NATIONAL INSTITUTE FOR TRANSLACIONAL RESEARCH ON HEALTH AND ENVIRONMENT IN THE AMAZON REGION- INPeTAm

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2009 Highlights

The first meeting of the project was held at Institute of Biophysics at UFRJ, from 30th to 31th March 2009. Senior researchers from the Amazon region and Rio de Janeiro discussed how to improve exchange between researchers, both group leaders and students enrolled with INPeTAm.

The second workshop was held at Hotel Rondon, Porto Velho, Rondônia, from 24th to 26th May 2009. The participation of more than 100 researchers from five different Brazilian states, together with the large attendance of participants from local institutions were important for the definition of specific aims and strategies of collaboration among the different groups involved. Every area included in the main project was represented. During the meeting, we had the opportunity to visit some of the laboratories that are already functioning at the capital of Rondônia. We have established discussion groups with the participation of researchers involved with public health, clinical research, environmental aspects and educational activities.

Other highlights corresponded to the visit of groups responsible for educational programs on both malaria control and field work with human populations, together with the visit of medical doctors and teachers of physical education, with the aim of characterizing the effects of endocrine disruptors and the diagnosis of metabolic syndrome that might arrive with the progress of the region.

Introduction

The Amazon region suffers from environmental degradation due to unsustainable exploitation of resources that takes place in cycles of economic expansion and collapse. Only a minority of the population benefits from this process. A peculiar combination of out-dated and modern extractive mining activities and a growing cattle industry affects the quality of environment and leads to human health problems, the extension of which is still to be determined. The degradation process causes losses of soil, biodiversity and water resources, worsening of social and agrarian conflicts. Furthermore, climate changes expose the region to the emergence and re-emergence of different diseases.

Study Areas

During the first year of the project, we have analyzed different aspects of the Madeira river basin and some of its tributaries in Rondônia and Amazonas Brazilian States. Studies from the last decade have shown high levels of mercury affecting the riverside population of several locations in Amazonia, as described in Table 1.

The Jamari river is a tributary of Madeira river, and is where the Samuel hydroelectric dam was constructed and has been operating since 1989, at 52 km from the main town of Rondônia, Porto Velho. Additional impacts on the Jamari basin are the cassiterite mining activity upstream Samuel dam, and the intense past use of DDT for the control of malaria, which is still endemic in the region. A significant portion of the basin is used for cattle ranching, and this corresponds to an expanding activity.

Tributaries of Madeira river present different types of water, which vary in pH and in organic matter dissolved, among other features that affect the bioavailability of heavy metals and organic pollutants, such as pesticides, and the activity of plankton and microbial communities that in turn are important in the environmental transformations of these pollutants.

Administrative fragmentation of the region through the recent creation of new counties has intensified environmental exploitation, especially cattle related activities. The chemical and biological pollution in the Jamari basin is its main socio-environmental problem.

Pollutant levels must be evaluated not only in the local biota, but also in local human populations and their diet. The Family Health program covers only a minority of the population. Most complaints are related to infectious, parasitic and respiratory diseases, the latter occurring mainly during the agriculture-related fire season, in the driest period of the year. Malnutrition affects around 5.6 % of the child population under 2 years of age

(DATASUS, 2006).

Table 1. Hg concentration in hair samples from riverside communities along Madeira River (from 2000 to 2002).

Location	Mean [Hg] µg.g^{-1}	SD	Number of samples
Porto Velho-RO	6.00	1.67	108
Cujubim-RO	6.30	4.00	12
Foz do Candeias-RO	46.59	11.38	08
São Carlos-RO	9.40	6.16	16
Papagaios-RO	13.72	7.71	13
Firmeza-RO	11.21	2.54	04
Terra Caída-RO	9.61	3.61	07
Boa Vitória-RO	13.82	3.10	03
Nazaré-RO	10.60	5.65	64
Itacoã-RO	11.97	4.33	06
Auxiliadora-RO	8.96	6.44	33
Sto.A.P.Queimado-RO	14.68	6.45	14
Calama-RO	9.14	5.83	33
Puruzinho-AM	15.67*	5.87	15
Valparaiso-AM	20.10	17.72	20
Livramento-AM	36.88	11.99	15
Santa Rosa-AM	13.99	3.12	19
Nazaré do Retiro-AM	17.89	4.21	15
Curralinho-AM	19.04	10.75	04
Accepted value – WHO	< 6.00		

Data obtained from the archives of Biogeoquímica Ambiental Laboratory -UNIR.

General Objective

Our main objectives are to diagnose and try to overcome the anthropogenic environmental impacts on human health. We also intend to implement the training of human resources in order to start and sustain the development of scientific activities in the area.

Specific objectives achieved during the first year (2009)

- First workshop on Translational Research in Health and Environment in the Amazon Region at Porto Velho, Rondônia;

- Characterization of the main sources of contaminants and its quantification in biotic and abiotic samples;
- Definition of exposure groups and their characteristics;
- Limnological and ecotoxicological studies at the Samuel reservoir, its tributaries and Madeira and Jamari rivers, as well as field sampling of soils, for analysis of chemical and biological pollutants;
- Characterization of human exposure through analysis of mercury in hair;
- Diagnosis and evaluation of the main problems related to the occurrence of toxic cyanobacteria blooms in some Amazonian reservoirs and exposure pathways through different water uses and fish consumption;
- Evaluation of human populations health status concerning infectious and parasite diseases, neurologic and endocrine-metabolic disorders;
- Nutritional and neurophysiologic evaluation of riverside populations;
- The mechanisms involved in the diagnosed problems have been studied through experimental models at the molecular level, seeking the application of laboratory-generated knowledge to clinical practice, configuring the aimed translational;
- Bacteriological analysis of drinking water and actions to mitigate contamination of water resources;
- Trace the epidemiological profile of malaria, leishmaniosis and hepatitis in the target populations
- Education related to environmental awareness as a mean to minimize human health risks.

ENVIRONMENTAL HEALTH

This step involved the definition of the contaminants of interest, their transport mechanisms and destination system in environmental (fate) and setting of the routes of exposure. This was done from the assessment of existing environmental studies, with rigorous analysis of the criteria for sampling and laboratory analysis.

The definition of contaminants of interest was based on the following criteria: substance that has been produced, or handled, released in local considered outbreaks of issue; be an important and known intermediary degradation of substances produced, handled or made in local considered outbreaks of issue; be a likely product degradation of substances found in hazardous waste in environmental compartments impacted by emissions and concentrations; display in any of the compartments analyzed to compromise the ecosystem and health and well-being of communities. One possibility is to use reference standards as established by national and international laws. The identification of these contaminants is an iterative process based on the analysis of concentrations of contaminants spots on the quality of data environmental sampling and the potential human exposure.

The sediment samples, soil, water, biota (plankton algae, macrophyfites, fish, etc.) have been collected from the areas of mining with drainages of the Madeira and Jamari rivers.

The samples collected have been properly packed and transported to the corresponding laboratory unit at Federal University of Rondônia and to the Biophysics Institute from Federal University of Rio de Janeiro, where the analyses have been performed.

Area: Environmental Toxicology

Research Group:

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Mariana Badini da Costa
Marcio Rodrigues Miranda (aluno de doutorado)

Ronaldo de Almeida (aluno de doutorado)
Dario Pires de Carvalho (aluno de mestrado)
Jenifer Saffi, ULBRA, Rio Grande do Sul

The concentration of heavy metals and organic substances (pesticides, etc.) are increasing as a result of posting anthropogenic (mercury from “garimpos” is one of the most representative examples). The availability and toxicity of these pollutants depend on its extension and physical properties behavior - chemical dictated by environmental factors.

The contamination by acute toxic agents is easily detected due to the immediate effect, allowing rapid control of source. Chronic exposure to toxic substances might produce long-term damage, such as genotoxicity. A source of genotoxic and / or carcinogenic activity can only be detected after people being exposed for many years. The solution to this problem must be based on knowledge of the real harmful chemical compounds and the nature of their effects. A program of prevention, in order to identify the genotoxic products and minimize human exposure, requires the development of simple and inexpensive methods, but with some degree of efficiency. In summary, in accordance with the guidelines adopted internationally for the assessment of potential genotoxic carcinogen, not only the Ames test is required, but also tests with mammal cells (OECD – guidelines for testing of chemicals: genetic Toxicology, 1994).

Interestingly, it has been shown that the Amazon population is submitted to high concentrations of methyl mercury, although they do not develop the neurological changes expected. We must pursue the causes of the differences between the Amazonian population and that existing in Japan, where many cases of contamination of methyl mercury were lethal. The high concentration of Selenium in the region could have protective effects and might then explain the lack of toxicity. Selenium is an important anti-oxidizing agent and is a constituent of the molecular primary structure of proteins such as detoxification enzymes. We are then interested in the profile or the degree of genotoxicity in peripheral lymphocytes obtained from samples of local populations from the different regions studied.

Determination of heavy metals

We have determined by appropriate technical procedures, such as Atomic Absorption Spectrophotometry (ASS), with generation of hydrides (CVASS) and graphite furnace (FLASS) according to Malm, 1991, Malm et al., 1998, Bastos et al., 2005L, 2004, Bastos et al., 2005.

The analyses of metallic speciation were carried out by processes using selective extracts or other hyphenated- techniques. To test hypotheses on domain controllers in the

process of mutilation and compare the vulnerability of different environments, the powers of mutilation were determined by hatching in - situ with 203Hg in 2 sediment samples, periphyiton and water. The me203Hg formed in hatching was taken by leachability acid and extraction in cocktail, followed by measurement on a rackbeta detector LKB1214. To assess the role of different physiological groups of micro biota involved in methylation of Hg, and Sn we have used contractive photosynthesis diclorofenil (DCMU), diethyl stableguard urea, sulphate reduction (molybdate sodium) bacteria prokaryotes (cloramfenicol), chloroform (metanogenicas) and fungi (ciclohexamida)..

Plankton

The samples of plankton have been collected with the aid of networks, drag with opening mesh of 25, 70 and 290mm. In the lab, the concentrated plankton has been separated by means of filtration systems. After this step, samples of plankton were separated into phytoplankton and zooplankton with the aid of funnels of decantation, after that samples were frozen and lyophilized for the subsequent determination of their concentrations of pollutants.

Cyanotoxins

Studies about occurrence of cyanobacterial blooms in Samuel reservoir has been carried out through a sampling program in two scales: monthly and each 6 months, during rain and drought season. At least one field station has been harvested in different depths every month. In case of bloom occurrence and identification of other possible contamination, other areas of the reservaior or rivers Madeira and Jamari can be sampled.

Field measurements – water temperature was measured by a digital thermistor at each 0,10 m onto the depth of 2, 5 m, and thereafter at each 0,5 m until the bottom. Values for dissolved oxygen, conductivity and pH were obtained from specific electrodes . Transparency of water was estimated by extinction of Secchi disc. Turbidity was obtained using a turbidmeter. The value of total alkalinity was obtained by potentiometric titration according APHA (1995).

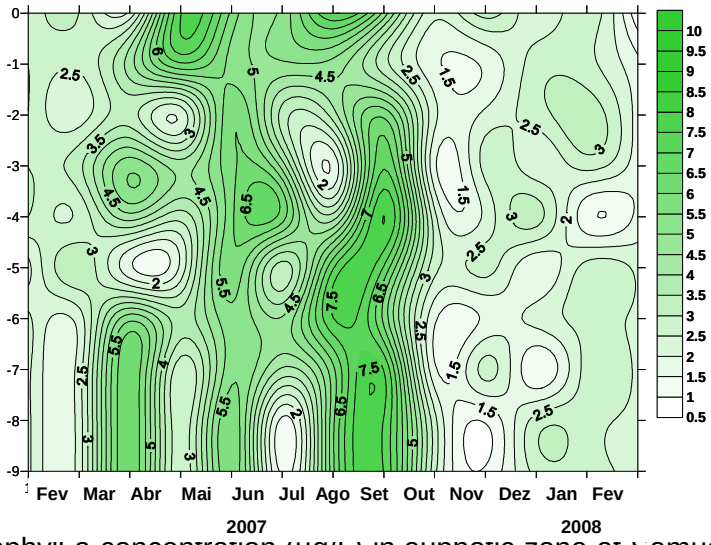
Nutrient and chlorophyll - sampling has been carried out with “van Dorn” bottles. The chlorophyll-a is normally determined through the extraction of filters in acetone 90% and the concentration is estimated according to (APHA, 1995). Samples filtered were used for analysis of dissolved nutrients. These analyses have been done by ion chromatography using anionic and cationic columns at a Dionex equipment.

Limnological data already analyzed showed us that Samuel reservoir can be classified as meso-oligothophic. The majority of limnological parameters do not explain the

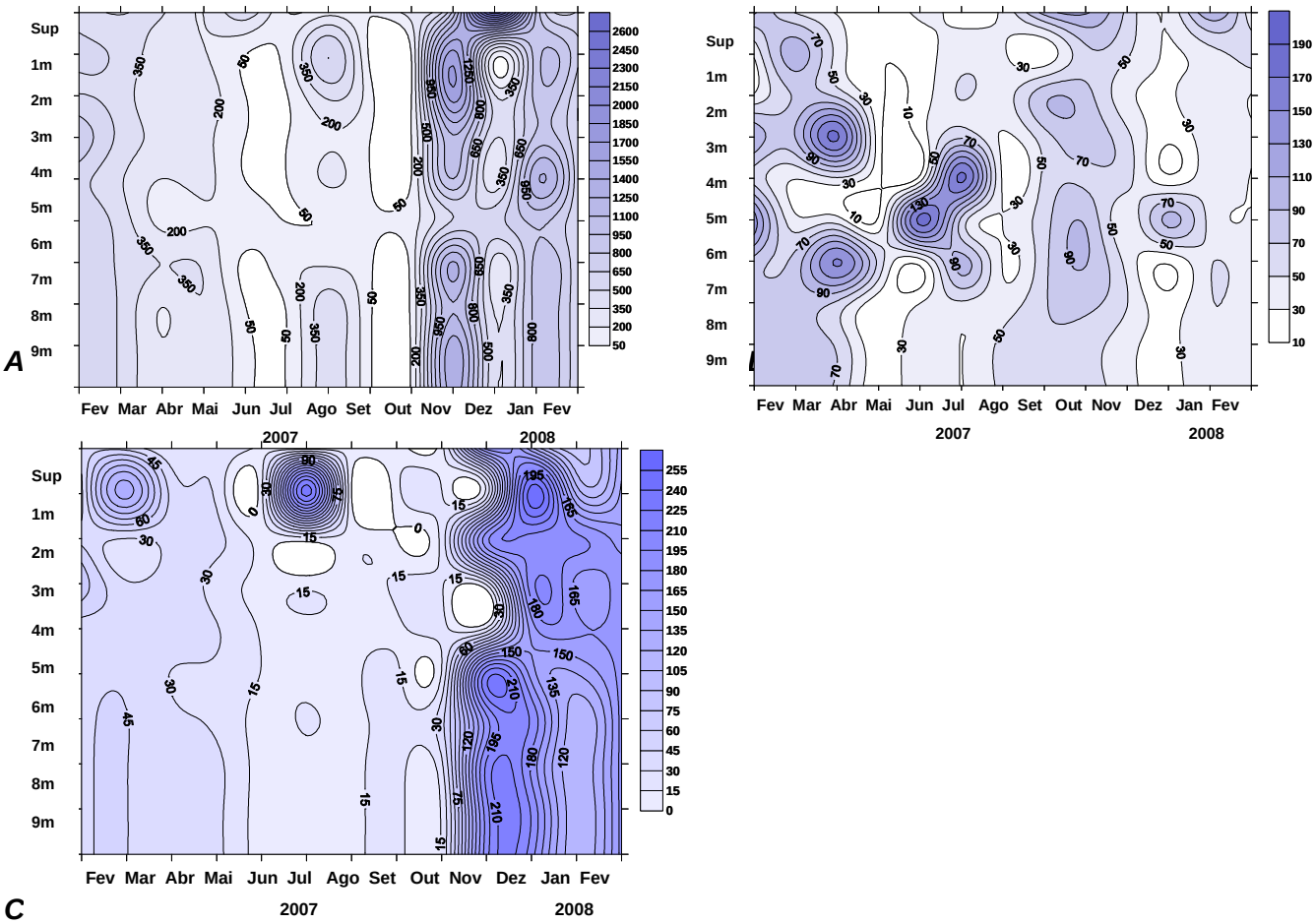
occurrence of cyanobacterial blooms in this reservoir. However *Microcystis* toxic blooms have been confirmed during last 4 years. A possible explanation for it is the main objective of a PhD study that has been done in collaboration between Laboratory of Ecophysiology and Toxicology of Cyanobacteria at IBCCF/UFRJ and Laboratory of Environmental Biogeochemistry Prof. Wolfgang Pffeifer at UNIR. The hypothesis that high dissolved iron concentration can be responsible for the high density of *Microcystis* at phytoplankton community is been tested in experimental conditions using cultures of *Microcystis* strains isolated from water samples from Samuel reservoir.

Besides, a culture collections of cyanobacteria strains isolated from Samuel reservoir was initiated and future studies about ecophysiology and ecotoxicology of these strain can be useful to a better understand of control mechanism of cyanobacterial dominance in Amazonian conditions.

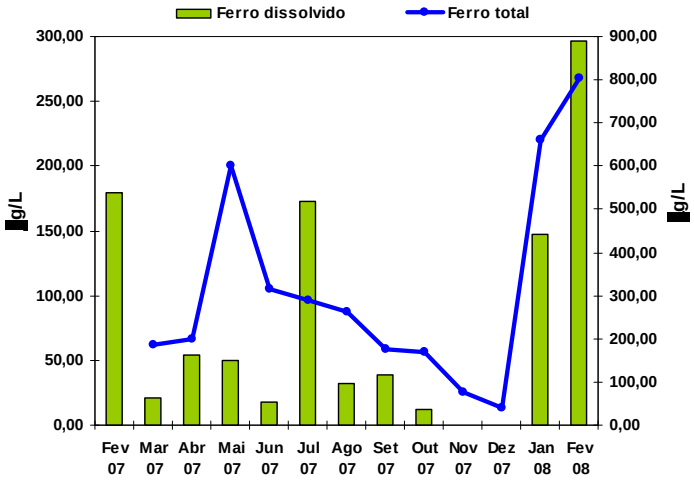
Some main results already obtained with this study are presented below:



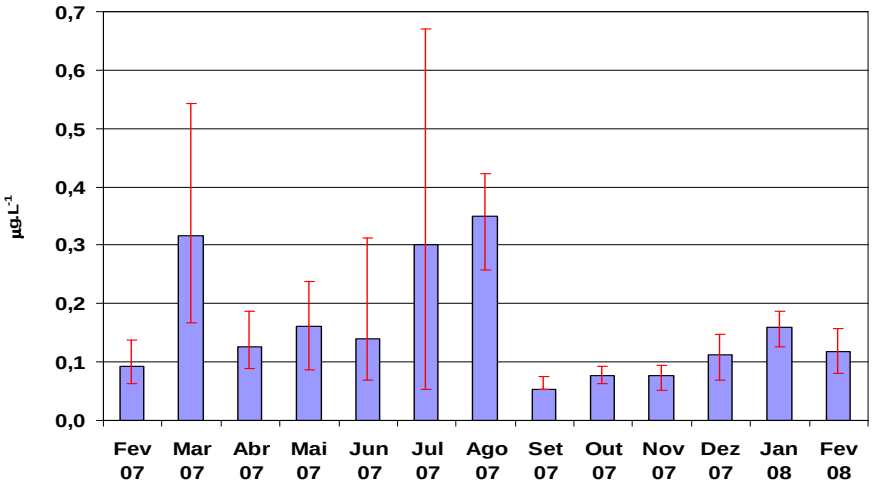
Variation of Chlorophyll-a concentration (µg/L) in eupnotic zone at Samuel reservoir during a seasonal cycle



Variation of Nitrate (A), Ammonium (C) and Orthophosphate (C) concentration (µg/L), in water column of Samuel reservoir during a seasonal cycle.



Variation of total iron and dissolved iron concentration in euphotic zone at Samuel reservoir during a seasonal cycle.



Variation of dissolved microcystin concentration in water samples from Samuel reservoir during a seasonal cycle

HUMAN HEALTH

Area: Clinical Studies- Endocrine Disruptors

Research Group:

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Local population concerns about environmental health were evaluated by risk perception analysis. Risk perception can be defined as “the ability to interpret a situation of potential damage to the environment, health or life (material or cultural damage or well-being reduction) of oneself and others, based on previous experience and its extrapolation to the future.

This step included interviews with community leaders to describe the Project and evaluate local cultural specificities to be considered in the design of the research instruments. For each study area, a visit plan will be negotiated with the communities. Participatory methods were used, with meetings with local groups, decision makers and other social actors, all properly informed about in the investigation process. The Institutional Committee of Ethics in Research has approved all the studies.

We have selected adults and children of all ages that are residents of the selected areas, who agreed to participate in the research. The data of these patients have been obtained after a written consent, properly evaluated by the Committee of Ethics in Research from UFRJ or UNIR. We had access to information on dietary habits, background and family diseases in search of risk factors or variables that better identify exposure to environmental pollutants or that may affect the health of the population of the area of study through questionnaires.

The data of physical examination of the children – weight, stature and head circumference – have been compared to the data of other countries, recommended by the World Health Organization. They consist of a series of curves and percentiles illustrating the distribution of children in accordance with the measures selected. For nutritional status

parameters we have used the calculation of body mass index (IMC), which provides information with respect to energy reserves. All adults have also had their blood pressure measured.

We have evaluated the population living in the riverside areas of Madeira River and a more isolated community living in an affluent of the Madeira River, at Puruzinho, as shown in the Figure above. We have also collected samples of hair and blood of the local population and human breast milk.

We have evaluated different human groups that live at riverside areas. The use of a pre-defined 24 hour memory food habit interview and a dietary inquiry together with an epidemiologic inventory were the main tools that have been used.

Besides the social and cultural conditions, the geographical and demographical situation of the Amazon contributes to the maintenance of the endemic and/or epidemic status of different diseases.

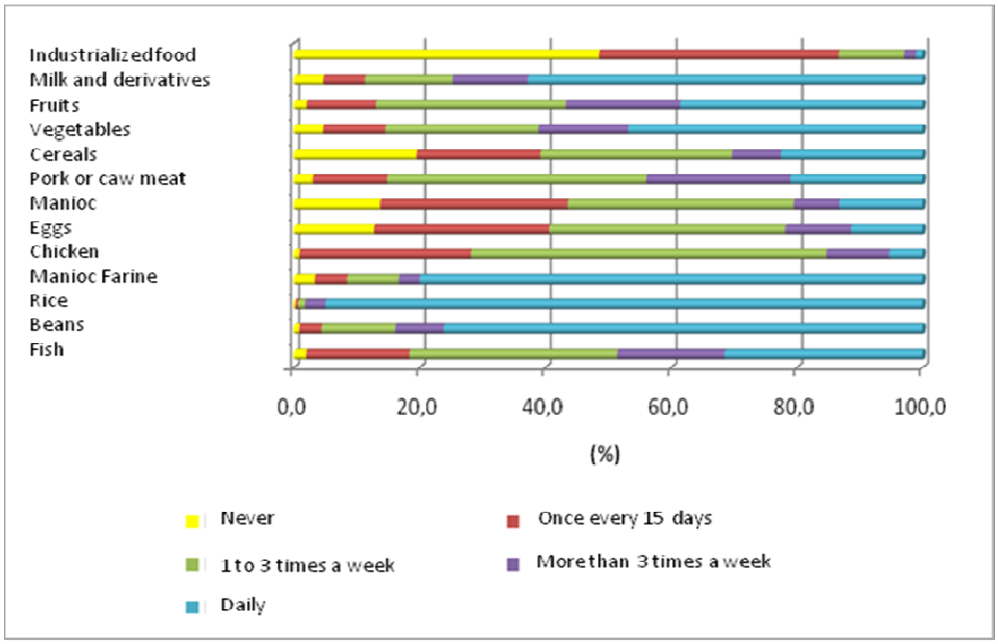
The majority of the population suffers from intestinal parasites that may cause serious cases of anaemia and malnutrition; both situations are related to a lower cognitive status and other psychomotor alterations, which lead to social exclusion from childhood on. Disease control and educational programs to prevent new infections seem to be of fundamental importance in order to improve life quality and ameliorate the future perspectives of such populations.

Clinical examination of the thyroid gland of children from 6 to 18 years old revealed that in about 5% goiter was identified, the majority of which are females and at pubertal age. These results show that the riverside population does not have a high prevalence of goiter, since about 10% of goiter prevalence is normally expected at the pubertal stage. Also, no

ectopic male gonad has been found, and the mean age of menarche was comparable to other populations of Brazil (12.5 years old), showing that endocrine disruptors did not change testicles and male or female pubertal development of the population examined.

We did not detect any significant changes in body mass index and nutritional status of the population, the majority of which presents normal nutritional status.

The figure below shows the alimentary habit of the riverside population examined.



Hacon et al., unpublished data.

Area: Immunology/inflammation

Research Group:

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Juliana P. Zuliani. IPEPATRO, Porto Velho

Laboratories participating in the area of immunology and inflammation are undertaking preclinical studies to determine basic mechanisms of disease and molecular targets with animal and cellular models. Models of infectious diseases prevalent in the Amazon region include infections with gram-negative bacteria, *Trypanosoma cruzi* and *Leishmania*. In addition, new inflammatory effects and biochemical pathways mediated by venoms from amazon snakes are being investigated.

Collaboration with Dr. Juliana Zuliani (IPEPATRO, Porto Velho) has been established in order to investigate the role of fosfolipases A_2 (FLA_2) in induction of inflammatory mediators and cell death in macrophages and on the differentiation and activation of bone marrow-derived mast cells. The experiments are aimed to investigate the effects of a FLA_2 isolated from the venom of *Bothrops atrox* in macrophages, the possible role of a FLA_2 in the cytotoxic activity of lymphocytes and the involvement of a PLA_2 in the signal transduction activated by purinergic $P2X_7$ receptors in macrophages. We have also investigated the role of secretory PLA_2-V in *Leishmania* infection. Initial results indicated that $sPLA_2$-V deficient mice express increased resistance to infection with *L. major*. Possible differences in T helper cell subsets are being investigated.

The role of TLR signaling in B-lymphocyte development is being studied. The group found that TLR4 signaling can replace the function delivered by the BAFF/BAFF-R axis in B-cell maturation. These results identified a new pathway of B-cell differentiation driven by either LPS or gram-negative bacteria.

The immune regulatory role of phagocytosis of apoptotic cells (efferocytosis) in infections by *T. cruzi* and *Leishmania* has also been investigated. The group found that apoptotic lymphocytes opsonized by antibodies from *T. cruzi*-infected mice induce proinflammatory efferocytosis, leading to secretion of TNF-α and parasite killing inside macrophages. Previous immunization of mice with apoptotic cells protected against infection *in vivo*.

Area: Epidemiological and Human Toxicological Studies

Research Group:

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The Center for Indian Health in Rondônia (CESIR) was created in 1996 through a partnership between the Federal University of Rondônia (UNITE), Porto Velho, and the National School of Public Health (ENSP), Oswaldo Cruz Foundation (FIOCRUZ), in Rio de Janeiro. Given the almost total ignorance about the dynamics of health and disease in indigenous peoples, which does reflect the lack of epidemiological data enabling the knowledge on the profile of morbidity and mortality of these people, CESIR's priority is to contribute to the production of new knowledge in this field. The creation and implementation of CESIR departed from the premise that the pooling of efforts by institutions of higher education, research and provision of health services can result in better planning and implementation of health care for the indigenous people in Brazil.

The CESIR participated in 2009 in activities related to the training of health professionals. We coordinated the Professional Master in Disease Surveillance, offered by the National School of Public Health / FIOCRUZ, under the Training Network Surveillance Health organized under the coordination of Dra. Janne Miller. The Training Course for Managers of SUS, which is in the process of selection of students. We have completed surveys on Alcoholism, Gender Violence, Mental Disorders, Suicide and Homicide in Porto Velho, and an ethnographic study of Indigenous Health Agents in Rondonia, both under the

supervision of Prof. Ari Miguel Teixeira Ott. We initiated the study "approach of respiratory symptoms in surveillance of tuberculosis among the Indigenous Peoples In Rondonia, Amazonia, Brazil", coordinated by Prof. Paul Basta from ENSP / FIOCRUZ. In this project we involved graduate students from UNITE, including the Campus Guajará Mirim and undergraduate students.

The impact of environmental pollutants on the growth and development of children in the state of Rondônia is being evaluated through home visits by the group of the Center for Toxicology and Environmental Health (CeTSA/UNIR). We have studied the Massangana Garimpo (Municipality of Montenegro), Fishermen's Village and King Fish (Itapuã d'Oeste), neighborhoods and Marechal Rondon Sector Four (Ariquemes) in July and in Sebastian Itapuã d'Oeste, Fishermen's Village and King Fish in October. The target population consists of women of reproductive age and children from 0-5 years. At first we collected data using questionnaires, we performed anthropometric measurements and collect samples of hair and breast milk. General data obtained were tabulated and are being analyzed. We have also studied the prevalence of tuberculosis in Indigenous populations in the project entitled "Symptomatic Respiratory Surveillance of Tuberculosis among indigenous peoples of Rondônia". We have thus submitted an abstract to the Brazilian Congress of Tropical Medicine that will be presented in 2010.

The assessment of children includes collecting hair samples to determine concentrations of mercury. Dietary habits, personal history (prenatal, childbirth, abortion, stillbirth, newborn ill-formed, vaccinations, diseases) and family (ingestion of food contaminated with heavy metals and organochlorine pesticides) will be evaluated through a questionnaire. We have also searched for risk factors or variables that identify the exposure to environmental pollutants that may affect growth and development of children. Children are being submitted to the evaluation of psychomotor development through the Gesell test and Stanford-Binet. The data will be statistically analyzed, presented as tables, illustrations and graphics, and compared to existing literature on the subject. The analysis will be used for the correlation between the clinical data obtained after the evaluation and determination of levels of environmental pollutants in biological specimens.

Area: Biotechnology and search of bioactive molecules

Research Group:

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Mara Arruda, Universidade Federal do Pará, Extracta

Milton Nascimento, Universidade Federal do Pará, Extracta

Bartira Rossi-Bergman, IBCCF-UFRJ, Rio de Janeiro

Mariano Gustavo Zalis, HUCFF-UFRJ, Rio de Janeiro

Leonardo Calderon, UNIR, Porto Velho

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Jenifer Saffi, ULBRA, Rio Grande do Sul

Aline Roberta Polli - UNIR, Núcleo de Ciência e Tecnologia, Departamento de Biologia, Porto Velho

Valdir Alves Facundo - UNIR, Núcleo de Ciência e Tecnologia, Departamento de Biologia, Porto Velho

Development of new drugs and discovery of bioactive molecules

The possibility that other new compounds can be assessed as anti-parasite, anti-malaria or anti-Leishmania drugs is also of great interest for this programme, through the close relationship among researchers associated with the Extracta, a company interested in the prospection for natural products from the Amazon biodiversity. There are studies in progress between Amazon researchers in Pará and the Extracta, through formal agreement already in course.

Malaria remains the greatest cause of morbidity and mortality in the world with up to three million deaths and approximately five million cases of the disease in a clinical status that possibly ought to receive antimalarial therapy. More recently, an empirical approach to estimate the number of events caused by clinical *P. falciparum* throughout the world, using a combination of epidemiological, geographical and demographic data estimates that there was a mean of 515 episodes of malaria P. falciparum in 2002 (raging from 300 - 600 million; Snow et Al., 2005). These global estimative are up to 50% larger than those reported by World Health Organization.

99% of cases of malaria in Brazil are concentrated in the Brazilian Amazon, where only 12% of the total population of Brazil lives. Each year, about 350,000 new cases are reported. The state members of greater incidence of cases are Amazonas (35%), Pará (27%) and Rondônia (24%), followed by Amapá (4%), Acre (3%), Maranhão (2%), Roraima (2%), Mato Grosso (1%) and Tocantins (1%).

In the Amazon, most cases of malaria are due to P. vivax. Another neglected parasite infection, which requires attention of the Brazilian Government, is Leishmaniosis. In Brazil, the American Tegumentar Leishmaniosis is one of the dermatological conditions that deserve more attention, due to the magnitude of the disease and also because of the risk of deformities that it can produce in humans. The mucosal lesions occur in 1 / 3 of the cases and are spread through blood or the lymphatic system. Extensive mucosal lesions of oropharynx and larynx can be very painful, normally with oedemas and sometimes deeply infiltrated. The Leishmaniosis Cutis is considered the second largest public health problem of the State of Rondônia. According to the Ministry of health, the region is highly endemic, with an annual prevalence of 115 cases per 100,000 inhabitants (Gil et Al., 2003).

One of the groups of IBCCF/UFRJ which is part of key team programmers of this National Institute developed a few years ago a new anti-leishmanial drug of plant origin, whose molecule has been improved by nano-struturation and chemical synthesis. This chalcona, which has a better anti-parasitic activity than the prior substance used, antimonial glucantime, has been used as a prototype for the technically improvement permeation for transcutaneous or enteric absorption. Thus, nano formulations in lipossomas, nano elastics or other polymeric nano particles and micro particles in hydrogel are being studied and adapted to improve their effectiveness. To optimize effectiveness, oral mucoadesins and micro particles are being employed. Another strategy used aims at the reduction of toxicity and the number of doses needed for use in leishmaniosis through microformulations in biodegradable polymers of slow release to be used in sub cutis location.

Despite the technology involved and value-added, reducing costs of these processes is to enable an anti parasitic product We also aim to improve the effectiveness of a vaccine gene (DNA coding the Antigen lack of Leishmania) to be administered via Intranasal instillation or through its encapsulation in Nano and micro particles of mucoadesins and to study the immunological mechanisms related to protector effect in leishmaniasis including its visceral form. These mechanisms involve the role of Dendrite cells of mucosa and Retinoic acid activation cells regulatory and memory involved in the homing of mucosa. Another strategy related to biotechnology involves the use of vectors not alive - viral and not pathogenic, such as lactobacillus that lack in cytoplasm and / or on the surface and the use of plants such as tobacco as an edible vaccine.

Cytotoxic and Mutagenic activities of Combretum Leprosum and Echinodorus grandiflorus extracts on eucariotic cell

We have tested the cytotoxicity and mutagenicity in yeast S. cerevisiae and V79 cells

of extracts from five samples received from Aline Roberta Polli. The results will continue to be analyzed in 2010.

Area: Biotechnology and new approaches for the Diagnosis of Endemic Diseases- Prevalence and diversity of viral and host genetic variation in population in the Amazon Riverside

Research Group:
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Rosane Silva, IBCCF-UFRJ, Rio de Janeiro
Turan P. Urmenyi, IBCCF-UFRJ, Rio de Janeiro
Claudia Equi, IBCCF-UFRJ, Rio de Janeiro
Elizabeth Valentin de Souza – DT1 fellowship
Juliene A. Ramos- PhD student
Luisa Hoffmann – PhD student
Vanessa Neitzke Montinelli – MSc student
Jose Antonio Bernardes – under graduate medical student
Deusilene Souza Vieira - IPEPATRO/Rondônia
Juan Miguel Villalobo Salcedo - IPEPATRO/Rondônia

Treatment of hepatitis C with interferon (IFN) leads to various side effects, some of which are severe and detrimental to quality of life. Besides side effects, treatment has a high cost. Since around 50% of patients do not respond to current treatment, it would be valuable to establish predictors of response to treatment. The determination of pretreatment viral load, the rate of viral decline during treatment and viral genotype and their variants that might determine virus resistance to drugs are important predictive factors of response. The early identification of patients non-responders to treatment should prevent the continuation of therapy. Thus, the determination of viral load factor is essential for therapeutic decision. The accurate measurement of viral content in the serum should be performed in the presence of an internal control added to the patient sample in known quantity, in order to allow its quantification by RT-PCR. We intend to develop a biotechnological process of an internal control for quantification of hepatitis C. The internal control generated can be used in national commercial kits for quantification of HCV in serum. This approach could provide the basis for developing similar tools for the diagnosis of other diseases prevalent in the region, such as

hepatitis B and Delta. For instance, hepatitis B virus (HBV) and Delta virus prevalence in the Amazon region is the largest in the country. An aggravating factor for HBV in this region is the infection of young population, due to vertical transmission and sexual promiscuity. Therefore, we propose to study the genetic diversity of HCV, HBV and HDV in the region aiming to establish the epidemiological pattern and phylogeny for future association with patterns of response to treatment. We must stress that this research will be performed by sequencing the complete genomes of infected patients in high-performance sequencer (454 Genome Sequencer 20 system - Roche Applied Science). Such equipment is available at the National Laboratory of Scientific Computation (LNCC) in Petropolis in Rio de Janeiro. This use is agreed with the coordinator Ana Teresa Vasconcelos Computational Genomics Unit Darcy Fontoura de Almeida.

As a product of our visit to Rondônia on May 2009, the Laboratory of Metabolism, Macromolecular Firmino Torres de Castro-IBCCF-UFRJ, Rio de Janeiro, has received and trained a PhD student from IPEPATRO, Deusilene S. Vieira. The activities of the student were her training in the detection, quantification and genotyping of hepatitis virus (HCV, HBV and HDV). The activities developed in Rio de Janeiro were done according to the protocols developed by the group of researchers from Rio together with the PhD visitor student.

Hepatitis D virus: We used two strategies to achieve the amplification of segments of the genome of HDV, as described below: 1 - "in house" viral RNA extraction methodology as well as Min QIAamp Virus Spin Kit QIAGEN's and then for the reactions of reverse transcription the Kit High Capacity was used, with random primers and the enzyme Multiscribe Reverse Transcriptase. We used sera brought by the student as well as specific primers to HDV. The cDNAs used could not be amplified. Aiming to increase the sensitivity of the methodology we used real-time PCR. Samples extracted by QIAamp Min Virus Spin Kit of QIAGEN and the reverse transcription reactions performed by Kit High Capacity underwent the PCR reaction in real time with SYBR Green. Again there was no success in any of the cDNAs used. A new set of degenerate primers is being produced. However, we had a great difficulty in obtaining further contact and serum from patients with HDV in Rondônia.

Hepatitis C virus: The activities performed in relation to hepatitis C virus aimed at transferring the expertise and methodology for the PhD from IPEPATRO / Rondônia. Researchers in our laboratory have established the methods. Under the partnership with IPEPATRO, methodologies have been taught to the student, aiming at a lower cost and greater efficiency in patient care, fulfilling the goal of translational research project. 1 - We performed and taught the student, the extraction of HCV RNA by the “in house” method, with the serum of patients brought from Rondônia. Likewise, the extraction of viral RNA with the

Qiagen kit was followed by reaction with High capacity cDNA reverse transcription kit. cDNAs samples brought from Rondônia were also tested in qRT-PCR reactions in real time for the measurement of viral levels. To this end, we used the Taq Man assay system designed by us. The results were as expected: all sera tested, local or Rondônia had their viral load determined with adequate sensitivity in international units as recommended the WHO. 2 - One of the major limitations in Rondônia, according to the information from local employees and observed in our visit to Porto Velho, is the genotyping of HCV. This information is essential for establishing the time of treatment with Interferon-Ribavirin. In addition, to meet the interaction between groups and to transfer the competence in order to successfully genotype all samples related to the student's thesis, PCR products of all cDNAs of sera from Rondônia were sequenced and genotyped by comparison with international banks for sequences of HCV. The student was trained in quality analysis of the sequences obtained and the use of databases of HCV. 3- All the protocols and reports of viral load measurements by qRT-PCR and real-time genotyping of HCV were sent to Rondônia. Hepatitis B: Protocols were developed for extraction and in-house amplification of DNA of hepatitis B. Protocols for genotyping and resistance to lamivudine have also been tested and established.

In conclusion, until now we managed to develop an interaction with a group of Rondônia interested in research and use of knowledge generated in the development of diagnostic methods for viral load and genotyping of HCV, which is lacking in the region. Studies with HBV, with regard to genotyping and drug resistance have been established. Protocol for determination of HBV viral load and development of internal control of quantification are ready to be tested. Studies with Delta virus require great effort since we found it difficult to extract viral RNA in adequate quantities and study their genetic variability. We feel the need to establish better mechanisms in order to achieve the desired continuity of research activities undertaken with IPEPATRO. We have had great difficulty in returning requested information and implementation of new ideas arising as a product of discussion with the researchers from that Intituto.

Area: Microbiological parameters of water sources and actions to mitigate contamination

Research Group:
Alvaro Augusto da Costa Leitão, IBCCF-UFRJ, Rio de Janeiro
Janine Simas Cardoso, IBCCF-UFRJ, Rio de Janeiro
Gunther Brucha, UNIR, Ji-Paraná, Rondônia

The disordered occupation of the study region has caused an alarming number of infected people and the cycle parasite-reservoir is perpetuated, mainly due to the presence of contaminated waters with human excreta what has now being aggravated by increasing density on population and an overall lack of information and inadequate therapy. We have started the evaluation of the local conditions that promote the dissemination of such diseases, as well as to construct programs of environmental education that may prove to be crucial to decrease such illness.

The group of Dr Alvaro Leitão has analyzed samples of water from different sources at Porto Velho, Puruzinho, Ouro Preto do Oeste and Ji-Paraná. In the collection points aliquots of water for bacteriological analysis have been done, in amber flasks with total capacity of 100ml (sterile). Subsequently, efforts were driven to count faecal coli forms in membrane filtration (units forming colonies) and DBO, for the complementary information on the water quality. The samples have been collected and transported to the laboratory in accordance with the recommendations of standard methods for examination of wastewater (APHA, 1985). The method is used for the determination of numbers of faecal coliforms.

The samples were all contaminated with faecal coliforms and the group has trained the local community in order to implement hygiene habits with the aim of decreasing water contamination. Furthermore, the use of PET bottles and sunlight exposure of contaminated water (solar disinfection, SODIS) have been introduced in these communities to try to disinfect drinking water.

EDUCATION, SCIENTIFIC DIFUSION AND COMMUNICATION

Educational actions are a priority for INPeTAm. These actions include direct interaction with the people that live in the area of the project, training of specialized human resources, and communication with the public regarding the results of the project and related themes. Moreover, given the complexity and transdisciplinary nature of the project, these actions also target internal communication amongst members of the participating teams and the development of mechanisms to improve collaboration and favor new interactions between participants with different scientific backgrounds and research interests and. specializations.

Area: Education and scientific diffusion: Interactions with the population.

Group:

Pedro M. Persechini, IBCCF-UFRJ, Rio de Janeiro
Julieta Schachter, IBCCF-UFRJ, Rio de Janeiro
Eduardo José Lopes Torres, IBCCF-UFRJ, Rio de Janeiro
Gustavo Henrique Grimmer, IBCCF-UFRJ, Rio de Janeiro
Ricardo Agum Ribeiro, UFF, Rio de Janeiro
Walace Pacienza Lima, IBCCF-UFRJ, Rio de Janeiro
Jean Remy Davee Guimarães, IBCCF-UFRJ, Rio de Janeiro
Olaf Malm, IBCCF-UFRJ, Rio de Janeiro
Mauro F Rebelo, IBCCF-UFRJ, Rio de Janeiro
Rejane Corrêa Marques, Center for Toxicology and Environmental Health- UNIR, Rondônia
Sérgio Augusto Coelho de Souza, IBCCF-UFRJ, Rio de Janeiro
Alvaro Augusto da Costa Leitão, IBCCF-UFRJ, Rio de Janeiro
Janine Simas Cardoso, IBCCF-UFRJ, Rio de Janeiro
Jéssica Costa de Andrade, IBCCF-UFRJ, Rio de Janeiro
Camila Sant'Anna Pimenta, IBCCF-UFRJ, Rio de Janeiro
Gunther Brucha, UNIR, Ji-Paraná, Rondônia

Education and Science Communication are multifaceted areas involving practical and theoretical actions.. Within INPeTAm, different team members have activities and proposals related to these áreas. Some existing projects reinforced the reflection on this theme, such as "Ciência na Estrada: educação e cidadania", ("Science on the Road: education and

citizenship"), FIOCRUZ - BAHIA; "Espaço Ciência Viva" ("Live Science Space"), and "Atualização na formação de Professores de Ensino Médio" (Update on qualification of secondary school teachers" and "Jovens Talentos" (Young Talents), IBQm-UFRJ. The latter attracted nearly 300 teachers from Rondonia. These proposals were also associated to experimental activities in Amazonian communities..

The setting of INPeTAm allowed the formation of teams adressing issues related to Education in Health and the Environment as well as to Science Communication. Their proposals focus preferentially on multidisciplinary actions and on inclusion of local social actors for project implementation.. INPeTAm has established a routine of *Workshops*, Seminars and Conferences that allow to Exchange experiences and expectations concerning the ongoing and planned projects and identifying gaps and opportunities.. Presently, four proposals are in course:

- Education in Health: Malaria in the context of public health.

- The Inquiry Cycle as a tool for integration between the university and Amazonian communities: Ecology in the Schoolyard – EEPE.

- Solar disinfection (SODIS) using methylene blue as a catalizer.

- The Boa Vista hydrographic basin as an experimental model in science teaching and technology transfer

These proposals aim at the empowerment of local actors and are being developped in the districts of Mutum-Paraná (Porto Velho), Vila do Puruzinho (AM) and in the municipality of Ouro Preto do Oeste – RO.

The educational projects incorporate the feed back of the communities, the health workers and decision makers, among other social actors, and the venues are public spaces such as schools, health units or recreation and leisure spaces that are of free access to the communitiy and participants. The activities in each venue are adapted to the locally available infrastructure.

The ongoing projects seek a sócio-educational practice that is in line with the reality of the groups involved (teachers, students, health workers, community leaders and families. The activities contextualize the health issues under their biological, environmental, political and social dimensions. The objective is to establish a two-way exchange of knowledge and

tools (social technology), in such a way that not only a diagnostic is made, but that participants can turn themselves into transforming agents.

A common feature of the present initiatives is their participatory nature and search for empowerment, deconstructing the idea that researchers should bring knowledge to isolated communities: as stated by Paulo Freire, nobody educates anybody, but nobody is educated alone.

These projects were constructed from interactions between researchers and post-graduate students from UFRJ, UFF, UNIR and other research and education institutions in Rio de Janeiro and Rondônia, in addition to social actors in each project venue.

After one year of work, many connections were established between the federal universities of Rio de janeiro and Rondônia and different research centers in the state of Rondônia. Relationships based on work and trust were established with the communities, and the latter expressed their acceptance of a further Project development.

Area: Communication, integration and cross-interactions

Group

Pedro M. Persechini, IBCCF-UFRJ, Rio de Janeiro
Ricardo Agum Ribeiro, UFF, Rio de Janeiro
Mauro F. Rebelo, IBCCF-UFRJ, Rio de Janeiro
Fernando Braga Goldenberg, IBCCF-UFRJ, Rio de Janeiro
Natascha Krepski, IBCCF-UFRJ, Rio de Janeiro
Andrea Fiorani, IBCCF-UFRJ, Rio de Janeiro

Due to the complexity of our activities that involve transdisciplinary interactions and multicenter localization, we developed four lines of actions aimed to favor communication and interaction both among members of INPeTAm and with the public: web-based resources, seminars, documentation, and meetings.

INPeTAm Home Page: WEB 2.0 for communication and interaction

The IMPeTAm portal was created and located inside the homepage of the Carlos Chagas Filho Biophysics Institute (www.biof.ufrj.br/inct) using the open-access program DRUPAL. This portal utilizes Web 2.0 tools to provide synchronized and asynchronized communication. In addition to internal communication, the INPeTAm portal is also directed to the communication with the external public -both academic and non-academic - providing visibility to our actions, improving scientific diffusion, and improving existing collaborations

and opening new possibilities of cross-interactions between the participating research groups.

It provides modern tool for information management such as *doi*- and *End Note*-based handling of bibliographic information and the placement of different kind of files such as texts, images, audio, and videos. Each item is listed and linked to the individual site of each participating member (an individual or group) that has direct and autonomous access to manage its own content. With the support of the National Reseach Network (RNP) large video files can be uploaded and easily reached on demand. Resources for Webnar will soon be available, allowing participants to follow conferences and meetings from different locations. A tool for discussion forums is also provided, allowing the continuous interaction between the participants regarding any topic of interest. The full use of all the capabilities of the portal requires training of the end user that we will be providing during the current year.

Video documentation

For full diffusion o four activities all relevant activities such as Workshops, Seminars, Expeditions, didactic materials and others are being recorded on DVD and prepared for posting on the INPeTAm website.

INPeTAm Seminars

The INPeTAm Conferences are organized twice per month at the facilities of Instituto de Biofísica Carlos Chagas Filho, with wide diffusion to reach the external academical community. The speakers address issues of general interest as well as related to specific ongoing sub-projects, favoring transdisciplinary interactions and creating new contact opportunities. Similar activities are planned to start in Porto Velho during 2010 as well as the setup of a system allowing non-presencial participation through the Rede Nacional de Pesquisa - RNP (National Research Network). Presently we diffuse vídeo conference recordings and other vídeos of interest and will be shortly activating live WEB—TV. We are planning a vídeo-conference system to allow interactivity and better participation of people in more distant centers and posting on the INPeTAm homepage.

INPeTAm Conferences in 2009

All at Instituto de Biofísica Carlos Chagas Filho, under coordination and organization of Pedro Muanis Persechini and Ricardo Agum

1- Ricardo Agum Ribeiro
PhD student at Programa de Pós-Graduação em Ciência Política da Universidade Federal Fluminense - UFF.
Conference title: "Políticas Públicas da Malária"
Date: 08th May 2009.

2- Rejane Corrêa Marques
Centro de Toxicologia e Saúde Ambiental Núcleo de Saúde – Universidade Federal de Rondônia - UNIR.
Conference title: "O Impacto dos Poluentes Ambientais no Crescimento e Desenvolvimento de Crianças"
Date: 02d July 2009.

3 - Álvaro Augusto da Costa Leitão
Laboratório de Radiobiologia Molecular. Instituto de Biofísica Carlos Chagas Filho - UFRJ.
Conference title: "Desinfecção Solar Melhorando a Qualidade da Água"
Date: 16th July 2009.

4 - Mauro Rebelo
Instituto de Biofísica Carlos Chagas Filho - URFJ.
Conference title: "O INPeTAm na Internet"
Date: 30th July 2009.

5 - Denise Pires de Carvalho
Instituto de Biofísica Carlos Chagas Filho-UFRJ.
Conference title: "Por que Estudar a Função Tireóidea em Populações Vulneráveis na Amazônia? A Recente Experiência em Porto Velho"
Date: 13th August 2009.

6 - Ricardo Tostes Gazzinelli
Researcher at Centro de Pesquisas René Rachou CPqRR/FIOCRUZ – MG and INCT Coordinator for vaccine development
Conference title: "Papel da Imunidade Inata na Patogênese da Malária"
Date: 01 October 2009.

7- Volney Camara
Faculdade de Medicina e Instituto de Estudos em Saúde Coletiva (IESC) da UFRJ.
Conference title: "Método da Epidemiologia nos estudos sobre Saúde e Ambiente"
Date: 22th October 2009

8- Thadeu Figueiredo Rocha / Victor de Souza Villa Verde
Technitian at Divisão de Estudos de Demanda de Energia da ELETROBRÁS.
Conference title: "Perspectivas do Mercado de Energia Elétrica de Rondônia no Horizonte 2009- 2018"
Date: 05th November 2009

9 – Julieta Schachter / Ricardo Agum Ribeiro / Gustavo Henrique Davis Grimmer Nolasco / Eduardo Torres, Grupo de Educação em Saúde -INPeTAm
Conference title: Educação em Saúde: a malária no contexto de saúde pública em Porto Velho – RO.
Date: 19th Novembe, 2009

10 - Mariano Gustavo Zalis
Faculdade de Medicina - UFRJ
Conference title: Marcadores Genéticos de Resistência a Múltiplas Drogas em *Plasmodium Falciparum*
Date: 3rd December

Workshops

Workshops were promoted with participants from all envolved institutions. After a first meeting at IBCCF on 30th March 2009, the First INPeTam Workshop was made in Porto Velho the 24, 25 and 26 May, with around 100 participants, of which 30 from Rio de Janeiro (UFRJ and UFF), many from other states (PA, BA, RS e DF) and from 4 campi of

Universidade Federal de Rondônia (Rolim de Moura, Ji-Paraná, Vilhena e Porto Velho) and also from five other institutions dealing with health research and education. During this workshop all local laboratories were visited and some ongoing collaborations were started during these visits. The next workshop is planned for July 2010 in Rio de Janeiro.

Training of specialized human resources, Exchange of trainees, technical visits

INPeTam offers a unique opportunity for the training of human resources specialized in the region. Therefore, some students from Rondonia have come to the Federal University of Rio de Janeiro and vice versa to participate in seminars and workshops, and also to perform experiments linked to their thesis in the different areas covered by the project, such as: toxicology, environmental analytical chemistry, health, emerging and re- emerging diseases, among others. These activities involved more than 20 students and were developed fully in line with the training of human resources in the graduate courses in both Rio de Janeiro and Porto Velho universities.

Description of the expected results

We have achieved the majority of our aims for the first year of project, as described below.

The results of the first year of project will probably serve as an “agent of changes”, contributing to the organization of local populations around the protection of the environment and, consequently, their quality of life, as a means to achieve a sustainable human development. In that respect, the identification of prevalent diseases in the region and the discovery of cellular and molecular mechanisms that are involved in the pathophysiology of several diseases will be extremely important to improve the quality of life of the population. Environmental and Human Health programs should be articulated between the Institutions involved and professionals from the Amazon region. Part of the studies that have begun will result in the warehouse patents related to new diagnostic tools, as well as the new therapeutic approaches. One of the more relevant goals to be achieved refers to the training of local staff to act in the area of biotechnology, bioengineering and to the development of technological innovation. In this context, the close participation of a company already installed and acting in the region is a key feature of the current research program.

This should also support and strengthen the agencies responsible for public policies for health and environment in the region, and, in turn, provide better communication and dialogue between the scientific community, decision makers and civil society. The monitoring

of populations exposed to environmental pollutants and environmental degradation is essential.

This work should is also important to alert the authorities with regard to environmental problems that may affect the health of the population of some cities in the Amazon. By the interaction of researchers of the Federal University of Rondônia and Pará, with researchers from consolidated groups is desired to strengthen research and graduate programs in the region.

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APPENDIX

SCIENTIFIC PRODUCTION

INTERNATIONAL CONGRESS

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20. Autores: RAMOS, J.A.; Hoffmann, L.; RAMOS, A.L.A.; C.A. Villela-Nogueira; URMENYI, TP; SILVA, R; RONDINELLI, E; The influence of the genetic diversity of the host and HCV in patients with chronic hepatitis C responsive and non responsive to treatment. Natureza:Resumo; Edição / Número:1/1; Título dos Anais:XX National Meeting of Virology; Volume:14; Fascículo:1; Série:1; Número da página inicial:109; Número da página final:109; Nome do evento:XX National Meeting of Virology; Cidade do evento:Brasília - DF - Brasil; País:BRASIL; Idioma:Inglês; Divulgação:Impresso; Nível:Nacional; Observação:Trabalho apresentado na forma de pôster, 2009

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elementos traço em sólidos em suspensão no alto rio Madeira, Rondônia, Brasil. Geochimica Brasiliensis (Rio de Janeiro), v. 23, p. 049-066, 2009.

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9. LINHARES, Déborah Pereira ; SILVA, Joiada Moreira da ; LIMA, Tatiane Rodrigues ; GOMES, João Paulo Oliveira ; ALMEIDA, Ronaldo de ; BASTOS, W. R. . Mercúrio em diferentes tipos de solos marginais do baixo rio Madeira, Amazônia Ocidental. Geochimica Brasiliensis (Rio de Janeiro), v. 23, p. 117-130, 2009.

10. NASCIMENTO, Elisabete Lourdes ; GOMES, João Paulo Oliveira ; CARVALHO, Dario Pires de ; ALMEIDA, Ronaldo de ; BASTOS, W. R. ; MIYAI, Roberto Keidi . Mercúrio na comunidade planctônica do reservatório da Usina Hidrelétrica de Samuel (RO, Amazônia Ocidental. Geochimica Brasiliensis (Rio de Janeiro), v. 23, p. 101-116, 2009.

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12. TORRES, Joao Paulo Machado ; BRITO, José Laílson ; SALDANHA, Giselle Cavalcante ; DORNELLES, Paulo ; SILVA, Cláudio Eduardo de Azevedo ; MALM, Olaf ; GUIMARÃES, Jean Remy Davèe ; AZEREDO, Antônio ; BASTOS, W. R. ; Silva, VMF ; Martin, AR ; CLÁUDIO, Luiz ; MARKOWITZ, Steven . Persistent Toxic Substances in the Brazilian Amazon: Contamination of Man and the Environment. Journal of the Brazilian Chemical Society (Impresso), v. 20, p. 1175-1179, 2009.

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v.23, p.079 - 090, 2009.

16. GALVAO, RCF; GOMES, JPO; ALMEIDA, R; BERNARDI, JVE; BASTOS, WR & LACERDA, LD. Variação sazonal de elementos traço associados aos sólidos em suspensão do alto rio Madeira, Amazônia Ocidental. Geochimica Brasiliensis (Rio de Janeiro). v.23, p.067 - 078, 2009.

SEMINARS

1) 2º. Minicolóquio para Produtos Naturais da Biodiversidade Ativos contra agentes de Doenças Negligenciadas e Identificação de Alvos Moleculares organizado pelo Instituto de Pesquisa e patologias Tropicais (IPEPATRO/FIOCRUZ Noroeste), sob a Coordenação do Prof. Luiz Hildebrando Pereira da Silva nos dias 04, 05 e 06 de novembro de 2009.

2) I Workshop em Pesquisa Translacional em Saúde e Ambiente na Região Amazônica, Data: 24, 25 e 26 de maio de 2009.Universidade Federal de Rondônia. Instituição Organizadora do Evento: Instituto de Biofísica Carlos Chagas Filho/ UFRJ.

SCIENTIFIC DIFFUSION

Oral communications and Conferences

I Workshop do INCT para Pesquisa Translacional em Saúde e Ambiente na Região Amazônica.
Apresentação “O Sistema SODIS de Desinfecção Solar utilizando azul de metileno como catalisador para o povo ribeirinho”
Porto Velho,2009 – Rondônia

Projeto de Extensão “A Bacia Hidrográfica do Igarapé Boa Vista como Modelo para Ensino de Ciências e Transferência de Tecnologia”
Curso: Formação de Professores do Ensino Fundamental
Módulo “Sistema SODIS de Desinfecção de Água “
Ouro Preto do Oeste, 2009 – Rondônia

Curso: Engenharia Ambiental do Campus de Ji-Paraná
Palestra: “Sistema SODIS de Desinfecção de Água”
Fundação Universidade Federal de Rondônia
Campus de Ji-Paraná, 2009 - Rondônia

Projeto de Extensão Universitária “Bio na Rua 2009”
Palestra: “A Desinfecção Solar Promovendo a Qualidade da Água”.
C.A. de Biologia – Instituto de Biologia da UFRJ
Lona cultural Renato Russo, 2009 – Ilha do Governador - Rio de Janeiro

Palestra: “A Desinfecção Solar Promovendo a Qualidade da Água”.
Colégio Municipal Leonel Azevedo
Aula para alunos do Ensino Fundamental
Ilha do Governador, 2009 – Rio de Janeiro´

FOLDER OF THE I WORKSHOP

IBCCF

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http://www.cnpq.br/programas/inct/_apresentacao/inct_pesquisa_translacional.html

INSTITUTO NACIONAL DE CIÊNCIA E TECNOLOGIA
PARA PESQUISA TRANSLACIONAL
EM SAÚDE E AMBIENTE NA REGIÃO AMAZÔNICA

I Workshop

24, 25 e 26 de maio de 2009

Porto Velho - Rondônia

PROGRAMA

I Workshop INCT PeTAm

DOMINGO 24 DE MAIO

9:15h - Boas vindas. Rondon Palace Hotel

10h - Visitas com todos os participantes

- Campus da UNIR:
  - Laboratório de Biogeoquímica Ambiental
    Profs. Wanderley Bastos, Angelo Manzatto e
    Miyuki Yamashica
  - Laboratório do Centro de Estudos de Biomoléculas aplicadas. Profs. Rodrigo Stabeli e Leonardo Calderon
  - Laboratório de Química de Produtos Naturais 1.
    Prof. Valdir Facundo
  - Laboratório de Química de Produtos Naturais 2 e de Combustíveis. Profa. Mariangela Soares Azevedo
  - Centro de Estudo do Índio. Profs. Ana Escobar e
    Ari Miguel T. Ott
  - Grupo de Pesquisa em Recursos Renováveis.
    Prof. Artur de Souza Moret
  - Laboratório de Genética. Profs. Maria Manuela Moura e Rubiani Pagotto

13h - Almoço

15h - VISITA IPEPATRO, CEPEM e CEMETRON
Profs. Mauro Tada e Luiz Hildebrando Pereira

18h - Auditório da UNIR
Conferência Ensino e Popularização de Ciência
Prof. Leopoldo de Meis –
- Coquetel de recepção

SEGUNDA FEIRA 25 DE MAIO

8 às 12h- Visitas guiadas

GRUPO 1
- Hidroelétrica de Santo Antonio.
- Cachoeira do Teotônio - população ribeirinha
Estudos de malária e endemias hídricas
Prof. Tony Katsuragawa
Estudos de intoxicação pelo mercúrio
Prof. Olaf Malm

GRUPO 2
- EMBRAPA

Profs. Mauricio Reginaldo e César Domingues
- Escolas secundárias
Profas. Vera Engrácia, Ana Escobar e Walterlina Brasil.

12:30h - Almoço

14h - Apresentação individual dos representantes dos participantes (5min cada) e dos Programas de Pós-graduação (15 min cada).

16h - Reuniões de grupos (Ambiente, Saúde e Educação)

18:30h - Jantar

20h - Auditório do Rondon Palace Hotel
Apresentação do Projeto INCT PeTAm
Prof. Olaf Malm –

TERÇA FEIRA DIA 26 MAIO

8 às 10:30h - Relatos das reuniões de grupos

ENCERRAMENTO