Instituto Nacional de Ciência e Tecnologia de Fluidos Complexos (INCT-FCx)

Annual Report – Year 2 (April – 2011)

NATIONAL INSTITUTES OF SCIENCE AND TECHNOLOGY – INCT

MONITORING AND EVALUATION

PERIOD: de 2/4/2010 a 2/4/2011

IDENTIFICATION OF THE PROPOSAL

TITLE: INCT of Complex Fluids (INCT-FCx)

Number: 573560/2008-0

Term: from 2/4/2009 to 2/4/2014

Total funding: R$ 4.200.000,00
General expenditures: - R$ 1.320.697,94
Capital: - R$ 2.732.650,06
Fellowships: - R$ 146.652,00

COORDINATOR: Antonio Martins Figueiredo Neto

MAIN INSTITUTION: USP

PARTICIPATING INSTITUTIONS: (see the submission form)

MEMBERS OF THE PROPOSAL: (see the submission form)

RESEARCH PROPOSAL (Attach to the partial report)

Were there any changes of the goals and targets of the proposal? () YES (X) NO

If yes, report these changes:

Were there any changes in the original chronogram? ( ) YES (X) NO

If yes, report these changes:

Were there any problems to develop the proposal? (X) YES ( ) NO
If yes, report these changes:

1) There is still the problem mentioned in the previous report, related to the extremely small number of CAPES scholarships given to the INCT. Indeed, CAPES has not kept the pace of the increasing funds allocated to the INCT by CNPq/MCT/FAPs. The result was an almost negligible number of scholarships attributed to the INCT, which has note contributed to easy the paperwork of the members who were forced to write either new or the same proposal to support applications for M. Sc. and Ph. D, scholarships from other agencies.

MEMBERS

WERE THERE ANY CHANGES IN THE INITIAL COMPOSITION OF THE RESEARCH TEAM? (X) YES ( ) NOO

If yes, report these inclusions and exclusions:

a) Three inclusions: - Prof. Dr. **Daniel Reinaldo Cornejo**, Assistant Professor at the Institute of Physics, Universidade de São Paulo, specialist in magnetism; Prof. Dr. **Nágila Raquel Teixeira Damasceno**, from the Faculdade de Saúde Pública da USP; and Prof. Dr. **Katia Regina Perez,** from EPM, UNIFESP.

DESCRIBE MECHANISMS OF INTERACTION BETWEEN PARTICIPATING RESEARCH GROUPS OF THE INCT:

We have several mechanisms of interaction:

1) First, there is the website of the INCT-FCX (http://fluidos.usp.br). In this website there is a description of the members and of the available experimental facilities, as well as a forum of discussions.
2) We organized an annual School for the students of the associated groups, and a scientific meeting with international participants.
3) We organized periodic seminars at the home institution in order to discuss ongoing research topics. These seminars are recorded and can be retrieved at our website. They are also transmitted in real time by the IPTV of USP.
4) The Steering Committee organized periodic evaluation meeting to gauge the progress of ongoing research and to gather suggestions and eventual changes of goals.

REPORT EVENTUAL DIFFICULTIES OF THE PARTICIPATING RESEARCH GROUPS AND THE MECHANISMS TO OVERCOME THESE DIFFICULTIES:

We have not detected these eventual difficulties.

WAS THERE EITHER THE INCLUSION OR THE EXCLUSION OF ANY INSTITUTIONS OR COMPANIES? (X) YES () NO

If yes, indicate the number: 1 (one)
Nantex – Nanotecnologia Experimental Ltda. (Piracaia, SP).

OBTAINED RESULTS / TARGETS

LIST AND COMMENT THE OBTAINED SCIENTIFIC AND/OR TECHNOLOGICAL RESULTS:

A – RESEARCH:

Among the various results obtained by the team of the INCT-FCX, we highlight some topics that deserve attention. These topics are described in more detail in the Report of Activities. Some of them deal with multidisciplinary research, which is a fundamental characteristic of our Institute.

B – TRAINING OF HUMAN RESOURCES:

We have formed 13 Ph.D.s and 19 M.Sc.s in this period. Also, we promoted the training of about 16 undergraduate students in the research laboratories related to this proposal. We have tried to offer to our students the possibility of going beyond their own laboratories, and getting acquainted with research work at different laboratories of this INCT.

C – TRANSFER OF KNOWLEDGE AND TECHNOLOGY:

1) We developed a method to use of iron oxide nanoparticles for isolating the exosomes from a biological solution. This results of this method have been used to support the application for an international patent (PCT WO201021335). Group of Dr. L. Gamarra.
2) Beginning in 2010 (group of Prof. Dr. Giancarlo Espósito, IFUSP) we established a collaboration with Nantex – Nanotecnologia Experimental Ltda. (Piracaia, SP). In this collaboration we are developing water based ferrofluids and also light lubricating oil based ferrofluids. In this last case, we reached the state of art with respect to stability, and we are now refining the process of fabrication and the control of quality to be tested at (Itu, SP) in t*witters* for automotive sound systems. We are also developing nanostructured supported catalysts of the core-shell type, which are composed by a nucleus formed by superparamagnetic nanoparticles coated by a layer of TiO_2, SiO_2, or Al_2O_3. The catalyst is deposited on this kind of support. We have prepared catalysts on the basis of palladium platinum, rhodium and cerium. We have performed catalytic tests for the coupling reaction of Zuzuki-Myaura, which is used in the synthesis of drugs. The results have shown that these catalysts may be recycled due to easy separation of the reaction medium by the action of a magnetic field. It is important to point out that the typical efficiency is about 35%

for commercial catalysts based on metallic palladium, and that in the present investigation we have obtained efficiency between 43 and 45%.

D – EDUCATION AND DISSEMINATION OF SCIENCE:

1) The INCT-FCx has organized a Recycling Course for high-school teachers at Maringá, Paraná ("Complex Fluids in High School: Properties and Applications in Physics, Chemistry and Biology"); we are writing a book to help teachers at the classroom, with explanations on the structure of matter, and in particular on complex fluids (see Appendix II).
2) We organized the I Course of Advanced Extension on Dyslipidemia and Atherosclerosis at UNIFESP, from 2 to 5 August, 2010 (see Appendix II).
3) We organized the I Advanced School on Nanobiotechnology with applications to Medicine, from 21 to 26 February. This school was a proposal of the group of nanotechnobiololgy of the Brain Institute (InCe) of the Hebrew Institute of Research and Teaching Albert Einstein and of the INCT-FCx (see appendix III).
4) The INCT is responsible for a website with up-to-date information on all of its activities, a list of members, different expertise, experimental facilities, announcements of scientific meetings, and a forum of discussions for researchers, school teachers, and industry people. (see Appendix II).
5) The INCT has organized an annual School on Complex Fluids, for member and interested students (see Appendix II).
6) We have produced 9 online videos for the dissemination of topics related to our research programs (see Appendix II).
7) We have reached control on the absolute calibration of optical tweezers, which opens the possibility for the study of the interactions between membranes and cell cytoskeleton.

ENUMERE O(S) IMPACTO(S) CAUSADO(S) PELAS AÇÕES E RESULTADOS DO PROJETO PARA A AMPLIAÇÃO, MELHORIA E CONSOLIDAÇÃO DA COMPETÊNCIA TÉCNICO-CIENTÍFICA NACIONAL PARA:

A – RESEARCH:

1) The research developed in the characterization and quantification of modified human LDL (oxidized) by means of noninvasive techniques such as Z-scan has proved very efficient and promising. This new method of identifying risk factors for cardiovascular disease may come to occupy an important place in the prevention of disease and in therapeutic methods.
2) Laboratories associated with the INCT are synthesizing and characterizing magnetic nanoparticles for different uses, in particular in Medicine. This research can have major impact in the process of taking images by resonance. We have already achieved in this project the industrial application of nanoparticles as heat dissipation elements in loudspeakers.
3) We developed a method for the isolation of exosomes from biological solutions by using iron oxide nanoparticles. This result has been submitted to support the application for an international patent by the group of Dr. L. Gamarra (PCTWO201021335).
4) Some of the published data of our laboratories have contributed to the advancement of the knowledge on inflammatory mechanisms related to outcomes in patients with chronic renal diseases, which stimulates the search for early markers of the disease and for therapeutic alternatives of treatment.

B – TRAINING OF HUMAN RESOURCES:

Most of the M. Sc. Students trained at the INCT have proceeded the work towards a Ph. D. degree. Doctors formed at the INCT have joined post-doctoral programs in Brazil and abroad. The undergraduate students have mostly entered a graduate program, with the advantage of having a reasonable multidisciplinary background.

C – TRANSFER OF KNOWLEDGE AND TECHNOLOGY:

1) The multidisciplinary research developed at the INCT in the context of cardiovascular diseases may give rise to new methods of analysis and even to the development of equipment to contribute to the diagnosis and identification of risk factors. The results of this investigation will be decisive in the future investigations of methods to try curbing the level

oxidation of lipoproteins in human beings, as the use of antinflammatory drugs, as astatine, which are still questioned in the literature.

2) The synthesis and characterization of magnetic nanoparticles at our laboratories will also produce direct effects, as this type of material is very much used as an element of contrast in the production of images by magnetic resonance and as carrier of drugs and hyperthermia in the treatment of cancer. Results of research in this area of synthesis and characterization of magnetic nanoparticles are already in use companies to produce heat dissipaters in sound devices (loudspeakers and ear phones).
3) We are about to finish the construction in Brazil of the first equipment of magneto hyperthermia of deep tumors. This equipment will generate a patent.

D – EDUCATION AND DISSEMINATION OF SCIENCE:

The recycling course that has taken place in Maringá, Paraná, had a considerable impact in this region from the point of view of preparing high-school teachers. We plan to continue this activity, in Maringá and also in São Paulo (see Appendix II).
The School of Nanobiotechnology was also efficient to train and prepare professionals in this area at the level of the expertise at the INCT. We plan to repeat this experience in São Paulo.
These activities of the INCT will contribute to foster multidisciplinary research in this area, involving different professionals, in particular form the areas of human health.

FOR DISCLOSURE, LIST THE OBTAINED RESULTS THAT DESERVE ATTENTION IN TERMS OF SCIENTIFIC, TECHNOLOGICAL OR SOCIAL DEVELOPMENT:

1) Members of INCT-FCx belonging to the Institute of Physics at USP, Institute of Biomedical Sciences at USP, School of Dentistry at UNESP in São José dos Campos, Federal University of São Paulo (Diadema campus) and from the Institute of Mathematics and Statistics at USP have shown that the treatment of periodontitis has a direct impact in the improvement of the quality of LDL in patients. This result was mainly based on experiments using the Z-scan technique at IFUSP.
2) We have shown that the expression of a protein HO-1 can reverse renal fibrosis. We have identified bradykinin as the inflammatory mediator of glomerulopathy; we have demonstrated that cell therapy can reverse renal fibrosis.

RESULTS IN NUMBERS

A – INDICATORS OF RESEARCH	
NUMBERS OF THE TECHNICAL, SCIENTIFIC AND ARTISTICAL PRODUCTION IN THE PERIOD (enclose references):	
TYPE	**QUANTITY**
BOOKS	-
CHAPTERS OF BOOKS	19
ARTICLES IN NATIONAL JOURNALS	10
ARTICLES IN INTERNATIONAL JOURNALS	163
PAPERS IN NATIONAL MEETINGS	~ 60
PAPERS IN INTERNATIONAL MEETINGS	~ 140
SOFTWARE	-
PATENTS	1
PRODUCTS	1
PROCESSES	-
ARTISTIC PRODUCTION (SPECIFY)	-
OTHER (SPECIFY):	-

B – INDICATORS ABOUT THE FORMATION OF HUMAN RESOURCES	
NUMBERS ON THE FORMATION OF HUMAN RESOURCES IN THE PERIOD	
TYPE	**QUANTITY**
COMPLETED:	
SCIENTIFIC INITIATION	20
MASTER	19
DOCTOR	13
POST-DOCTOR	2
OTHER (SPECIFY):	-
ONGOING:	
SCIENTIFIC INITIATION	29
MASTRE	39
DOCTOR	59
POST-DOCTOR	22
OTHER (SPECIFY):	-

C – INDICATORS OF KNOWLEDGE AND TECHNOLOGY TRANSFER	
NUMBERS OF THE PRODUCTION IN THE PERIOD (specify and enclose references):	
TYPE	**QUANTITY**
Method for the isolation of exosomes from biological solutions using iron oxide nanoparticles. This result has been submitted to support an application for an international patent (PCT WO201021335). Group of Dr. L. Gamarra.	1
Catalysts and dissipaters of heat with magnetic nanoparticles (G. Brito – IFUSP).	2

D – INDICATORS OF EDUCATION AND DISSEMINATION OF SCIENCE	
NUMBERS OF THE PRODUCTION IN THE PERIOD (specify and enclose references):	
TYPE	**QUANTITY**
Production of videos	9
Courses for the recycling of high-school teachers	1
Specialized schools	2


CNPq
Conselho Nacional de Desenvolvimento Científico e Tecnológico
CAPES
Ministério da Ciência e Tecnologia
BRASIL
UM PAÍS DE TODOS
GOVERNO FEDERAL
FAPESP
GOVERNO DE SÃO PAULO

ADDITIONAL INFORMATION

DESCRIBE OTHER FORMS OF MAKING PUBLIC THE RESULTS OF THE PROJECT:

1) Results obtained by the INCT are posted in the website.
2) Schools of Complex Fluids are directed to our own students, at different levels, but they are also directed to interested people (undergraduate and graduate students, doctors and post-doctors) working in problems of the areas involved in the INCT.
3) Regular seminars in São Paulo are widely announced; these seminars are transmitted alive by IPTV-USP, recorded, and posted in the website. The recycling course for high-school teachers is another form of transferring knowledge to the public.
4) Press releases and interviews of members of the INCT.

DESCRIBE THE IMPROVEMENTS IN THE PHYSICAL INSTALLATIONS IN THE HOME INSTITUTION AND IN THE ASSOCIATED LABORATORIES, AS PHYSICAL ADAPTATIONS, EQUIPMENT, ETC:

1) Funds from the INCT-FCx have been used to reinforce the laboratory of the Group of Complex Fluids at IFUSP, home of this INCT. This laboratory makes available to the members of the INCT a number of optical linear and nonlinear techniques for the study of fluids, in particular of fluids of biological interest (human LDL). We have implanted the technique of dynamic light scattering.
2) We have completed the remodelation of a room at the EPM (UNIFESP) for the new laboratory to produce and characterize giant vesicles.
3) We have implemented at the IFUSP a cluster of computers that can be used by all members of the INCT, including post-doctors and students. This cluster contains 6 servers, with a total of 48 Intel processors (INTEL XEON X5550), 144GB of RAM memory (DDR3 1066MHZ 12X12GB) and 12TB of hard disc (SATA 12X1TB 7200RPMS), of high-speed access (http://gauss.of.usp.br/cluster).
4) We have bought and learned how to use the new biomarkers by cytometry flow at the EPM.
5) The project enabled the installation of an optical table at the José de Filippi unit at the Diadema campus of UNIFESP. It also enabled the purchase of a microplate reader to be connected to the Jobin Yvon fluorimeter to allow the quick acquisition of data.
6) In the associated laboratory at UEPG, we have built new facilities for nonlinear optical experiments.
7) Vascular Biology Laboratory – we have implemented studies of endothelial turnover involving flow cytometry; genetic studies and culture of cells for studies of atherosclerosis (expansion of the laboratory of lipids and atherosclerosis at UNIFESP).
8) Construction of another room for synthesis of complex fluids in the campus of UEM and installation of a room for the measurement of electrical impedances.
9) The INCT has allowed the improvement of a fluorescence microscope in the laboratory of Prof. Dr. N. Camarra (ICB-USP); this upgrade will allow time lapsing analysis with polarized light and morphometry. These parameters nay be used in several other projects in this group, with an expressive qualitative improvement.
10) There were adaptations in the laboratories at the Institute of Physics at UFAL, with the purpose of implementing a laboratory of spectroscopy of photocorrelation. Equipments were bought with funds from the INCT and are in the process of importation according to the rules of CNPq. The implementation of this equipment will allow the investigation of thermally excited phenomena at a time scale of less than 5 nanoseconds, so that it will be possible to study in real time the dynamics of liquid crystalline films and other fluids of biological interest.

WERE THERE ACTIVITIES OF INTEGRATION WITH OTHER INCT'S: (X) YES ( ) NO

IF YES, GIVE SOME DETAILS:

These activities were carried out at an individual rather then institutional basis. Among other activities, we should mention:

1) Interactions between Prof. S. Gomez and Prof. Arandi Genani Bezerra Jr, member of the INCT on Health Diagnostics, with respect to the study nonlinear optical of metallic nanoparticles with applications in the Health area (UEPG-Paraná). Interactions with Prof. Ivan Helmuth Bechtold, member of the INCT on Organic Electronic.
2) Interactions between the UFAL group with the ONCT on Nanobiostructures and Nanobiomolecular Simulations - Prof. Francisco Fidélis (UFAL); INCT of Biological Markers – Prof. Antonio Sérgio Sombra (UFC).

CONSIDERAÇÕES FINAIS

COMMENT ON OTHER RELEVANT ASPECTS FOR THE GENERAL DEVELOPMENT OF THE PROJECT:

What is the role of the INCT for the formation of a network of research?

The role of the INCT for the establishment of a network of research has been essential. Initially, it is important to point out the relevance of the allocation of funds to the consolidation and improvement of the experimental and computer facilities of several associated groups and laboratories. The existence of a steering committee with periodic meeting to analyze the development of the research programs and to carry out some small adjustments has been essential to foster the synergism between participating groups. The annual meetings for the discussion of research results and the schools for the students have contributed to the establishment of collaborations that could not have taken place without the framework of the INCT. The INCT has also acted to promote the integration between laboratories with complementary techniques, and to avoid the duplication of experimental facilities. The INCT has contributed to a more rational use of the computer facilities, with the concentration of efforts in the establishment of a single and more powerful cluster to be used by all the members of the Institute.

EVALUATE THE DIALOGUE OF THE INCT WITH CNPq AND OTHER FINANCING AGENCIES OF THE PROGRAM:

The dialogue with CNPq has been adequate, although there are some questions that should be mentioned. The procedures of importation by CNPq are very much slow, with systematic delays. This is in contrast with importations by Fapesp, which gives an example of efficiency. The dialogue between CNPq and Fapesp is quite good, although there is a problem that has to be fixed. This problem refers to the eventual changes of the budget due to new and special needs of the INCT. Fapesp works with a very strict initial budget, so that small changes have to be applied for and submitted to another analysis. This process at Fapesp is lengthy and should be made more flexible for the INCTs. It should be fine if these funds were attributed by items, so that we would be able to make changes within each one of these items. Of course, these changes should refer to smaller amounts of money, and should be limited to a strict maximum value.

Enclose a report of partial results, **with a maximum of 50 pages**, with the following items:

1. Steering Committee – meetings and decisions;
2. Activities of cooperation between groups of participants of the INCT;
3. Activities of cooperation between the INCT and other institutions (companies, nongovernmental institutions, etc);
4. Main technical-scientific results;
5. National and international meetings: presentation of works, organization of courses, seminars, talks, round-tables;
6. Activities of formations of human resources;
7. Perspectives and future developments.

LOCAL E DATA: São Paulo, April 25th 2011.

ASSINATURA: Antonio Martins Figueiredo Neto

Digitally signed by Antonio Martins Figueiredo Neto
DN: cn=Antonio Martins Figueiredo Neto, o=GFCx, ou=IFUSP, email=afigueiredo@if.usp.br, c=BR
Date: 2011.04.25 15:09:12 -03'00'

National Institute of Science and Technology of Complex Fluids

(Partial Report of Activities – Year 2)

Introduction

This report contains an introductory text, with the main results of the research activities, a brief discussion of the interactions between associated groups and laboratories, and some perspectives of future work. Also, there are three Appendices:

Appendix I – scientific publications, invited presentations in scientific meetings, publications for the general public, presentations in scientific meetings, formation of human resources (completed works), formation of human resources (work in progress), patents, prizes, and chapters of books.
Appendix II – teaching activities, dissemination of science, recycling courses, website of the INCT, topic meetings, and organized schools.
Appendix III – I Advanced School in Nanobiotechnology with Perspectives to Medicine.

The Steering Committee

Members:

Prof. Dr. Antônio Martins Figueiredo Neto (Coordinator)
Prof. Dr. Luis Juliano Neto (Deputy Coordinator)
Prof. Dr. Francisco Antonio Helfenstein Fonseca
Profa. Dra. Iolanda Midea Cuccovia
Profa. Dra. Lia Queiroz do Amaral
Prof. Dr. Luiz Roberto Evangelista
Prof. Dr. Niels Olsen Saraiva Camara
Prof. Dr. Sylvio Roberto Accioly Canuto

Members of the SC keep in touch electronically. Also, there were some personal meetings as we describe in the following.

1) **8 September, 2010, at IFUSP**
   In this meeting we have discussed the institution video, the preparation for the First Meeting of Monitoring and Evaluation of the INCT Proposals, which was held in Brasilia, from 22 to s3 November 2010. We have also discussed the interactions between associated groups and the idea of organizing topic thematic meetings. Prof. Sylvio Canuto presented a progress report on the installation of a computational cluster for use of the members of the INCT.

2) **13 April, 2011, at IFUSP**
We discussed the evaluation report of CNPq on the first 18 months of the INCT project. We planned a survey to assess the needs of the INCT during the next three years, and the organization of the annual meeting of the Institute in August 2011.

The main results of the research activities

1) The joint work of ICBUSP (M. Gidlund), IFUSP (A. M. Figueiredo Neto), FO in São José dos Campos, UNIFESP (M.A. NO Jardini) and IMEUSP (V. Giampaoli and E. C. Q. Aubin) aimed to investigate the association between chronic periodontitis and markers of risk of cardiovascular diseases . We have shown that after treatment of patients with periodontitis, that before the intervention showed poor quality of the LDL in the blood, had an appreciable improvement in the LDL quality. This fact was evidenced by means of the technique of Scanning-Z in SE and study of the products of lipid oxidation in the plasma. We investigated mixed models for cardiovascular markers in patients with periodontitis. Recently, there has been an increase in the impact of oral health on atherosclerosis and subsequent cardiovascular disease. This study aims to investigate the association between chronic periodontitis and markers of risk in cardiovascular diseases (CVD). In addition to optical properties, lipid profile, the levels of cytokines, antibodies anti-ox, thiobarbituric acid, reactive substances (TBARS) and differential hemogram were compared between the patients with periodontitis and healthy individuals. The objective was to evaluate the evolution of the risk factors for atherosclerosis in patients with periodontitis who were submitted to periodontal treatment and verify if, after 12 months of the application of the treatment, the indicators of risk for atherosclerosis of these patients have improved over time and may come to resemble markers of healthy people. The associations between the prevalence of periodontitis and confounding factors were independently analyzed, forming groups for the risk factors for cardiovascular disease, using the following criteria: gender (female, male), the age ($\leq$ 45 years; more than 45 years) and BMI ($\leq$ 25 kg/m2; more than 25 kg/m2 -overweight) and new groups defined by the combination of these categories. The patients with chronic periodontitis, which received periodontal treatment, during 12 months, had their cardiovascular markers evaluated in initial moment and 3, 6 and 12 months after the beginning of the treatment. It was considered the statistical adjustment of mixed models, aiming to study the influence of individual variables, in addition to the effect of the time in the recovery of cardiovascular markers in treated patients. These adjusted models are also useful for the comparison between the control group and periodontitis group in initial instant (pre-treatment). Non-parametric statistical methods were used for the identification of serologic differences distinguished, some of them involving established risk factors for atherosclerosis. As changes in diet and life style were not reported by the patients, there is evidence that periodontal treatment has positively influenced their cardiovascular markers.

We also investigated the quality of the LDL in high-performance athletes, selected from EPM (F. A. Fonseca, M. C. Izar). In a population of about 100 athletes we have seen that the quality of their LDL was of very good quality, i.e., presenting low index of modification by oxidative stress. This result is

very interesting and, to a certain extent unexpected, because it could be expected that the physical stress would be a risk factor for modification of LDL, which was not revealed. We are now comparing this result with a control population to validate the conclusions. Another aspect of research related to LDL was the effect of statins on the quality of the LDL in patients who receive these drugs. Two statins were investigated, rosuvastatin and simvastatin. In the two cases, we found a decrease in the concentration of LDL in the blood, in the meantime, the relative percentage LDL-modified/LDL-native remained constant, within our experimental error. This fact shows that the main effect of the statins is the decrease in total LDL and does not imply a relative improvement of the quality of the LDL in the blood. This study allowed a better understanding of the metabolism of sterols by the effects of treatment with statins in maximum doses or moderate doses combined with an inhibitor of absorption of cholesterol. We studied the effects of the treatment in the mobilization of endothelial progenitor cells and in the microparticles derived from the endothelium and platelet (new biomarkers of cardiovascular disease). The analyzes of the immune characteristics of LDLs (in relation to amounts of antibodies of oxidized LDL) showed significant differences.

Exploratory analysis of the employment of ferrofluids in atherothrombosis. Experiments were performed in vitro by dissolution of clots in IF-USP with results still not conclusive. We programmed new tests for the current year. At Unifesp it was improved the model of induction of pulmonary thromboembolism, adopting the technique of the access of jugular vein of the rabbit New Zealand and new catheter Terumo, with best results under echocardiographic monitoring. New tests are being planned for the current year, depending on the evolution of the technique of dissolving clots. These tests will be extended to the model of stroke by thrombin injection in carotid artery of New Zealand rabbits.

2) We conducted an experimental study using the technique of non-linear optics, scanning-Z in time-scale of milliseconds of the phase transition N-I in a termotropic liquid crystal formed by a mixture of molecules in the form of rod (E7). The data showed that this phase transition has tricritic character with a critical exponent $\beta = 0,27$, very close to 0, 25 which is the theoretical value. This work involved groups of experimental physicists of UEPG (S. Gomez), IFUSP (A. M. Figueiredo Neto) and the group theoretical Statistical Mechanics of the IFUSP (S. Salinas).

3) In a large number of situations of practical interest (for example, in viscous flow through porous media and in processes of oil extraction) there is a noticeable interest in the possibility of controlling the development of instabilities of interface between fluids. In other words, the control of such instabilities would provide an optimization of such processes. Recently, the group theoretical physicists of UFPE (coordinated by Prof. J. A. de Miranda) has developed protocols for control of hydrodynamic instabilities in situations of displacement between immiscible fluids and miscible. These analytical and numerical studies showed that effective control processes can be materialized controlling the rate of injection of involved fluids. We also have progress on the formation of patterns that occur in

magnetic fluids (ferrofluids and magnetoreologic fluids), unveiling new dynamic behaviors and unprecedented morphologies of interface. Finally, we have developed theoretical studies in examination of confined rotating fluids systems and confined variable systems, unveiling the role of the forces of rotation (centrifugal and Coriolis forces) and the geometry of the environment in the forms assumed by the emerging patterns in the fluid-fluid interface.

4) Studies involving the group of statistics in the IME-USP of Dra. Viviana Giampaoli and the FMUSP of Dr. Sergio Paul Bydlowski and Dra. J. Pereira.

Polymorphisms of enzymes of phase 1 and 2 of the metabolism of drugs in patients with Diffuse Large B-cell Lymphoma: The purpose of this study was to evaluate the influence of single nucleotide polymorphisms (SNPs) of CYP2B6, CYP3A5, GSTM1, GSTP1, GSTT1, PON1, NQO1 and MDR1 in response to treatment with R-CHOP and CHOP in 82 patients with Diffuse large B-cell lymphoma, without evidence of HIV infection. For DNA extraction the samples were obtained from peripheral blood. The laboratory values such as LDL and HDL did not differ among the groups. The SNPs were analyzed by PCR-RFLP. In relation to the patients who had complete response (CR) to treatment (70 %), 51% were treated with R-CHOP. On the treatment, 50% of patients with RC presented classification of ECOG 0-1 (p=0.0193) and the majority of these patients (41 %) had no extranodal involvement (p=0.0377). There was no association between the SNPs in the CYP2B6, CYP3A5, GSTT1, NQO1 and MDR1 (C3435T) and the studied variables. Only CYP3A5 (sex p=0.0519), GSTM1 (age (p=0.016; p=0.0372), MESONS1 (extranodal involvement p=0.0307), PON1 (symptoms B p=0.0201; Bulky p=0.0148) and MDR1 C1236T (sex p=0.0316) showed an association. In relation to overall survival, the treatment variables (p=0.0129), IPI (p=0.000342), age (p=0.0155), staging (p=0.00281) and ECOG (p=0.00869) were significant. In terms of disease-free survival (DFS), only age (p=0.0292), staging (p=0.0402) and ECOG (p=0.0142) were found to be related to survival time.

Study on the CML: The Chronic myeloid leukemia (CML) is a myeloproliferative neoplasia originated from the hematopoietic stem cell. The CML progresses in biphasic pattern with chronic phase (HR) initially asymptomatic followed by progression to acute phase (FA) and blast crisis (CB). In CF the myeloid compartment is expanded, but the differentiation and cell function are preserved, with thr usually effective treatment. However, in the CB there is loss of the capacity of cellular differentiation and refractory to therapy and new cytogenetic abnormalities may appear in 80% of the patients. We evaluated circulating endothelial cells (ECS) of 136 individuals, 50 (36.8 %) in the control group, 32 (23.5 %) with CML in CF, 23 (16.9 %) with CML in CB and 31 (22.8 %) with CML in AF. We also studied the genes of Securina and VEGFA in 104 individuals with 30 (28.8 %) in the control group, 28 (26.9 %) with CML in CF, 15 (14.5 %) with CML in CB and 31 (29.8 %) with CML in AF. We used the global Kruskal-wallis non-parametric statistical test, to compare the mean values of circulating endothelial progenitor cells (CEPs), mature circulating endothelial cells (CEMs), activated CECs 5 and CECs in percentage, with a significance level α equal to 5 %. When found statistically significant difference we carried out for multiple comparisons using the Kruskal-wallis test a posteriori. Using the Kruskal-Wallis test to the

differences in the percentages we observed that there is no difference in between the groups (p-value = 0.029), and that this difference between the groups blast crisis and accelerated phase (p-value = 0.0218). We also observed that the contribution to CPB from CEP was equal to contribution of CEM for the control group (p=0.7715), for the accelerated phase group (p-value = 0.1005) and critical phase group (p-value = 0.4384). In group blast crisis it was detected a statistically significant difference (p-value = 0.0344). We tested whether the contribution to CEC from CEP was lower than the contribution of CEM for the group blast crisis, and we reject this hypothesis (p=0.0172). Therefore the contribution to CEC from CEP was greater than the contribution of CEM for the blast crisis group. According to the Kruskal-Wallis test there is difference, in relation to the Variable Securina, between the groups p-value = 0.003500, and this difference was observed between the groups of Blast Crisis and Control (p-value = 0.0012). It was established that there is no difference in relation to the Variable CEC between groups p-value < 0.0001, this difference was observed between all groups with the exception of group FC and FA. Also that there is no difference between the groups in relation to the Variable VEGF (p-value = 0.8273).

5) Results concerning the research line on lipids and proteins, interactions, structure and functions. Researchers involved: IFUSP (L. Amaral), IQUSP (I. Cuccovia), EPM (L. Juliano, M.A. Juliano, K. A. Riske e K. R. Perez).

Interaction of lipid bilayers with peptides: Antimicrobial peptides are part of the natural defense system of plants and animals and exhibit lytic activity against the membranes of microorganisms. We are interested in the study of the interaction between antimicrobial peptides (synthesized by co-workers) and model membranes (lipid bilayers of different composition) with the aim of revealing the mechanism of action of these peptides. During 2010, Dr. Karin A. Riske continued the work with collaboration with Dr. Antonio Miranda and his Ph.D. students Tatiane Domingues and Marta Martins, in which the interaction of several antimicrobial peptides (especially Gomesin) with lipid vesicles is being studied with optical microscopy of giant lipid vesicles (GUVs) and with isothermal titration calorimetry (ITC). It was observed by optical microscopy that the presence of the different peptides causes distinct responses on the GUVs: while some peptides (Gomesin, Tachyplesin and Polyphemusin) induce sudden burst of the vesicles, others (Magainin and Protegrin) induce the opening of pores across the bilayer. In parallel, measurements with the ITC technique are being carried out. After data analysis, it will be possible to obtain the thermodynamical parameters of the peptide-membrane interaction, such as ΔH, ΔG and ΔS and association constant. Additionally, leakage experiments of a fluorescent probe incorporated in lipid vesicles are being made in collaboration with Dr. Katia R. Perez with the goal of relating the leakage rate induced by Gomesin and its analogues with the molar fraction of negative lipids in the membrane. The collaboration started in 2009 to study the hybrid peptide cecropin/melittin (BP100), synthesized by researchers from EMBRAPA (Drs. M. A. Rodrigues and M. P. Bemquerer), continued in this period. We investigated the interaction of BP100 with liposomes. The effects of the liposome charge, peptide/lipid ratio and ionic strength on this interaction are being studied by means of several approaches, such as fluorescence spectroscopy, zeta potential, circular dichroism (CD) and nuclear magnetic resonance (NMR). The fluorescence experiments, CD and NMR show that there is an optimal concentration of

charged lipid in the liposome membrane necessary to the structuring and consequent lytic activity of BP100. The zeta potential measurements show that there is a peptide/lipid ratio depending on the membrane charge for which the membrane potential is reversed. In this year we broadened the results with optical microscopy of GUVs for different lipid compositions, mimicking the membranes of microorganisms and mammals. Generally, we see that the peptide causes vesicle burst after the formation of domains on the GUVs surface. For some lipid compositions we observed penetration of the peptide in the inner compartments of the GUVs before a significant membrane permeabilization. Another work in collaboration in the context of the INCT, started in 2010, is the study of the interaction of membrane models with some analogues of the antimicrobial peptide Gomesin (with modifications in the turn of the hairpin structure of Gomesin that decrease the net charge of this peptide). From the one side, we are investigating the interactions of these various analogues with membranes composed of different molar fractions of negatively charged lipids by means of ITC. From the other side, we are obtaining zeta potential results which indicate the surface charge density of the vesicles as the peptides bind to the membrane surface.

Effect of the detergent concentration, salts and temperature on the phase behavior of N,N,N-trimethyldodecylammonium triflate (DTATf): Rheology measurements showed an increase in the viscosity of the system with concentration and an unusual effect of decrease in viscosity with addition of salt. Therefore, it is interesting to study the structure of this amphiphilic system. During this year we showed that the DTATf micelles exhibit phase transitions as a function of temperature in the presence of sodium triflate, NaTf, above 0.05 M. The mixture of DTATf and NaTf forms crystals below 42 ^{o}C. Above that temperature a phase separation occurs, with the formation of a detergent-rich viscous phase which sediments and another detergent-poor phase. Above 58 ^{o}C only a liquid phase exists. These results were interpreted as being due to the poor hydration of the triflate ion, which forms an ionic pair with the quaternary ammonium salt at the water/hydrocarbon interface of the micelle and changes the aggregate size, degree of dissociation and critical micellar concentration.

6) Studies of liquid crystals and adsorption phenomena in complex fluids, involving groups of IFUSP (S. Shibli, L.Q. Amaral), EMU (L.R. Evangelista, P.R.G. Fernandes, H. Mukai, A. J. Palangana, and M.S. Filho). The most important results obtained in this second period refer to the study of the adsorption of ions in nematic liquid crystals and complex fluids in general, and on the role of these ions in the sing of impedance spectroscopy. With regard to the processes of adsorption, the model proposed for liquid crystals along two decades was successfully applied to the phenomenon of biosorption. This application was made possible with the involvement of chemical engineers at EMU, UFPR and Unicamp. The results of impedance spectroscopy have advanced and we made a survey of generalizations involving the phenomenon of anomalous diffusion. The lyotropic biaxial nematic phase between two isotropic phases has been reevaluated from the point of view of data for the index of refraction. The results obtained so far indicate the possibility of a transition between positive and negative biaxial nematic phases, in analogy with fundamentals of optics of biaxial liquid crystals. In another system, there is a coexistence of two uniaxial nematic phases, without an intermediate biaxial phase.

7) Results from ICB-USP laboratories, coordinated by Prof. N. Camara.

Oxidative stress and the changes in renal vascular permeability are associated with the development of renal lesions during infection by P. berghei ANKA. The acute kidney injury (AKI) is a frequent clinical problem in adult patients with severe malaria in most of African Continent, in parts of Asia and Latin America. Centers of studies estimate that the AKI associated with malaria can occur between 1-4 % of hospitalized adults, with a mortality rate that can reach above 45 %. The pathophysiology of the AKI is multifactorial and may be associated with the nephrotoxicity of the products of oxidative stress, elements that are present in the infection by Plasmodium, or as a consequence of a nonspecific inflammatory response induced by the parasite. During the intraeritrocitic phase of malaria cycle, the parasite uses the hemoglobin as one of the primary nutrients for their survival within the cell. However, the oxidation of hemoglobin within the digestive vacuoles of erythrocyte produces large quantities of free heme (Fe^{+3}), a molecule capable of inducing the oxidative stress of the cell. The oxidative stress mediated by free heme can cause serious damage in different organs through the generation of reactive oxygen species by the cells of the host and is associated with the oxidation of lipoproteins and complications such as renal failure, atherosclerosis, peritoneal endometriosis and thrombocytopenia. In patients who develop AKI associated with malaria, the extension of the lesions may vary from a mild proteinuria until a uremia associated severe with metabolic acids. On the basis of the information above, we have launched a study to characterize the development of AKI associated with malaria in an experimental model of murine infection, as well as the participation of the products of toxic metabolites of oxidative stress. The incidence of AKI associated with malaria was verified by high levels of urea and creatinine, as well as an increase between the reason of proteinuria by creatinine ratio (fig 1).

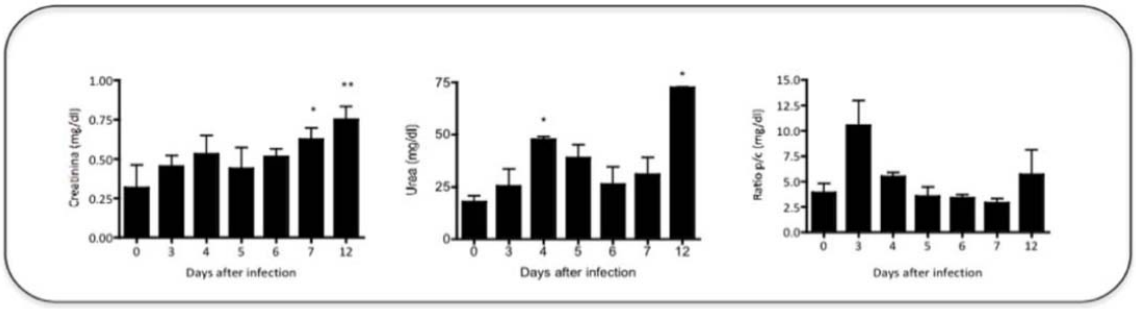


Figure 1 - Evaluation of acute kidney injury associated with malaria. Renal function (a) (creatinine) and (b) plasma urea, and (c) proteinuria by creatinine ratio were evaluated before infection (day zero) and from the day 3 in BALB/c mice by P. berghei ANKA.

These data are consistent with the increase expression of mRNA from proinflammatory molecules such as the iNOS, HIF-1a, IFN-g and ICAM-1 in renal tissue of infected mice (fig 2).

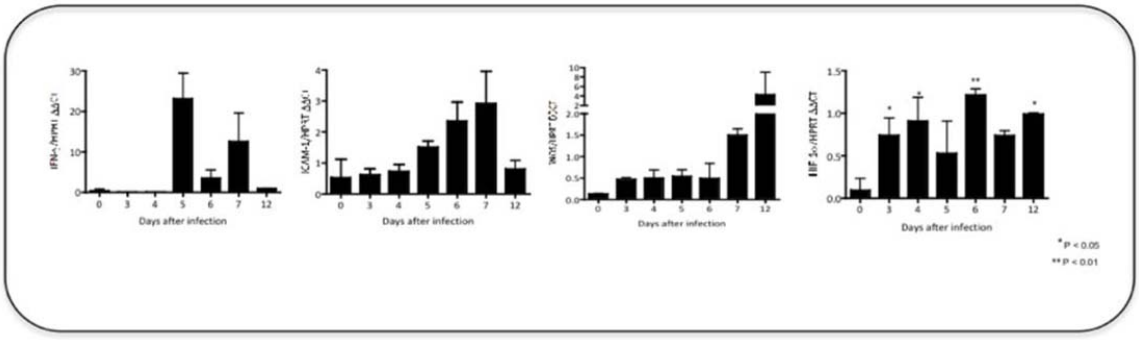


Figure 2 - Evaluation of acute kidney injury associated with malaria. The expression of mRNA (a) IFNg, (b) ICAM-1, (c) HIF-1a and d) inos during infection by P. berghei ANKA were quantified in renal tissue from BALB/c mice by P. berghei ANKA before infection (day 0) and from the day 3 after infection.

In addition, the free heme appears to contribute to the increase in the oxidation of lipoproteins, which was detected in plasma samples (fig. 3). The increase of absorbance by 234 nm is known to reflect the accumulation of conjugated carbon dienes in the oxidation of LDL.

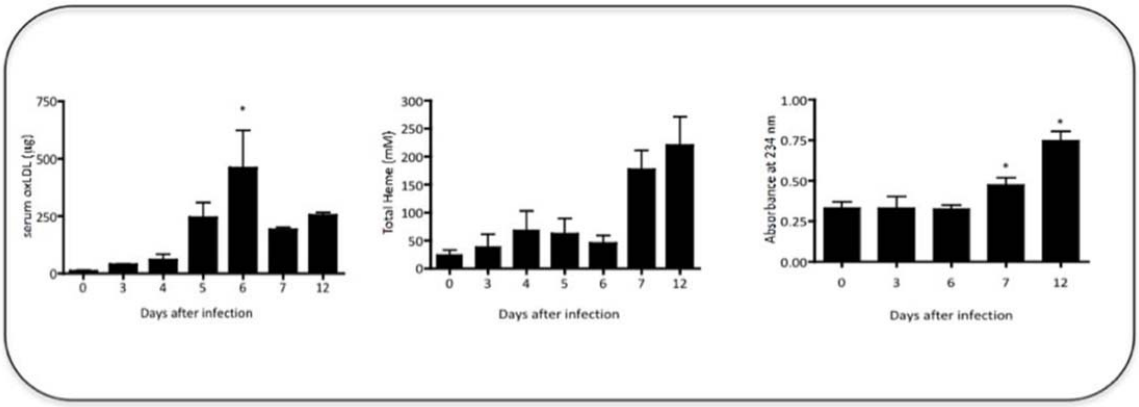


Figure 3 - The products of oxidative stress in renal lesion associated with malaria was determined by (a) quantification of circulating oxidized LDL, (b) total heme plasma and (c) the formation of conjugated carbon dienes during infection by P. berghei ANKA in BALB/c mice.

Progressive glomerular and tubular structural changes architectures in kidney were also observed during the acute phase of infection (fig. 4).

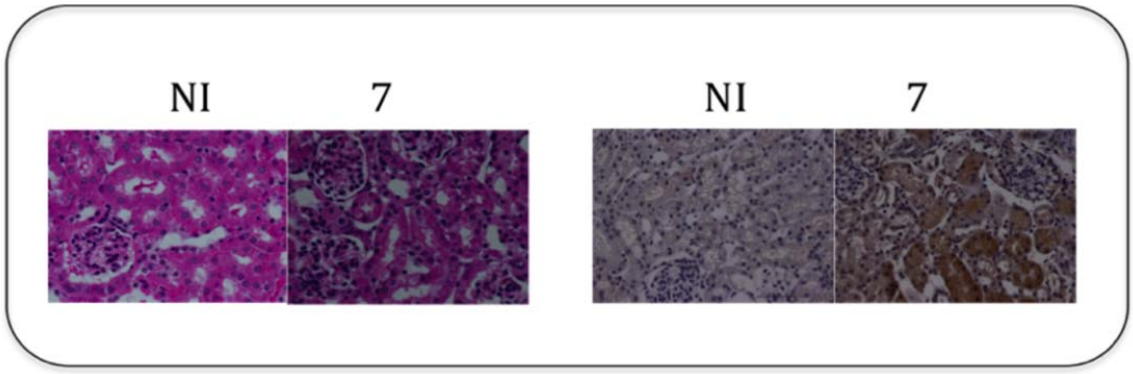


Figure 4- Histological analysis of BALB/c mice kidney not infected (NI) and on the day 7 after infection by P. berghei. ANKA were marked by (a) HE and (b) hipoxiprobe. The renal tubules stained with hipoxiprobe represent the presence of obstruction and ischemia of the injured tissue.

The evidences so far obtained support the initial proposal of the oxidative stress products participation in the development of AKI associated with severe malaria. The renal dysfunction resulting from the infection initiated in the first days after inoculation of the parasite, and the participation of pro-inflammatory molecules seems to be important during the early events of the lesion. The preservation of the vascular endothelium is essential to the proper functioning of biological processes performed by renal microvasculature. However, the changes in renal architecture can lead to compression in the tubular capillaries and reduce the microvascular flow. Morphological and functional alterations in renal vascular permeability may lead to an increase in the adhesion of leukocytes and of infected erythrocytes in the endothelium that result in tissue injury. As a continuation of this work, we want to investigate the participation of products of oxidative stress in injury and dysfunction of the endothelial cells during infection by Plasmodium. Our results should provide more details about the pathophysiology of AKI associated with malaria and reveal among other benefits, new therapeutic interventions.

8) Results referring to foams. Group of Professors A. Tufaile and A. Tufaile, from EACH-USP. We produced and investigated foams of amphiphilic systems as detergents. The results were analyzed using methods of dynamic systems and chaos. We have described some mechanisms in the formation of foams, such as stretching and bending, and the logistic growth of the size of the film. We have observed "random walk" movements and scattering similar to a Galton plaque. In the analysis of models for foams, we used a "Random Apollonian Packing" and calculated the fractal dimension. It was described how the presence of granular material in the foam affects the distribution of the number of sides of the bubbles forming the foam. We observed the distribution of spacing between the first neighbors of cells that form granular material beneath the foam and found that their size distribution obeys a lognormal function. We are still studying foams in Hele-Shaw cells, which are narrow chambers with transparent walls. We are exploring the chaotic light scattering by foams. A possible application for this chaotic scattering of light through the foam is the use of these materials as antennas of non-directional signals (wireless) and as light scattering units in liquid crystal displays and illumination devices. In order to better understand the

behavior of light through foams, we have built a hyperbolic prism, which has the same geometry of the liquid bridges in the foams, but with larger dimensions.

9) Results from ICB-USP laboratories, coordinated by Prof Luiz Juliano and Maria A. Juliano.

Kallikreins

The human tissue kallikrein (hKLKs) constitute a family of 15 genes with high homology with the sizes ranging from 4-10 Kb, located in the chromosome 19Q13.4 , and encode serine proteases of molecular mass of approximately 30 KDa with activities trypsin-like for the majority of the kallikreins and chymotrypsin-like for hKLK3 and hKLK7). The hKLKs are synthesized as pre-proenzimas. The pre-segment contains 17-20 amino acid residues and the pro-segment has 4-9. The activation of the enzymes is an irreversible process that occurs through cleavage of pro-segment by enzyme itself or by another. Once activated, the action of kallikrein can be controlled by inhibitors of serine proteases such as serpins.

Human tissue kallikrein 2 (hKLK2)

The hKLK2 belongs to the family of serine proteases having a trypsin-like activity. The hKLK2 is synthesized and secreted by the prostate gland along with the tissue kallikrein 3 (hKLK3) that is known clinically as PSA (Prostate-specific antigen). hKLK2 presents in its primary structure 80% homology with the hKLK3, and approximately 50% with the other kallikreins. There is evidence that the hKLK2 activates the hKLK3 (PSA) cleaving between the residues Arg-Ile, removing the last 7 amino acids (Ala_7Pro-Leu-Ile-Leu-to-be-Arg_1, that belongs to the pro-segment), resulting in mature hKLK3. The levels of hKLK2 in the prostate are of 1-3% compared with the levels of hKLK3 (PSA), sufficient quantity to promote a complete conversion of pro-hKLK3 in active hKLK3 (PSA). Prostate cancer is the second leading cause of death among men in North America, in spite of the disease is curable if early diagnosed. The genes corresponding to KLK2, KLK3 (PSA) and prostase (KLK4) are expressed at high levels in the prostate, and the KLK2 and KLK3 are almost restricted to the prostate, making them ideal for markers prostate diseases. Potential physiological substrates have been proposed for both enzymes, such as semenogelin I and II, with the cleavage in tyrosine, leucine and glutamine residues resulting in liquefaction of the seminal plasma after ejaculation and also fibronectin. It was shown in 2001 by other authors that the hKLK2 and hKLK3 (PSA) degrade IGFBP-2, -3, -4 and -5, which are growth factors that can be secreted by the cells of prostate cancer in the process of metastasis that alter the balance between osteoblasts and osteoclasts and constituents of the bone matrix, which stimulate bone formation. In addition, *in vitro* studies show that hKLK2 may activate plasminogen promoting the hydrolysis of plasminogen activator inhibitor, which results in the activation of the urokinase system. hKLK2 was also reported in colon and breast cancer, which led us to believe that the enzyme may be involved in the malignant transformation of cells. In spite of all these knowledge with the discovery of the hKLK2 location and its high level of expression , few is known about its specificity, therefore, a detailed biochemical study is justifiable, since this enzyme is directly related to prostate diseases. Therefore, the search for natural substrates and possible inhibitors are of great interest to better understand the

physiology of the pathology, and for the development of therapies and new drugs. Thus, the objectives of this work were: - Optimize the conditions for measuring the activity of the enzyme by determining the best test conditions, since this enzyme has a low catalytic activity in the usual conditions of enzyme assays. - Examine the specificity of hKLK2 using a library of FRET peptides derived from the sequence K L R S S K. - Verify possible activity of release of kinins by hKLK2.

Determination of the best conditions for hKLK2 assays.

The effect of different salts in catalytic activity of hKLK2 was studied in the presence of increasing concentrations of kosmotropic and kaotropic salts, such as: sodium citrate, sodium acetate, betaine, sodium bicarbonate, sodium borate, sodium phosphate, sodium iodide, sodium sulfate, sulfide, sodium sulfite, sodium tartrate, sodium thiocyanate and taurine. The catalytic activity of hKLK2 had an increase of 16 times in the presence of 1000 mM sodium citrate, and the other salts tested did not increase the catalytic activity of the enzyme. These results show that the enzyme needs an environment with high ionic strength obtained in the high concentration of salt. The enzyme salt dependent activation mechanism may be associated with the change of the conformational structure of the protein; present in two equilibrium forms. One when the enzyme is inactive and the protein is in a relaxed form and stretched. In the other the enzyme is more compacted and structured in the presence of high concentration of salt thus leaving exposed the active site of the enzyme. Another indication that activity of hKLK2 is dependent of in the presence of high concentrations of sodium citrate is the presence in body prostate fluids of 40 to 150 mM of citrate. Another way to mimic an environment with a negative charge, for the enzyme is the replacement of salts by glycosaminoglycans. Analyses with different concentrations of glycosaminoglycans (0 to 16 μM) were performed with the substrate Abz-KLRSSKQ-EDDnp. Its highest activity was observed in low concentrations of heparan sulfate, and also with a concentration of approximately 5 μM a of dermatan sulfate, while the condoitrim inhibited completely the activity of hKLK2. In addition to this study of activation by salts and glycosaminoglycans, the pH of the buffer is one of the items of great importance for the enzyme activity. The effects of pH was evaluated in the presence of sodium citrate using as substrate Abz-KLRSSKQ-EDDnp. The optimal pH for activity was in the range 7.5 - 8.5 . The catalytic activity of the enzyme in relation to the time was done aiming to verify the stability of the enzyme. The enzyme activated with sodium citrate at 37 Cº and remained stable for 60 minutes. After this period the catalytic activity of the enzyme diminishes, and after 4 hours to the residual activity was 35% compared to the initial activity.

hKLK2 specificity profile

The specificity study was done by incubating the enzyme with a library of FRET peptides derived from sequence K L R S S K, where each position was replaced by the 20 natural amino acids. The kinetic parameters were performed in the best condition, which was, Tris HCl 20 mM, 1.0 mM EDTA, 1000 mM sodium citrate at pH 7.5.

S_1 subsite

This specificity study showed that the hKLK2 is a arginyl-hydrolase, because it cleaved only to R S bound in the series Abz-KLXSSKQ-EDDnp, where X was replaced by 20 natural amino acid.

S_2 subsite

All of the sequences of peptide series Abz-KXRSSKQ-EDDnp were hydrolyzed at peptide bond Arg-Ser. The peptides hydrolyzed with the higher catalytic efficiency were the sequences containing hydrophobic amino acid residues at this position, namely Val, Met and Pro. Similar results were obtained with the hKLK1, hKLK13 and hKLK6, showing that the kallikreins have a selective specificity in theirs S_2 subsites.

S_3 subsite

All of the peptides of the series Abz-XLRSSKQ-EDDnp were hydrolyzed at peptide bound Arg-Ser. hKLK2 did not show high selectivity in this subsite accepting amino acid residues without charge such as alanine, hydrophobic residues as phenylalanine, and charged amino acids as histidine, arginine and glutamic acid as shown in table 1.

S_1' subsite

All of the peptides of the series Abz-KLRXSKQ-EDDnp were hydrolyzed at peptide bound Arg-Ser. The S_1'subsite of hKLK2 showed no selectivity accepting amino acid residues with charged as well as hydrophobic side chains (table 2). Abz-KLRISKQ-EDDnp was hydrolyzed with the greatest catalytic efficiency, confirming that hKLK2 can activate the hKLK3 and to self-activate the cleave between amino acid residues Arg-Ile.

Table 1 Kinetic parameters for the hydrolysis of substrates for interaction with S_3 subsite of hKLK2

X	k_{cat} (s^{-1})	K_m (μM)	k_{cat}/K_m $(mM.s)^{-1}$
Abz-XLR↓SSKQ-EDDnp (P_3)			
M	*0,9±0,1*	*0,6±0,1*	*1541±0,4*
Q	*10,3±0,5*	*7,3±0,7*	*1408±0,7*
A	*4,2±0,1*	*3,1±0,2*	*1376±0,5*
R	*5,3±0,2*	*3,9±0,4*	*1337±0,5*
N	*9,6±0,3*	*8,0±0,5*	*1197±0,6*
H	*4,3±0,1*	*4,7±0,3*	*906±0,3*
V	*4,3±0,1*	*4,8±0,3*	*893±0,3*
K	*5,0±0,3*	*5,9±0,8*	*856±0,4*
E	*4,9±0,3*	*6,9±0,9*	*720±0,3*
F	*4,9±0,2*	*7,6±0,6*	*643±0,3*
I	*0,4±0,0*	*1,2±0,2*	*306±0,1*
L	*0,2±0,0*	*1,3±0,2*	*148±0,1*

Hydrolysis conditions: 20 mM Tris-HCl, 1.0 mM EDTA, 1000 mM sodium citrate, pH 7.5, hKLK2 1.58 nM, 37 ºC. ↓ indicates the cleavage site.

S_2' subsite

All of the peptides of the series Abz-KLRSXKQ-EDDnp were hydrolyzed at peptide bound Arg-Ser. The subsite S_2' accepted better hydrophobic amino acids as showed by the catalytic efficiencies (table 3). Similar specificity can be observed with hKLK3 and hKLK6.

Table 2 Kinetic parameters for the hydrolysis of substrates for interaction with S_1' subsite of hKLK2

X	k_{cat} (s^{-1})	K_m (μM)	k_{cat}/K_m $(mM.s)^{-1}$
Abz-KLR↓XSKQ-EDDnp (P_1')			
I	*3,5±0,1*	*1,5±0,1*	*2378±0,7*
M	*1,1±0,0*	*0,6±0,1*	*2036±0,4*
N	*16,8±1,4*	*9,4±1,3*	*1783±1,1*
H	*6,5±0,2*	*4,3±0,4*	*1511±0,6*
E	*11,0±0,7*	*8,2±0,9*	*1338±0,7*
L	*3,1±0,1*	*3,2±0,3*	*956±0,3*
Q	*4,5±0,2*	*5,0±0,7*	*906±0,4*
S	*5,0±0,3*	*5,9±0,8*	*856±0,4*
W	*0,8±0,1*	*1,3±0,1*	*638±0,2*
F	*0,9±0,1*	*1,8±0,3*	*533±0,2*
V	*0,1±0,1*	*0,2±0,1*	*360±0,1*
R	*0,2±0,1*	*0,6±0,1*	*359±0,1*
K	-	-	-

Hydrolysis conditions: 20 mM Tris-HCl, 1.0 mM EDTA, 1000 mM sodium citrate, pH 7.5, hKLK2 1.58 nM, 37 ºC. ↓ indicates the cleavage site.

S_3' subsite

All of the peptides of the series Abz-KLRSSXQ-EDDnp were hydrolyzed at peptide bound Arg-Ser. S_3'showed selectivity for phenylalanine, and proline. Cleved with less efficiency charged amino acids as lysine and arginine, as showed in table 4. This result is in according to the enzyme modeling that indicates the interaction of P_3 residue with Trp of the enzyme.

Table 3 Kinetic parameters for the hydrolysis of substrates for interaction with S_2' subsite of hKLK2

X	k_{cat} (s^{-1})	K_m (μM)	k_{cat}/K_m $(mM.s)^{-1}$
Abz-KLR↓SXKQ-EDDnp (P_2')			
I	*1,2±0,0*	*0,9±0,1*	*1350±0,4*
F	*3,0±0,0*	*2,6±0,1*	*1145±0,4*
V	*2,5±0,1*	*2,3±0,3*	*1128±0,4*
P	*7,3±0,3*	*7,3±0,6*	*1002±0,5*
S	*5,0±0,3*	*5,9±0,8*	*856±0,4*
E	*6,8±0,3*	*8,1±0,8*	*835±0,4*
R	*3,0±0,1*	*3,7±0,3*	*827±0,3*
G	*3,1±0,1*	*3,8±0,5*	*801±0,3*
L	*2,0±0,1*	*2,7±0,4*	*751±0,2*
A	*3,2±0,1*	*4,7±0,2*	*683±0,3*
N	*3,5±0,2*	*8,6±1,1*	*412±0,2*

Hydrolysis conditions: 20 mM Tris-HCl, 1.0 mM EDTA, 1000 mM sodium citrate, pH 7.5, hKLK2 1.58 nM, 37 ºC. ↓ indicates the cleavage site.

Table 4 Kinetic parameters for the hydrolysis of substrates for interaction with S_3' subsite of hKLK2

X	k_{cat} (s^{-1})	K_m (μM)	k_{cat}/K_m $(mM.s)^{-1}$
Abz-KLR↓SSXQ-EDDnp (P_3')			
F	*5,0±0,2*	*1,4±0,2*	*3515±1,2*
P	*3,2±0,2*	*1,5±0,2*	*2157±1,0*
A	*1,0±0,1*	*0,5±0,2*	*1798±0,7*
V	*2,0±0,1*	*1,2±0,2*	*1734±0,5*
Q	*1,1±0,1*	*1,0±0,1*	*1049±0,3*
K	*5,0±0,3*	*5,9±0,8*	*856±0,4*
L	*3,2±0,1*	*2,3±0,3*	*722±0,5*
R	*0,6±0,0*	*1,2±0,1*	*458±0,2*

Hydrolysis conditions: 20 mM Tris-HCl, 1.0 mM EDTA, 1000 mM sodium citrate, pH 7.5, hKLK2 1.58 nM, 37 ºC. ↓ indicates the cleavage site.

Release of kinins by hKLK2

hKLK2 was reported devoid of kininogenase activity, however our data with FRET peptide library suggested that hKLK2 having trypsin-like activity could also release kinins from kininogen. In order to check the origin of this inconsistency two FRET peptides derived from human kininogen containing C- and N-terminal sequence of bradykinin (Abz-MISLMKRPQ-EDDnp and Abz-GFSPFRSSRIQ-EDDnp) were synthesized and assayed as substrate of hKLK2. If this peptidase has kininogenase activity both peptides should be hydrolyzed. Only the peptide Abz-GFSPFRSSRIQ-EDDnp was hydrolyzed and the kinetic parameters are showed in Table 5, and the other peptide was completely resistant. In addition we also synthesized and assayed the peptide Abz- MISLMKRPPGFSPFRSSRI-NH_2, that is the fusion of the two peptides Abz-MISLMKRPQ-EDDnp and Abz-GFSPFRSSRIQ-EDDnp . The peptide Abz- MISLMK*RPPGFSPFR↓SSRI-NH_2 was cleaved as indicated by arrow only at R-S bound. These results indicate that hKLK2 does not present kininogenase activity due to the resistance to hydrolysis of K-R bound indicated by *. As already mentioned, different groups of INCT will interact with the group of EPM.

Table 5. Kinetic parameters for the hydrolysis of the peptides analogs to C- and N-terminal sites of bradykinin in human kinogen

k_{cat} (s^{-1})	K_m (μM)	k_{cat}/K_m $(mM.s)^{-1}$
Abz-GFSPFR↓SSRIQ-EDDnp		
0,6±0,1	*1,7±0,4*	*340±0,1*
Abz-MISLMKRPQ-EDDnp	*Resistant to hydrolysis*	

Hydrolysis conditions: 20 mM Tris-HCl, 1.0 mM EDTA, 1000 mM sodium citrate, pH 7.5, hKLK2 6.30 nM, 37 ºC. ↓ indicates the cleavage site.

10) In terms of theoretical physics, the group at UFRGS, under the leadership of Prof. Marcia Barbosa, has shown that a system of pair interacting particles with a spherically symmetric potential and the addition of two different scales leads to an explanation of density and diffusion anomalies if these scales are accessible. Also, it has been shown that systems with directional pair potentials and two interactions scales lead to anomalies and critical points, while spherically symmetric potentials do not explain critical points. These results were well established experimentally, without however a clear theoretical explanation.

The theoretical group of simulations at IFUSP, under the leadership of Professors S. Canuto and K. Coutinho, has obtained expressive results in the calculations for the birefringence of molecules belonging to liquid-crystalline systems using quantum mechanics ideas. This is a collaboration between the theoretical group at IFUSP and the experimental group at DF/UFAL. In addition, we have studied oxidation reactions in model molecules in water solutions using a quantum mechanical formalism, computational simulations and perturbative calculations. These investigations are the providing the basis to begin the study of oxidation of molecules of biological interest, as phospholipids, esters of cholesterol, and triglycerides.

11) Results involving the interactions with companies (experimental group of Prof. Giancarlo Brito, at IFUSP).

Beginning in 2010, we established collaboration with Nantex – Nanotecnologia Experimental Ltda (Piracaia, SP). In this collaboration, we are developing water based ferrofluids, in special ferrofluids in light lubricating oil. In this last system, we have reached the state of art in terms of colloidal stability, and we are completing the procedures of fabrication and control of quality in order to test Bravox (Itu, SP) in twitters for automotive sound systems. We are also developing nanostructured supported catalysts of the core-shell type, which are composed by a nucleus formed by superparamagnetic nanoparticles coated by a layer of TiO_2, SiO_2, or Al_2O_3. The catalyst is deposited on this kind of support. We have prepared catalysts on the basis of palladium platinum, rhodium and cerium. We have performed catalytic tests for the coupling reaction of Zuzuki-Myaura, which is used in the synthesis of drugs. The results have shown that these catalysts may be recycled due to easy separation of the reaction medium by the action of a magnetic field. It is important to point out that the typical efficiency is about 35% for commercial catalysts based on metallic palladium, and that in the present investigation we have obtained efficiency between 43 and 45%.

Activities of cooperation between participating groups of the INCT

We have several mechanisms of interaction:

1) The first of them is the website of the INCT-FCx (http://fluidos.usp.br). On the site there is description of the members and of the available experimental facilities, as well as a forum of discussions.
2) We have organized an annual school for students of the associated groups, also open to all interested students, and a scientific meeting with international participation.
3) We have organized periodic seminars in the home institution of the INCT, with the purpose of discussing ongoing research. These seminars transmitted in real time by IPTV-USP, are recorded and made available at the website.
4) The Steering Committee held periodic meetings to evaluate partial results and give suggestions of eventual changes of goals.

Some perspectives and future developments

1) We aim to continue the research involving the non-linear optics response of human and animal lipoproteins trying to understand their Physical origin. We will also investigate the effects of Omega 3, 6 and 9 in the quality of human LDL.
2) Perspectives involving theoretical investigations, linked to some experimental activities of the Institute:
   Theoretical study of water to show that the second critical point is in fact a tricritical point. Show that the cyclodextrin and more efficient than surfactant (currently used) in gene therapy. We are working on a theory that in will allow predicting the critical concentrations of coagulation of hydrophobic colloidal suspensions.
   Studies aiming at: The understanding of non-equilibrium phase transitions and the analysis of entropy production in systems outside the thermodynamic equilibrium; the modeling of biological related problems and treated within the context of statistical mechanics and of the stochastic dynamics. In particular, we will focus in the modeling of processes for the spreading of epidemics and other problems of the biological population dynamics. It will be also involved in these studies researchers from Nancy-Université, France, Federal University of Bahia and a researcher from the University of Michigan, USA; The studies on growth of surfaces and on modeling of ecological systems will be continued. We will still continue to work on the processes of formation and the dynamics of micelle aggregates in aqueous media, studying the properties of nanoscopic magnetic systems involving dipole magnet interactions, and investigate the behavior of systems outside the thermodynamic equilibrium, especially those that present absorbents. We have studied oxidation reactions of model molecules in aqueous solution by means of quantum calculations, computer simulations and perturbation free energy calculations. These studies are generating subsidies to start the studies of oxidation of molecules of biological interest, such as phospholipids, cholesterol esters and triglycerides.

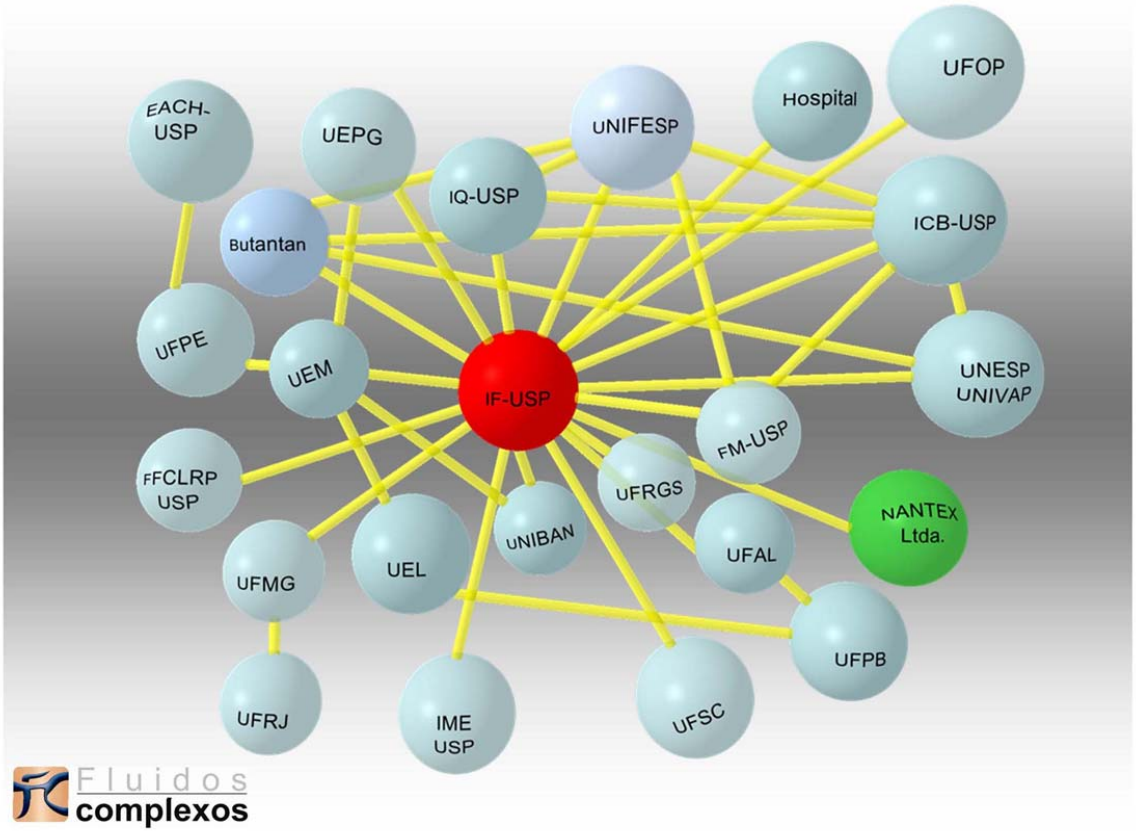
3) The line of research involving the comparison of the treatment of dyslipidemia, hypertension, and diabetes mellitus has allowed a better understanding of the endothelial turnover (endothelial microparticles, platelet microparticles and endothelial progenitor cells). Relevant interaction with one of the most important research groups in the area, led by Prof. Nikos Werner will be established from the second half of 2011. The results of these analyzes of microparticles and progenitor cells, as well as phytosterols and markers of cholesterol synthesis will also allow greater interaction with researchers of Campinas (UNICAMP). We have studies in the final stage of completion and other planned for the current year, expanding these concepts to patients with acute coronary syndromes. With the support of the INCT-FCx was possible a large epidemiological survey in the city of São Paulo for the evaluation of phytosterols content of in the food mainly consumed. Data were obtained from a random population of 1600 individuals distributed in neighborhoods from all regions of the city. The analysis of phytosterols will be the first national publication that will allow a realistic overview of the content of this substance in the

mainly consumed foods, and the importance to the lipid metabolism in our population. The line of research involving tools of molecular biology should be expanded and the results should be materialized with the conclusion of various theses in the current year.

4) We intend to undertake a project to study the inhibition of LDL phagocytosis by macrophages using a nontoxic fraction secreted in culture by enteropatogenic atypical Escherichia coli bacteria.
5) A program of biocatalysis from products of microorganisms isolated from the composting facilities of the São Paulo Zoo and of genes identified by metagenomics will be established.
6) The newly acquired equipment of LSD we possible to perform an extensive characterization of lipoproteins in native and oxidized form as well as the effects of temperature. In addition, experiments with lipid vesicles as well as vesicles+DNA are already being carried out. In view of the good preliminary results of the experiments with X-ray, new experiments will be carried out for the samples of lipoproteins and lipids as well as new projects of structural using X-ray will carried out in collaboration with other member of of INCT-FCx, which will permit further integration in the group.
7) Construction of the equipment for magneto hyperthermia. Study of the therapeutic effects of human mesenchymal stem cells from umbilical cord wall marked with nanoparticles of iron oxides using the animal model with focal cerebral ischemia. Immunophenotypical and Ultra-structural characterization of tumor cells of Glioblastoma Multiforme. Evaluation of the technique of magneto hyperthermia in the treatment of glioblastomas by means of animal models and tumors removed from patients.
8) Further studies in the mechanisms related to tissue injury by modified LDL and oxidative stress in vitro, in vivo and in humans. The data so far obtained corroborate the hypothesis that changes in LDL turn it more inflammatory with induction of cellular stress, inflammation and fibrosis. The prospects involve both understand the mechanisms and seek strategies that can reverse these outcomes. For both, new experimental models are being established and human studies are being planned to achieve these goals. Interesting, it will also be needs for use of new visual tools present in INCT that it will provide further collaboration between groups.

Array of current collaborations

On the next page depicts the collaborative relationships between the various institutions of the INCT-FCx. In red the head-quarter is represented and in green is represented the company, just incorporated into the project.


EACH-USP
UEPG
UNIFESP
Hospital
UFOP
IQ-USP
Butantan
ICB-USP
UFPE
UEM
IF-USP
UNESP UNIVAP
FM-USP
FFCLRP USP
UFRGS
NANTEX Ltda.
UNIBAN
UFAL
UFMG
UEL
UFPB
UFRJ
IME USP
UFSC
Fluidos complexos

(INCT-FCx) Appendix I

Scientific publications*

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***In some of these publications, we just give the number of the first page or the number of the article.**

Invited presentations in scientific meetings

1. XI Meeting on Recent Advances in Physics of Fluids and its Applications, FLUIDS 2010, held at the city of Colonia del Sacramento, Uruguay, from November 3 to 5, 2010. A.M. Figueiredo Neto.
2. Seminar on Nonlinear Optics and Spectroscopy of the annual workshop LPHYS'10 (held in 2010 in Foz do Iguaçu, Brazil, July 5-9, 2010). A.M. Figueiredo Neto.
3. 2011 SPIE Photonics West "Emerging Liquid Crystal Technologies VI", held on Jan. 22-27, 2011, in San Francisco, CA, USA. . A.M. Figueiredo Neto.
4. International Workshop on Complex Physical Phenomena in Materials, Recife-PE, Brazil December 14-17 2010. A.M. Figueiredo Neto.
5. Palestrante convidada do evento: Dynamics Days Asia Pacific 6 in Sydney, on Glassy Dynamics, DDAP6, Sidnei, Austrália, Julho de 2010. Marcia Barbosa.
6. Palestrante convidada do evento: Enrico Fermi School on Complex Systems , Varenna, Itália, Junho de 2010. Marcia Barbosa.
7. Palestra convidada: "Produção de entropia em sistemas descritos por equações mestras", Tânia Tomé, Workshop de Física Teórica, CBPF_TEO, Rio de Janeiro, RJ, Setembro de 2010.
8. Palestra convidada: "Stochastic lattice models for population biology", Tânia Tomé, Statistical Physics of Non-Equilibrium and Disordered Systems 2010, Nancy, França, Maio de 2010.
9. Mini curso (Apresentação convidada): "Fenômenos fora do equilíbrio", IV Escola: Computação de Alto Desempenho para Sistemas Complexos, Tânia Tomé e M. J. Oliveira, IFSC, São Carlos, SP, Agosto de 2010,
10. Mini curso (Apresentação convidada): "Mecânica estatística de não-equilíbrio", Tânia Tomé, III Escola de Inverno de Física, Programa de Pós-Graduação em Física, Instituto de Física da UFBA, Salvador, Bahia, Julho de 2010.
11. Osmotically Stressed Liposomes e Ionic Specificity (Hofmeister Effect), apresentado no Workshop on Physics of Biological Membranes and Cell Shapes, Natal, Brasil, dezembro 2010 (palestras convidadas). Yan Levin.

12. Ions at the Air-Water Interface: Surface Tensions, Surface Potentials, and the Hofmeister series of Electrolyte Solutions, apresentado no The International Congress of Pasific Basin Societies}, Honolulu, Havai, decembro (2010) (palestra convidada). Yan Levin.
13. XV Meeting of the Brazilian Society for Cell Biology. São Paulo-SP. 24-27 de julho de 2010. Sylvia Mendes Carneiro.
14. ENZITEC 2010 IX Seminario Brasileiro de Tecnologia Enzimatica: Versatilidade e eficiencia na inovação sustentada. Local e data: Hotel Sheraton Barra – Rio de Janeiro 10 a 12 de novembo de 2010 . Participação: Palestrante convidado. Luiz Juliano.
15. 5º Simpósio Brasileiro de Quimica Medicinal. Local e data: Ouro Preto em 6 a 9 de novembro de 2010. Participação: Palestrante convidado. Luiz Juliano.
16. 2 Seminários no XXXIII ENFMC realizado de 10-14 de Maio em Águas de Lindóia/SP: a) A in situ SAXS Study of Glucagon Fibrillation, Cristiano Luis Pinto de Oliveira, Jesper Søndergaard Pedersen, Daniel Otzen, Kurt Erlacher, Manja A. Behrens, Jan Skov Pedersen. b) SAXS studies of DNA self-assembled structures, Cristiano Luis Pinto Oliveira, Felicie F. Andersen, Birgitta R. Knudsen, Elizabeth Irish, Thom LaBean, Ebbe S. Andersen, Jørgen Kjems , Jan Skov Pedersen.
17. Seminário convidado na ESPCA 2011 – Escola São Paulo de Ciência Avançada sob o tema: Structural Investigations of Soft Matter, Cristiano Luis Pinto Oliveira, ESPCA 2011 – 26 de Janeiro de 2011.
18. Palestra convidada no Breaking Barriers: From Physics to Biology. International Centre for Theoretical Sciences (ICTS), Mumbai, Índia. Palestra: From Physics to Biology in our Laboratory in Brazil. 2010. (Congresso). Oscar Nassif.
19. Palestrante convidado na escola de Verão de Óptica em Concepcion Chile; I Summer School on Optics and Photonics. Curso: Optical Tweezers and Defocusing Microscopy. 2010. (Escola). Oscar Nassif.
20. Palestrante convidado no ENFMC, Lindóia, SP; XXXIII Encontro Nacional de Física da Matéria Condensada (invited lecturer). Tomography of fluctuations in red blood cells. 2010. (Encontro). Oscar Nassif.
21. Organizador e palestrante no Workshop em Natal. Workshop on Physics of Biological Membranes and Cell Shapes. International Institute of Physics, Natal, RN. Oscar Nassif.
22. Palestrante convidado no Workshop on Physics of Biological Membranes and Cell Shapes. Palestra: Cell Dynamics and Defocusing Microscopy. International Institute of Physics, Natal, RN 2010. Ubirajara Agero Batista.
23. Palestrante convidado em School on Systems Biology. Cell Dynamics and Defocusing Microscopy. 2010. International Institute of Physics, Natal, RN 2010. (Escola e workshop). Ubirajara Agero Batista.
24. V Congresso Brasileiro de Engenharia de Tecidos e Estudos das Células-Tronco-Hospital, 19 e 20 novembro de 2010. Tema: Aplicações Biomédicas da Nanotecnologia. Palestrante : Lionel Gamarra.

25. “Effect of the Liquid Environment in the Electronic Spectroscopy of Molecular Systems.”, Sylvio Canuto, 8th Workshop on Molecular Theories and Simulations, Gaeta Latina, 24 a 26 de Maio de 2010, Italia. (Palestra Convidada).
26. “Relative Free Energy Calculation in Solution: Applications in Reaction and Aggregation.”, Kaline Coutinho, 8th Workshop on Molecular Theories and Simulations, Gaeta Latina, 24 a 26 de Maio de 2010, Italia. (Palestra Convidada).
27. “Solvent Effects in Molecular Spectroscopy and Reactivity”, Sylvio Canuto, Löwdin Lectures. 50 year of the Department of Quantum Chemistry, Uppsala University, Uppsala, Sweden 30 de setembro a 1 de outubro, 2010. (Palestra Convidada).
28. “Monte Carlo Method Applied in Simulations of Molecular Systems”, Kaline Coutinho, no CMSBS Montevideo/Uruguai, 03/03/2010. (Palestra Convidada).
29. “Monte Carlo Simulations of Aggregations and Reactions in Solution and Use of S-QM/MM to Study Electronic Properties in Solution”, Kaline Coutinho, no CMSBS Montevideo/Uruguai, 04/03/2010. (Palestra Convidada).
30. “Espectrocopia Molecular: Teoria, Experimentos e Simulação Computacional.”, Sylvio Canuto, I Workshop de Estrutura Eletrônica, Departamento de Física, UFAM, Manaus, 5 a 9 de julho de 2010. (Palestra Convidada)
31. “Física molecular e química quântica em perspectiva: avaliação dos últimos 25 anos e análise de algumas perspectivas.”, Sylvio Canuto, XII Escola Brasileira de Estrutura Eletrônica, EBEE, Brasília, 18 a 22 de julho de 2010. (Palestra Plenária Convidada).
32. “Aspectos Teóricos e Aplicações da Modelagem Molecular”, Sylvio Canuto, V Escola de Modelagem Molecular em Sistemas Biológicos, Petrópolis, 23 a 27 de agosto de 2010. (Palestra de Abertura Convidada).
33. “Aspectos Teóricos e Aplicações da Modelagem Molecular”, Sylvio Canuto, V Escola de Modelagem Molecular em Sistemas Biológicos, Petrópolis, 23 a 27 de agosto de 2010. (Palestra de Abertura Convidada).
34. “Solvent Effects in Molecular Spectroscopy and Reactivity”. Sylvio Canuto. 500 Congresso Brasileiro de Química, Cuiabá, 10 a 14 de outubro de 2010. Evento da Associação Brasileira de Química. (Palestra Plenária Convidada)
35. “Simulação Computacional de Líquidos e Efeitos do Meio em Espectroscopia Molecular”. Sylvio Canuto, III Simpósio de Estrutura Eletrônica e Dinâmica Molecular, Brasília, 13 a 17 de outubro de 2010. (Palestra Plenária Convidada)
36. “Homenageado pela ocasião dos 60 anos e pelo pioneirismo na área. Agradecimento pelo workshop dedicado “à sua liderança e pioneirismo na área de física molecular e química quântica” e a criação do prêmio “Sylvio Canuto” para os melhores trabalhos”. III SEEDMOL, Brasília DF. (Palestra Convidada)
37. “Delocalização eletrônica e efeitos na interação intermolecular de sistemas líquidos”. Sylvio Canuto, XXVIII Encontro de Físicos do Norte Nordeste, Teresina, PI, 9 a 11 de outubro de 2010. (Palestra Convidada)
38. “Intimidade molecular: das cores à fotossíntese”, Sylvio Canuto, Colóquio no âmbito do projeto “Convite à Física”, Instituto de Física da USP, 01/09/2010. (Palestra Convidada).

39. “Indistinguibilidade dos elétrons e efeitos na interação intermolecular de líquidos”, Sylvio Canuto, Colóquio no Instituto de Física da USP, 18/11/2010. (Palestra Convidada).
40. “Estudos Teóricos de Espectroscopia Eletrônica em Solução: Efeitos de Polarização e Estabilidade Conformacional Diferencial de Moléculas de Interesse Biológico”, Kaline Coutinho, no VIII WFME, Curitiba/UFPA, em 24/11/2010. (Palestra Convidada).
41. “QM/MM Hybrid Method Used in the Study of Solvent Effects in Molecular Properties and Reactive Processes”, Kaline Coutinho, no XXXVIII ENFMC, Água de Lindóia, 13/05/2010. (Palestra Convidada).
42. "Modelagem Molecular: aplicações, em moléculas de interesse biológico", Kaline Coutinho, Curso de Verão, no IFUSP, em 04/02/2010. (Palestra Convidada).

Participation in scientific meetings

1. XI Meeting on Recent Advances in Physics of Fluids and its Applications, FLUIDS 2010, Colonia del Sacramento, Uruguay, from November 3 to 5, 2010, 12th International Conference on Magnetic Fluids. 2010.
2. Nonlinear Optics and Spectroscopy of the annual workshop LPHYS'10 (held in 2010 in Foz do Iguaçu, Brazil, July 5-9, 2010)
3. 2011 SPIE Photonics West "Emerging Liquid Crystal Technologies VI", held on Jan. 22-27, 2011, in San Francisco, CA, USA.
4. International Workshop on Complex Physical Phenomena in Materials, Recife-PE, Brazil December 14-17 2010.
5. 12th International Conference on Magnetic Fluids, August 1 - 5, 2010 Sendai, Japan.
6. 23rd International Liquid Crystal Conference, 11-16 July 2010, Kraków, Poland.
7. Dynamics Days Asia Pacific 6 in Sydney, on Glassy Dynamics, DDAP6, Sidnei, Australia, Julho de 2010.
8. Enrico Fermi School on Complex Systems , Varenna, Itália, Junho de 2010.
9. International Conference on Nutrigenomics / 10º International Conference on Mechanisms of Antimutagenesis and Anticarcinogenics, 2010.
10. XXVIIIth International Congress of the International Academy of Pathology. 2010.
11. INCON/ICMAA 2010, September 26-29, Guarujá, Brazil.
12. Workshop de Aterosclerose e Biologia Vascular. Departamento de Aterosclerose – Sociedade Brasileira de Cardiologia. 2010.
13. Internation Paricle Accelerator Conference, IPAC2010, Kyoto, Japão, maio 2010.
14. Soft Matter Conference ISMC2010, Granada, Espanha, julho 2010.
15. Workshop on Physics of Biological Membranes and Cell Shapes, Natal, Brasil, dezembro 2010.
16. The International Congress of Pasific Basin Societies, Honolulu, Havai, dezembro (2010).

17. 63rd annual meeting of the division of fluid dynamics of the American Physical Society, Novembro 2010, Long Beach, USA.
18. World Congress on Emulsion 2010, Lyon, França, no período 12-14 outubro 2010.
19. Workshop de Física Teórica, CBPF_TEO, Rio de Janeiro, RJ, Setembro de 2010.
20. Statistical Physics of Non-Equilibrium and Disordered Systems 2010, Nancy, França, Maio de 2010.
21. XXXIII Encontro Nacional de Física da Matéria Condensada, 2010, Águas de Lindóia.
22. 10th International Conference on Non Crystalline Solids, Barcelona, Spain, 21-23 April 2010.
23. 2011 March Meeting of the American Physical Society (APS), Dallas, Texas, USA, 21-25 March 2011.
24. 4º Simpósio "Avanços em Pesquisa Médica dos Laboratórios de Investigação Médica do HCFMUSP, 2010, São Paulo.
25. Gordon Research Conference on Bioelectrochemistry. Biddeford, EUA. Electroporation of model lipid membranes containing charged lipids.
26. 3rd International Workshop on Spectroscopy for Biology. Maresias, SP.
27. 467th WE-Heraeus Seminar: Biophysics of membrane transformations. Bad Honef, Alemanha.
28. Physics of Biological Membranes and Cell Shapes. Natal, RN.
29. ACC.10/i2 Summit 10, 2010, Atlanta.
30. World Congress of Cardiology 2010, 2010, Beijing, China.
31. The 78th Congress of the European Atherosclerosis Society, 2010, Hamburg.
32. XV Meeting of the Brazilian Society for Cell Biology. São Paulo-SP. 24-27 de julho de 2010.
33. 17th International Microscopy Congress. Rio de Janeiro, RJ, 19 a 24 de setembro de 2010.
34. XI Congresso da Sociedade Brasileira de Toxinologia – Toxinas naturais: Conhecimento atual e novos desafios. Araxá-MG, 25 novembro de 2010.
35. XXV Reunião Anual da Federação de Sociedades de Biologia Experimental – FeSBE. Águas de Lindóia-SP 25 a 28 de agosto de 2010.
36. XII Reunião Científica Anual do Instituto Butantan. Biotecnologia e Inovação em Saúde Pública. São Paulo-SP 01 a 03 de dezembro de 2010.
37. 5th Brazilian Symposium on Medicinal Chemistry – BrazMedChem2010, Ouro Preto (MG).
38. 1er Simposio Latinoamericano de Nanomedicinas, Buenos Aires, Argentina.
39. AACR 101st Annual Meeting 2010, Washington, Estados Unidos.
40. Noveno Congreso Latinoamericano de Sociedades de Estadística – IX CLATSE, : 19 a 22 de outubro de 2010. Viña Del Mar – Chile.
41. XXV International Biometric Conference – IBC 2010, 05 a 10 de dezembro de 2010, Centro de Eventos e Cultura da UFSC, Florianópolis – Santa Catarina.
42. 19º. Simpósio Nacional de Probabilidade e Estatística - SINAPE 2010, 26 a 30 de julho de 2010, São Pedro – São Paulo.

43. 55a. Reunião Anual da Região Brasileira da Sociedade Internacional de Biometria (RBras) - em conjunto com a IBC-2010, 8 de dezembro de 2010. Centro de Eventos e Cultura da UFSC, Florianópolis – Santa Catarina.
44. ENZITEC 2010 IX Seminario Brasileiro de Tecnologia Enzimatica: Versatilidade e eficiencia na inovação sustentada. Local e data: Hotel Sheraton Barra – Rio de Janeiro 10 a 12 de novembo de 2010.
45. 5º Simpósio Brasileiro de Quimica Medicinal. Local e data: Ouro Preto em 6 a 9 de novembro de 2010.
46. V Congresso Brasileiro de Engenharia de Tecidos e Estudos das Células-Tronco-Hospital, 19 e 20 novembro de 2010.
47. XI Congresso da Sociedade Brasileira de Toxinologia – Toxinas naturais: Conhecimento atual e novos desafios. Araxá-MG, 25 novembro de 2010.
48. 9th International Conference on New Trends in Immunosuppression & Immunotherapy, Geneva, 2010.
49. XLVII ERA-EDTA Congress - XLVII European Renal Association - European Dialysis and Transplant Association Congress, Munich, 2010.
50. American Transplant Congress, San Diego, 2010.
51. International Immunology, Kobe, 2010.
52. World Immune Regulation Meeting IV, Davos, Switzerland, 2010.
53. XXV Congresso Brasileiro de Nefrologia, Vitória, 2010.
54. XXXV Congress of the Brazilian Society for Immunology, Porto Alegre, 2010.
55. V Congresso Brasileiro de Células-Tronco eTerapia Celular, Gramado, 2010.
56. 42º Congresso Brasileiro de Farmacologia e Terapêutica Experimental, Ribeirão Preto, 2010.
57. 8th Workshop on Molecular Theories and Simulations, Gaeta Latina, 24 a 26 de Maio de 2010, Italia.
58. Löwdin Lectures. 50 year of the Department of Quantum Chemistry, Uppsala University, Uppsala, Sweden 30 de setembro a 1 de outubro, 2010.
59. I Workshop de Estrutura Eletrônica, Departamento de Física, UFAM, Manaus, 5 a 9 de julho de 2010.
60. 500 Congresso Brasileiro de Química, Cuiabá, 10 a 14 de outubro de 2010.
61. XXVIII Encontro de Físicos do Norte Nordeste, Teresina, PI, 9 a 11 de outubro de 2010.
62. "The 11th Experimental Chaos and Complexity Conference" Lille, França de 1 a 4 de junho de 2010.
63. 28th International Congress of the International Academy of Pathology 2010.
64. 15th Congresso f the European Hematology Association, June 10-13, 2010, Barcelona.
65. XIV Congresso da Sociedade Brasileira de Transplante de Medula Óssea. Rio de Janeiro, 2010.
66. Congresso Brasileiro de Hematologia e Hemoterapia 2010.
67. 39th Annual Scientific Meeting of the Society for Hematology and Stem Cells, 2010, Melbourne.

68. 56º Congresso Brasileiro de Genética, Guarujá, 2010.
69. XXXIII World Congress of the International Society of Hematology, Jerusalem, 2010.
70. 45th Annual Meeting of the American Society of Clinical Oncology, 2010, Orlando, FL.
71. IADR/AADR/CADR 89th General Session and Exhibition (March 16-19, 2011), San Diego. 2011.
72. 27 SBPQO, 2010, Águas de Lindóia.
73. Sir Michael Berry Symposium – Mexico. Março, 2010.

Formation of human resources (completed works)

Post-doctors

1. Aline Lopes Balladares, "Influência das Anomalias da Água em Soluções de Anfifílicas", colaboração a nível de Pós-Doutorado do CNPq, março a julho de 2010. Supervisor: W. Figueiredo.
2. Edgar Saucedo Casas. UFMG. Supervisor: U. Agero.

Doctors

1. Cleidilane de Oliveira Sena. Propriedades magneto-ópticas, mecânicas e não-lineares de elastômeros. Início: 2007. Doutorado em Física. Instituto de Física da USP, Conselho Nacional de Desenvolvimento Científico e Tecnológico. Orientador A.M. Figueiredo Neto.
2. Sílvia Cristina Ramos – concluída em dezembro de 2010. Orientadora: Prof. Dra. Maria Cristina Izar.
3. Marcelo Freitas de Andrade: "Comportamento Crítico de um Modelo de Reações entre Monômeros com Múltiplas Configurações Absorventes", Departamento de Física da UFSC, Tese de Doutorado, CNPq, apresentada em julho de 2010. Orientador: W. Figueiredo.
4. Antonio Weizenmann: "Acoplamento Dipolar entre Partículas Ferromagnéticas" , Departamento de Física da UFSC, Tese de doutorado, CNPq, apresentada em dezembro de 2010. Orientador: W. Figueiredo.
5. Marcelo Resende Thielo, "Diagrama de Fases e Anomalia na Densidade em Modelo de Gás de Rede Associativo", 23/02/2010. Orientação: Marcia C. B. Barbosa.
6. Marcia Szortyka, "Estudo das Propriedades Dinâmicas e Termodinâmicas em Sistemas Tipo Água". 23/03/2010. Orientação: Profa. Dra. Marcia Cristina Bernardes Barbosa.
7. Ana Paula Fernandes Bertocchi. Projeto: Transplante renal com doadores falecidos com critérios expandidos: análise histológica pré-implantação e correlação com evolução

clínica. Programa de Pós-Graduação em Nefrologia, Universidade Federal de São Paulo. Bolsa: CNPQ. Homologada em 02/2011. Orientador: Niels Camara.

8. Cíntia C. de Vequi Suplicy, doutorado no IFUSP, FAPESP, 09/2010 co-orientadora: Kaline Coutinho.
9. Rafael Carvalho Barreto, doutorado no IFUSP, FAPESP, 12/2010, orientador: Sylvio Canuto.
10. Vinicius Manzoni Vieira, de doutorado na UFAL, CNPq, 05/2010, co-orientador: Sylvio Canuto.
11. Felipe de Lara Janz. Características de expansão, diferenciação e criopreservação de células-tronco mesenquimais obtidas do líquido amniótico no segundo trimestre de gestação. FM-USP. Orientador: S. Bydlowski.
12. Andréa Turbuck Celestino. Modulação do fenótipo de resistência a múltiplas drogas por lipoproteínas em células de sarcoma uterino resistente à doxorrubicina. FM-USP. Orientador: S. Bydlowski.
13. Kleber Yamaguti, UEL, Paraná. Orientador: M.S. Filho

Masters

1. Marina Berardi. Análogos fluorescentes de agentes anti-parasitários: interações com agregados anfifílicos. Mestrado em Física Aplicada a Medicina e Biologia - FFCLRP USP. Dissertação defendida em 26/08/2010. Orientador: A. Ito.
2. Vinicius Mariani Lenart. UEPG. Orientador: S. Gomez. (2010).
3. Luciane Teixeira dos Santos. Orientadora: L.C. Courrol.
4. Andreia Grasso Nastri. Orientadora: L.C. Courrol.
5. Ana Paula Alves. UFMG. 2011. Orientador: U. Agero.
6. Keyde Cristina Martins de Melo – Programa de Pós-Graduação Inter unidades em Biotecnologia (USP, IBu, IPT) – data da conclusão 2 de fevereiro 2011. Orientadora: R.C. Ruiz.
7. Reinaldo Correia Da Silva. Título: Estudo funcional da ativação de macrófagos alveolares em modelo experimental de inflamação alérgica pulmonar em ratos com insuficiência renal aguda. Homologada em 26/05/2010. Programa de Pós-Graduação em Nefrologia, Universidade Federal de São Paulo. Orientador: Niels Camara.
8. Jose Victor Bartol Rodrigues. IME-USP. Orientadora: Viviana Giampaoli.
9. Rafael Rocha da Silva. Título da Dissertação: Modos ressonantes em filmes de cristais líquidos colestíricos contendo deformações Gaussianas no Pitch. UFAL. Orientador: I.N. de Oliveira.
10. Ana Paula Perdigão Praxedes. Título: Dinâmica de umidecimento de fluidos em filmes de quitosana dopada com dansilas. UFAL. Orientador: I.N. de Oliveira.
11. Lucas Modesto da Costa, mestrado no IFUSP, FAPESP, 03/2010, orientador: Sylvio Canuto.

12. Carlos Eduardo Bistafa, mestrado no IFUSP, FAPESP, 02/2011, orientador: Sylvio Canuto.
13. Natália Mastatuono Nascimento. Atividade enzimática de ADAMTS-13 e padrão de fragmentação do fator de von Willebrand em crianças hipoxêmicas portadoras de cardiopatias congênitas. FM-USP. Orientador: S. Bydlowski.
14. Juliana Rodrigues de Oliveira (Estudante de Mestrado - CNPq) Estudos cinéticos com a calicreína tecidual 2 humana, hKLK2 . Defendida em junho de 2010. EPM-UNIFESP. Orientadora: M.A. Juliano.
15. Tabata de Mello Tera. Imunolocalização dos marcadores de formação e reabsorção óssea em ROG em ratas ovariectamizadas/osteopenia induzida. 2010. Dissertação (Mestrado em Biopatologia Bucal) - Universidade Estadual Paulista Júlio de Mesquita Filho, Coordenação de Aperfeiçoamento de Pessoal de Nível Superior. Orientador: Maria Aparecida Neves Jardini.
16. Gilvan de Paula Leonardo. "Validação de Método Bioanalítico, Farmacocinética e Biodistribuição do HB1 em Camundongos". Mar 2010. Dissertação (Mestrado em Farmácia) - Universidade Bandeirante de São Paulo. Orientador: Claudete Justina Valduga.
17. Jose Jardes da Gama Bitencourt. "Desenvolvimento de formulação para uso oral contendo os fármacos miltefosine e itraconazol para tratamento da leishmaniose". Fev 2011. Dissertação (Mestrado em Farmácia) - Universidade Bandeirante de São Paulo. Orientador: Claudete Justina Valduga.
18. Maurício Nonato Capucim, UEL, Paraná. Orientador: M.S. Filho.
19. Cassio Alves. IFUSP. Orientadora: E.A. de Oliveira.

Initiation to science (undergraduates)

1. Henrique dos Reis Miguel. Hipertermia com colóides magnéticos aplicada à desobstrução de artérias. Início: 2009. Iniciação científica (Graduando em Física) - Instituto de Física da USP. Orientador Orientador A.M. Figueiredo Neto.
2. Letícia Bonfim. Estudo de peroxidação lipídica de pacientes hipertensos e hipercolesterolemicos. Início: 2009. Iniciação científica (Graduando em Física) - Instituto de Física da USP, Conselho Nacional de Desenvolvimento Científico e Tecnológico. Orientador A.M. Figueiredo Neto.
3. Tamires de Araújo Mora. Estudo de peroxidação lipídica de pacientes tabagistas e diabéticos. Início: 2009. Iniciação científica (Graduando em Física) - Instituto de Física da USP, Conselho Nacional de Desenvolvimento Científico e Tecnológico. Orientador A.M. Figueiredo Neto.
4. Leandro Passos de Figueiredo " Transporte de Prótons em Membranas Poliméricas – Um Estudo via Simulações Numéricas" , Iniciação Científica do CNPq, agosto de 2009 a julho de 2010.
5. Ewandson Luiz Lameu. UEPG. Orientador: S. Gomez. (2010).

6. Keilla Nazima. Orientadora: L.C. Courrol.
7. Camila Nabeshima. Orientadora: L.C. Courrol.
8. Lívia Maria Corrêa Finalização fevereiro de 2011. Orientadora: R.C. Ruiz.
9. Daniel Cressoni Christo Finalização fevereiro de 2011. Orientadora: R.C. Ruiz.
10. Leonardo Mano Vieira. Trabalho de Conclusão de Curso: "Estudo do potencial imunomodulador de células-tronco derivadas do tecido adiposo no modelo de diabetes auto-imune experimental induzido por estreptozotocina". Ciências Biológicas - Universidade de Santo Amaro. 07/2010. Orientador: Niels Camara.
11. Bruna Buscariollo. Trabalho de Conclusão de Curso: "Efeito de sub-produtos da ação da heme oxigenase-1 na glomeruloesclerose segmentar e focal experimental em camundongos". (Graduação em Ciências Biomédicas) - Universidade Federal de São Paulo. 12/2010. Orientador: Niels Camara.
12. Ricardo Fonseca da Rocha. EACH-USP. Orientador: A. Tufaile.
13. Ana Sara Marques – Bolsa de Iniciação Científica/UNIBAN. Universidade Bandeirante de São Paulo. Orientador: Claudete Justina Valduga.
14. Bruno Correia Guerrieri – Bolsa de Iniciação Científica/UNIBAN Universidade Bandeirante de São Paulo. Orientador: Claudete Justina Valduga.
15. Maria Aparecida dos Santos – Bolsa de Iniciação Científica/FAPESP – Proc. Nº 2009/17077-0. Universidade Bandeirante de São Paulo. Orientador: Claudete Justina Valduga.
16. Wendy Karen Mendes – Bolsa de Iniciação Científica/UNIBAN, Universidade Bandeirante de São Paulo. Orientador: Claudete Justina Valduga.
17. Adamor Luz Eleiel Virgino (IFUSP) e Gilberto Sussumu Hida (IME). Programa Aprender com Cultura da Pró-Reitoria de Cultura e Extensão da USP. Projeto "Da pesquisa contemporânea ao Ensino Médio: Uma Perspectiva Multidisciplinar focalizando Fluidos Complexos" - encerrado em 31/07/2010. Orientadora: L.Q. Amaral.
18. Genival Santos Almeida (quarto ano IFUSP) e Wellington Vinicius Zorzetti (segundo ano IFUSP). Programa Ensinar com Pesquisa da Pró-Reitoria de Graduação da USP, Projeto "Adequação do conteúdo dado em Termodinâmica ao estudo de diversos tipos de materiais" - encerrado em 28/02/2011. Orientadora: L.Q. Amaral.

Formation of human resources (ongoing work)

Post-doctors

1. Tatiana Helfenstein. Efeito do ferrofluido na aterotrombose. Início: 2010. Instituto de Física da Usp, Fundação de Amparo à Pesquisa do Estado de São Paulo. A.M. Figueiredo Neto.

2. Andréa M. Monteiro. Início: 2010. Instituto de Física da Usp, Fundação de Amparo à Pesquisa do Estado de São Paulo. A.M. Figueiredo Neto.
3. Evandro Freire Silva (FAPESP); IFUSP; Supervisor: Mário J. de Oliveira.
4. José Ricardo G. Mendonça (CNPq); IFUSP; Supervisor: Mário J. de Oliveira
5. Marcelo Freitas de Andrade: "Transições de fases fora do equilíbrio", colaboração a nível de Pós-Doutorado, Programa PNPD da Capes, Início, fevereiro de 2011. Supervisor: W. Figueiredo.
6. Maurício Ferreira Marcondes Machado Nível: Pós-Doutorado Projeto: Obtenção e caracterização das metacaspasses. Importância destas enzimas na morte celular Bolsa: FAPESP Ínicio 01/01/2009. Supervisor: L. Juliano.
7. Mario Augusto Izidoro: Desenvolvimento de inibidores para enzimas proteolíticas derivados de compostos orgânicos de telúrio e de nitrolefinas. Bolsa FAPESP, inicio maio/2009. Supervisor: L. Juliano.
8. Iuri Estrada Gouvêa Nível: Pós-Doutorado Projeto: "Estudo do mecanismo de enzimas proteolíticas via Inventário de Prótons e desenvolvimento de inibidores" Bolsa: FAPESP Ínicio: 09/10/07. Supervisor: L. Juliano.
9. Thaysa Paschoalin: Identificação dos moduladores proteolíticos e peptídicos da angiogênese no melanoma murino B16F10-Nex2 e possível relevância na evolução tumoral Inicio maio/2006. Supervisor: L. Juliano.
10. Javier Bustamante Mamani. Supervisor: L. Gamarra.
11. André Cesar da Silva. Supervisor: L. Gamarra.
12. Tatiana Tais Sibov. Supervisor: L. Gamarra.
13. Lorena F. Pavon. Supervisor: L. Gamarra.
14. Leandro Gustavo De Oliveira. Projeto: Células T Reguladoras na Pré-Eclâmpsia. 2008-2011. Universidade de São Paulo. Bolsa FAPESP (No Processo: 2008/57966-6). Supervisor: Niels Camara.
15. Ednilsom Orestes, pós-doutorado, CNPq, supervisor: Sylvio Canuto.
16. Paula Jaramillo, pós-doutorado, FAPESP, supervisor: Sylvio Canuto.
17. Daniel Luiz Silva, pós-doutorado, FAPESP, supervisor: Sylvio Canuto.
18. Cíntia C. de Vequi Suplicy, pós-doutorado, FAPESP, supervisora: Kaline Coutinho.
19. Jorge Alexandre Nogueira: (Pos doutorado - FAPESP) Estudo de especificidade e desenvolvimento de inibidores para as calicreínas teciduais humanas hKLK1, hKLK5, hKLK6 e hKLK7. EPM-UNIFESP. Orientadora: M.A. Juliano.
20. Eduardo Fontes Henriques. IFUSP. Supervisor: S. Salinas.
21. Fernando da Silva Alves, UEL, Paraná. Supervisor: M.S. Filho.
22. Sandra Mara Domiciano, UEL, Paraná. Supervisor: M.S. Filho.

Doctors

1. Alexsander Ramos Duarte. Estudo da Impedânia da solução KCl em baixa frequência. Início: 2007. Doutoramento (Graduando em Física) - Instituto de Física da Usp, Conselho Nacional de Desenvolvimento Científico e Tecnológico. Orientador A.M. Figueiredo Neto.
1. Priscila Ribeiro dos Santos. Características ópticas não lineares de lipoproteínas humanas. Início: 2009. Doutorado em Física. Instituto de Física da USP, Conselho Nacional de Desenvolvimento Científico e Tecnológico. Orientador A.M. Figueiredo Neto.
2. Celso Luiz Sigoli Risi. 2011. Estudo da dinâmica do diretor em materiais celulósicos líquido cristalinos por meio do espalhamento dinâmico de luz. IFUSP. A.M. Figueiredo Neto.
3. Claudine Feio – Orientador: Prof. Dr. Francisco A H Fonseca.
4. Carolina Nunes França – Orientador: Prof. Dr. Francisco A H Fonseca.
5. Henrique Tria Bianco – Orientador: Prof. Dr. Francisco A H Fonseca.
6. Carlos Eduardo Ferreira dos Santos – Orientador: Prof. Dr. Francisco A H Fonseca.
7. Luiz Fernando Muniz Pinheiro – Orientador: Prof. Dr. Francisco A H Fonseca.
8. Flávio Tocci Moreira – conclusão prevista para setembro de 2011. Orientador: Prof. Dr. Francisco A H Fonseca.
9. Thiago Escobar Colla, IF-UFRGS. Orientador: Yan Levin.
10. Tarcísio Nunes Teles, IF-UFRGS. Orientador: Yan Levin.
11. Alexandre P. dos Santos, IF-UFRGS. Orientador: Yan Levin.
12. Áttila L. Rodrigues (desde 2009, Capes); IFUSP; orientadora: Tânia Tomé
13. David R. de Souza (desde 2009, CNPq); IFUSP; orientadora: Tânia Tomé
14. Sérgio Leandro Espíndola Preza - Fármacos e sondas fluorescentes: estudos espectroscópicos e simulações computacionais. Doutorado em Física Aplicada a Medicina e Biologia - FFCLRP USP (bolsa CAPES). Início: julho de 2009. Orientador: A. Ito.
15. Marina Berardi - Propriedades estruturais de membranas modelo em interação com compostos com ação anti-Leishmania. Doutorado em Física Aplicada a Medicina e Biologia - FFCLRP USP. Bolsa FAPESP. Início: setembro de 2010. Orientador: A. Ito.
16. Douglas de Andrade Nível: doutorado Projeto: Estudo bioquímico da calicreína 13 humana Bolsa: CNPq Ínicio: 09/2008. Orientador: L. Juliano.
17. Márcia Yuri Kondo Nível: doutorado Projeto de Doutorado: Estudo das peptidases CLN2p/TPPI e scytalidoglutamico peptidase B (SCP-B) bolsa CNPq Ínicio: 04/2008. Orientador: L. Juliano.
18. Élide Escolástico Caroselli Nível: Doutorado Projeto "Efeito de compras orgânicos de telúrio em tripanossomatídeos e em modelos esperimentais de doenças relacionadas: uma abordagem multidisciplinar" Bolsa: CNPq Inicio:012/12/2007. Orientador: L. Juliano.
19. Debora Okamoto Nível: doutorado Projeto: Proteases em microorganismos halofilicos Bolsa CNPq Inicio maio/2008. Orientador: L. Juliano.
20. Cassio Alves. Tema: Simulação e modelagem computacional de dados de espalhamento a baixos ângulos, enfoque em estruturas de alta simetria. Início: 2011. Bolsa: Capes. Orientador: C.L.P. de Oliveira.

21. Vinicius Mariani Lenart. UEPG. Orientador: S. Gomez.
22. Flávia Rodfrigues de Oliveira Silva. Orientadora: L.C. Courrol.
23. Letícia Sicchieri Bonfante. Orientadora: L.C. Courrol.
24. Lívia Siman Gomes. UFMG. Orientador: U. Agero.
25. Ulisses Moreira Silveira Andrade. UFMG. Orientador: U. Agero.
26. Paula Magda Roma. UFMG. Orientador: U. Agero.
27. Roberta Viana Ferreira. Orientador: L. Gamarra.
28. Keyde Cristina Martins de Melo. Orientadora: R.C. Ruiz.
29. Sérgio Henrique Albuquerque Lira. UFPE. Orientador: J.A. de Miranda.
30. Eduardo Olímpio Ribeiro Dias. Orientador: J.A. de Miranda.
31. Freddy Hernandez Barajas. IME-USP. Orientadora: Viviana Giampaoli.
32. Karin Ayumi Tamura. IME-USP. Orientadora: Viviana Giampaoli.
33. Olga Cecilia Usuga Manco. IME-USP. Orientadora: Viviana Giampaoli.
34. Alejandra Andrea Tapia Silva. IME-USP. Orientadora: Viviana Giampaoli.
35. Rafael Rocha da Silva. Espectro de reflexão e propriedades fotônicas em sistemas multicamadas contendo cristais líquidos colestéricos. UFAL. Orientador: Italo Nunes de Oliveira.
36. Ana Paula Perdigão Praxedes. Estudo das Propriedades ópticas e termodinâmicas de polímeros biocompatíveis. UFAL. Orientador: Italo Nunes de Oliveira.
37. Rodrigo do Monte Gester, doutorado, CNPq, orientador: Sylvio Canuto.
38. Marcelo Hidalgo Cardenuto, doutorado, CNPq, orientador: Sylvio Canuto.
39. Yoelvis Orozco-González, doutorado, CNPq, orientador: Sylvio Canuto.
40. Lucas Modesto da Costa, doutorado, CNPq, orientador: Sylvio Canuto.
41. Carlos Eduardo Bistafa, doutorado, FAPESP, orientador: Sylvio Canuto.
42. Marcus Vinícius Araújo Damasceno, doutorado, FAPESP, orientadora: Kaline Coutinho.
43. Antonio Rodrigues da Cunha, doutorado, CNPq, orientadora: Kaline Coutinho
44. Evanildo Gomes Lacerda Júnior, doutorado, CNPq, orientadora: Kaline Coutinho
45. Elíseo Joji Sekiya. Avaliação de Produtos Celulares Implantáveis para tratamento de Lesão da Medula Espinhal em ratos Wistar FM-USP. Orientador: S. Bydlowski.
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50. Bruno Pontes. UFRJ. Orientador: H.M. Nussenzveig.

51. Rafael Dutra. UFRJ. Orientador: H.M. Nussenzveig.
52. Eduardo do Carmo (Fapesp). IFUSP. Orientador: S. Salinas.
53. Paula Fernanda Bienzobaz (CAPES). IFUSP. Orientador: S. Salinas.
54. Danilo Liarte (CNPq, S. Salinas em co-orientação com Carlos S. O. Yokoi). IFUSP.
55. David Simeão, UEL, Paraná. Orientador: M.S. Filho.
56. Andrezza Steudel, UEL, Paraná. Orientador: M.S. Filho.
57. Rafael Cobo, UEL, Paraná. Orientador: M.S. Filho.
58. Ricardo Gobato, UEL, Paraná. Orientador: M.S. Filho.
59. Emerson Teixeira da Silva. IFUSP. Orientadora: E.A. de Oliveira.

Masters

1. Soraia Hani Kasmas – Orientador: Prof. Dr. Francisco A H Fonseca
2. Daniela Melo Tegani – Orientadora: Prof. Dra. Maria Cristina Izar
3. Valéria Arruda Machado – Orientadora: Prof. Dra. Maria Cristina Izar
4. Celma Muniz Martins – Orientadora: Prof. Dra. Maria Cristina Izar
5. Henrique Andrade da Fonseca – Orientadora: Prof. Dra. Maria Cristina Izar
6. Simone Pinto de Melo Barbosa – Orientadora: Prof. Dra. Maria Cristina Izar
7. Lívia Lins – Orientadora: Prof. Dra. Maria Cristina Izar
8. Luciano Monteiro – Orientador: Prof. Dr. Francisco A H Fonseca
9. Célia Bittencourt – Orientador: Prof. Dr. Francisco A H Fonseca
10. Franco Valduga de Almeida Camargo. Orientador: Yan Levin.
11. Fernanda Benetti. Orientador: Yan Levin.
12. Fabíola Keesen Ferreira, Mestrado em Ecologia de Biomas Tropicais, Universidade Federal de Ouro Preto; Orientador: Everaldo Arashiro.
13. Oscar Alberto Barbosa Bohorquez (Capes); IFUSP; Orientadora: Tânia Tomé
14. Rodrigo Garcia; IFUSP: Orientador: Mário J. de Oliveira
15. José Higino Damasceno Júnior (desde 2008); IFUSP: Orientadora: Tânia Tomé.
16. Rodrigo Maia Cardozo: "Transições de fases irreversíveis em um modelo de reações competitivas" Mestrado, CAPES, Inicio, agosto 2010. Orientador: W. Figueiredo.
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20. Pedro Leonidas Oseliero Filho. Tema: Estudo estrutural de Sistemas auto organizados: Micelas em solução. Início: 2011. Bolsa: CNPq. Orientador: C.L.P. de Oliveira.

21. Pedro Juvencio de Souza Junior. Propriedades ópticas não-lineares de filmes esméticos dopados com azo-corantes. UFAL. Orientador: Italo Nunes de Oliveira.
22. Fernando da Silva, mestrado, FAPESP, orientador: Sylvio Canuto.
23. Carla Rosa Teixeira de Godoy. Quantificação de Células Endoteliais Circulantes em Portadores de Leucemia Mielóide Crônica por Citometria de Fluxo. FM-USP. Orientadora: J. Pereira.
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25. Gisele Rodrigues Gouveia. Detecção da expressão dos genes associados à resistência múltipla à droga, Oct-1 e MDR-1 e do gene bcl-2 em Linfoma Difuso de Grandes Células B. FM-USP. Orientadora: J. Pereira.
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27. Karolline Santana da Silva. Estudo dos polimorfismos dos genes das paraoxonases 1 e 2 em pacientes com linfoma não-Hodgkin. Orientador: S. Bydlowski.
28. Viviane Dias Faustino. RNAi em terapia gênica. FM-USP. Orientador: S. Bydlowski.
29. Pamela Oliveira de Souza. Polimorfismos de enzimas de fase 1 e 2 do metabolismo de drogas em pacientes portadores de linfoma não-Hodgkin. FM-USP. Orientador: S. Bydlowski.
30. Thiago Carlos Bertilin (Estudante de Mestrado - CNPq) Estudos Bioquímicos hKLK 7. EPM-UNIFESP. Orientadora: M.A. Juliano.
31. Vinicius Otavio da Silva (Estudante de Mestrado) Desenho e síntese de bibliotecas de substratos FRET para enzimas proteolíticas. EPM-UNIFESP. Orientadora: M.A. Juliano.
32. Augusto Cesar de Andrade Meyer. Enxerto ósseo autógeno em ratos diabéticos: Análise Histomorfométrica. Início: 2010. Dissertação (Mestrado em Pós-Graduação em Biopatologia Bucal) - Faculdade de Odontologia do Campus de São José dos Campos - UNESP. (Orientadora: M.A. Jardini).
33. Ítalo Adelk. UNIBAN, Universidade Bandeirante de São Paulo. Orientador: Claudete Justina Valduga.
34. Oseraldo Vieira Rocha. UNIBAN, Universidade Bandeirante de São Paulo. Orientador: Claudete Justina Valduga.
35. Maria Aparecida dos Santos. UNIBAN, Universidade Bandeirante de São Paulo. Orientador: Claudete Justina Valduga.
36. Alessandra Fagioli. UNIBAN, Universidade Bandeirante de São Paulo. Orientador: Claudete Justina Valduga.
37. André Bolbardi, UEL, Paraná. Orientador: M.S. Filho.
38. Ricardo alexandre Amaral, UEL, Paraná. Orientador: M.S. Filho.
39. Bárbara Gerbelli. IFUSP. Orientadora: E.A. de Oliveira.

Initiation to science (undergraduates)

1. Luiz Henrique da Silva. Estudo de lipoproteínas do sangue por meio de técnicas de óptica não-linear. Início: 2008. Iniciação científica (Graduando em Física) - Instituto de Física da USP, Conselho Nacional de Desenvolvimento Científico e Tecnológico. Orientador A.M. Figueiredo Neto.
2. Tiago Gualberto Bezerra de Souza . Estudo de colóides magnéticos. IFUSP. CNPq. A.M. Figueiredo Neto.
3. Lucas Ferreira Theotonio dos Santos (2010-2011). Orientadora: Prof. Dra. Maria Cristina Izar
4. Priscilla Natalli Stachera, com bolsa PIBIT. Orientador: S. Gomez.
5. Felipe Ferreira Laskoski, com bolsa PIBIT. Orientador: S. Gomez.
6. Felipe Aguiar Severino dos Santos (desde agosto de 2010, CNPq); Orientador: Everaldo Arashiro
7. Marcia Regina Figueiredo Luzia (Fapemig); Orientador: Everaldo Arashiro
8. Larissa Rodrigues Montaldi. Substratos de proteases em membranas modelo. Início: 01 de agosto de 2010. Bolsa PIC-CNPq . Orientador: A. Ito.
9. Renata Naporano Bicev. Tema: Encapsulamento de moleculas de DNA por vesiculas multilamelares. Início: 2010. Bolsa: CNPq. Orientador: C.L.P. de Oliveira.
10. Eraldo de Salles. Tema: Detetores a gás multifilares para raios X:Caracterização e desenvolvimento. Início: 2011. Bolsa: Pedido submetido ao PIBIC2011. Orientador: C.L.P. de Oliveira.
11. Priscilla Natalli Stachera. UEPG. Orientador: S. Gomez.
12. Felipe Ferreira Laskoski. UEPG. Orientador: S. Gomez.
13. Ricardo de Almeida Matos. Orientadora: L.C. Courrol.
14. Pedro Ivo Vieira. UFMG. Orientador: U. Agero.
15. Bruno Rodrigues Gonçalves. Orientador: U. Agero.
16. Plínio Borges. Orientador: U. Agero.
17. Fabiana Rossan. Orientador: L. Gamarra.
18. Liza Miyaki. Orientador: L. Gamarra.
19. Haline Luiz Gonçalves. Orientadora: R.C. Ruiz.
20. Camila Moreira Lanzillo. Orientadora: R.C. Ruiz.
21. Luciano dos Reis Wanderley. UFPE. Orientador: J.A. de Miranda.
22. João Vitor Nogueira Fontana. UFPE. Orientador: J.A. de Miranda.
23. Francisco Melo Rocha. UFPE. Orientador: J.A. de Miranda.
24. Camila Galvão Cardoso. Condição bucal de pacientes críticos e sua correlação com pneumonia associada à ventilação mecânica. Início: 2010. Iniciação científica (Graduando em Odontologia) - Faculdade de Odontologia do Campus de São José dos Campos - UNESP, Fundação de Amparo à Pesquisa do Estado de São Paulo. (Orientadora: M.A. Jardini). Processo 2010/06736-0

25. Ana Sara Marques. UNIBAN, Universidade Bandeirante de São Paulo. Orientador: Claudete Justina Valduga.
26. Fernando Cesar, UEL, Paraná. Orientador: M.S. Filho.
27. Wyllian Ponti, UEL, Paraná. Orientador: M.S. Filho.
28. Rafael L. Rubim. IFUSP. Orientadora: E.A. de Oliveira.
29. Vivian Vieira. IFUSP. Orientadora: E.A. de Oliveira.

Patents

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   Autores: L. F. Gamarra, M. Janiszewski, L.C. Marti

Prizes

1. Prêmios de N.O. Camara.
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   17° Prêmio Cientifico Dr.Odilo Antunes de Siqueira (2º lugar), "A participação dos receptores símiles ao toll-like (TLR2 e TLR4) e da molécula adaptadora MyD88 no desenvolvimento da lesão renal aguda secundária à sepse". Associação Paulista de Medicina. Presidente Prudente, outubro de 2010.

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5. Tropical Diseases and Renal Inflammation. CAMARA, N.O.S., ELIAS, R.M., PACHECO-SILVA, A., KELLER, A., BURDMANN, E. In: Inflammation and renal diseases. 1st ed. E-book pela Bentham Science Publishers, 2011.
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(INCT-FCx) Annex II

Teaching and Extension Activities

Extension course

Coordination: Francisco Fonseca and Maria Cristina Izar

The I Course of Advanced University Extension on Dyslipidemias and Atherosclerosis was held at UNIFESP in the period 2 to 5 August 2010. The course included advances in the understanding of the physiopathology of atherosclerosis and oxidation of lipoproteins, besides present and future perspectives on the use of nanoparticles. Several members of the INCT-FCx gave lectures and the discussion was conducted by INCT-FCx students. The course was programmed by the Sector of Lipids, Atherosclerosis and Vascular Biology of the Medical School of the Federal University of São Paulo, with participation of INCT members (Niehls Olsen, Maria C. Izar, Francisco A. H. Fonseca), of the InCor from USP-SP (Raul Maranhão and Raul D Santos), of the Institute Dante Pazzanese of Cardiology (Marcelo C Bertolami), besides several post-graduated students from these institutions.

UPDating Course

Coordination: Lia Queiroz do Amaral

In the previous report we described the second edition of the UpDating Course for Teachers: “COMPLEX FLUIDS IN MIDDLE SCHOOL: properties and applications in physics, chemistry and biology”, held at IFUSP in July 2009 (team: Lia Q. Amaral, Alberto and Adriana Tufaile, Antonio M. Figueiredo Neto and Paulo Boschcov). The course did not start with Thermodynamics, as the course in 2007, but with Structure of Condensed Matter, as already defined in the text about the course, written in 2008 by the team responsible for the pilot course in 2007. The content of Thermodynamics followed, divided in two separated topics, Thermodynamics (Adriana) and Phase Transitions (Lia), and it was defined that will be separated also in the book. The chapter on Thermodynamics was re-written with a focus in the concept of entropy and spontaneous processes, and this text, from Thomás Haddad and Adriana Tufaile, was finished march 2010. In the second semester of 2009 the INCT group of Maringá proposed to give the course with a local coordinator, Dr. Paulo Ricardo Fernandes. A Project was made, together with Dr. Lia Q. Amaral, and submitted to the State University of Maringá and to the local Directory of Middle School Teaching of the State of Paraná, with the proposal of the UpDating course.

This course was effectively held in July 2010 in Maringpá. A local INCT team (Paulo Ricardo G. Fernandes and Hatsumi Mukai) was responsible for Demonstrations and also for a theoretical part, completed with two INCT members from São Paulo (L.Q.Amaral and Claudete Justina Valduga). The course program had some differences in relation to the two previous ones.

The Maringá experience was very positive and led to more defined ideas about the text that shall be transformed in a book:

- it became clear that it shall not be a book directed only to teachers of Middle School, since in the present curriculum there is no space for a multidisciplinary focus in Complex Fluids. We started therefore to work with the idea of a text of scientific divulgation, for a broader public, including teachers and students but also any person with interest in general knowledge in this multidisciplinary area. This book shall be published within the INCT project.

- we decided to include new chapters : on foams and bubbles (Alberto and Adriana Tufaile), Emulsions (Claudete Valduga) and Ferrofluids (Giancarlo E. Souza Brito). Demonstrations developed in Maringá were also added (Paulo Ricardo and Hatsumi). First drafts of these new parts are already made and will be integrated in the final text revision. The chapter on Phase Transitions is being written by Hatsumi Mukai and Lia Q. Amaral, and shall include the treatment given for chemists, since this subject in Middle School belongs to the curriculum of chemistry.

Teaching projects coordinated by Dra. Lia Q. Amaral shall also be mentioned:

- in the program “Learning with Culture”, from the pro-rectory of Culture and Extension of USP, the Project “From contemporary research to the Middle school : a Perspective focusing Complex Fluids ” received two fellowships for under graduated students in the period August 2009 / July 2010. These students made first an evaluation of the text from their viewpoint. In the second part of the year each student worked in a defined theme: “Liquid Crystal Display” for Adamor Luz Eleiel Virgino (IFUSP) and “Thermodynamics” for Gilberto Sussumu Hida (IME). This project led to very positive results, presented in a final report to USP in August 2010.

- in the program “Teaching with Research” of the pro-rectory of Graduation of USP the Project “Adaptation of the content given in Thermodynamics to the study of different types of Materials” received two fellowships for under graduated students of IFUSP in the period march 2010 to February 2011 : Genival Santos Almeida and Wellington Vinicius Zorzetti. The results were also very positive, presented in a final report to USP march 2011.

The global experience with the three editions of the UpDating course for Teachers of Middle School and the projects with students from USP led to the clear

result that the theme “thermodynamics” is the one requiring defined focus and improvement in the Middle School.

For 2011 a fourth INCT course of UpDating is being planned, in july at IFUSP, but with program complementary to the previous ones, focusing Ferrofluids, with larger participation from Alberto and Adriana Tufaile (USP East), besides participation of other members from São Paulo.

Portal of INCT-FCx

The Portal of INCT-FCx at address URL – http://fluidos.usp.br, continues to receive content on the INCT activities, continuously, aiming its divulgation and also making available the existing competence for enterprises and for students of different levels, as well as their teachers.

The Portal gives information on several INCT activities, as meetings, schools, courses, experimental facilities, teams, mission, headquarters, coordination, etc. It has a Discussion Forum and channels to receive input to professionals of enterprises, Institutions of teaching and research, and teachers of different levels. News and the Scientific Production of INCT members are also found in the Portal.

Institucional Vídeo of INCT-FCx

Following CNPq recommendation, a video was prepared, in which one of the main researches developed by INCT is presented in detail for the general public. The subject chosen by the Steering Committee is the multidisciplinary work on LDL and human cholesterol. The video can be found both on the INCT Portal and on *YouTube* through the links:

http://www.youtube.com/watch?v=UBWOWC0Y_Y0
http://www.youtube.com/watch?v=79gYp4AluO8.

Schools organized in this period

V Summer School of INCT-FCx

The Fifth Summer School on Complex Fluids was organized by INCT-FCx at IFUSP in the period 7 to 11 February 2011, under the coordination of Dr. Cristiano Luis Pinto de Oliveira, who belongs to the Complex Fluids Group of IFUSP and also member of INCT-FCx.

The School program follows :

PROGRAM

	07/02	08/02	09/02	10/02	11/02
08:30-09:30	*Opening* Sayuri	Nagila	Karin	Sergio (Luciana)	Richter
09:30-10:30	Kaline	Sayuri	Amando	Carsten	Amando
10:30-11:30	Nagila	Kaline	Sergio (Débora)	Richter	Carsten
11:30-13:30	Lunch	Lunch	Lunch	Lunch	Sérgio (Jorge)
13:30-14:30	Saiuri	Nagila	Karin	Carsten	Closing and Certificates
14:30-15:30	Kaline	Karin	Amando	Richter	
15:30-15:45	coffee break	coffee break	coffee break	coffee break	
15:45-17:05	Batista MC Gualberto T Preza SLE Silva ERT	Benardi M Bicev RN Lenart VM Rodrigues TP	Gerbelli BB Guimarães RR Oliveira BF	Ramos S Santos PR Silva AG	

During the Summer School invited speakers presented each three lectures of one hour on several subjects. The students have been asked to submit abstracts for seminar presentations and 14 seminars have been selected. At the end of each day these students presented oral seminars (20 minutes each) on their themes of IC, master and doctor programs. The speakers and titles of their mini-courses are given below:

Speakers and respective themes presented in the Summer School

Speakers	Titles
Sayuri Miyamoto	Lipids: mechanisms of oxidation, antioxidant defenses and sicknesses
Kaline Coutinho	Molecular Modeling: From quantum calculation to computing simulation
Nagila R. T. Damasceno	electronegative LDL: structural properties and functionality
Karin Riske	Properties of Lipid Bilayers
Amando Ito	Fluorescence spectroscopy : principles and applications in Molecular Biophysics
Débora Levy	Cholesterol in the modulation of expression of resistance to multiple drugs
Luciana Morganti	Paraoxonasis
Jorge Ruiz	Lipidic vectors for genic therapy
Reinhard Richter	“On Growth and Form of Ferrofluids”, “Controlling Flow in Ferrofluids” and “Soft Magnets: Thermoreversible Ferrogels”.
Carsten Svaneborg	Molecular Dynamics of Complex Fluids

Oral presentations by students

	Nome	Titulo	Instituição
1	Batista MC, et al	Determination of Avogadro number via Langmuir method for Middle School teachers in Maringá	Departamento of Physics, State University of Maringá, Maringá – PR
2	Berardi M and Ito A	Study of aggregation and interaction with phospholipid vesicles of the drug leishmanicida miltefosina and a	Laboratory of Photo biophysics, Physics Department, Faculty of Phylosophy, Sciences and

		fluorescent analog	Languages of Ribeirão Preto,USP, Ribeirão Preto, SP
3	Bicev RN et al	Study of the interaction between the biomolecule DNA and membranes of neutral lipids.	Complex Fluids Group from IFUSP.
4	Gerbelli BB,e t al	Adjustment of data of small angle X ray scattering of lamellar phases	Complex Fluids Group from IFUSP.
5	Gualberto T et al	Determination of nanoparticles hydrodynamics radius in magnetic colloids	Complex Fluids Group from IFUSP.
6	Guimarães RR et al	Influence of the methodology of counting defects and anti-defects in liquid crystals in the Digal statistics	Physics Department, State University of Maringá, Maringá – PR
7	Lenart VM et al	Study of nematic-isotropic phase transition through Z-scan	Departamento f Physics, State University of Ponta Grossa, MGS, Brazil
8	Oliveira BF et al	Inversion of the topological charge signal of semi-integer defects in nematic liquid crystals induced by an external electric Field	Departamento of Physics, Federal University of Paraíba, João Pessoa, PB, Brasil
9	Preza SLE	Structural properties and optics from Simulations of molecular dynamics	Departamento of Physics and Mathematics, FFCLRP, USP - Brasil
10	Ramos S et al.	The Role of Soluble Fiber Intake in Patients under Highly Effective Lipid-lowering Therapy	Department of Medicine, Cardiology Division, Federal University of Sao Paulo, Sao Paulo, SP, Brazil
11	Rodrigues TP et al,	Study f the electric impedance of the liquid crystal MBBA and its correlation with electrical circuits	Departamento of Physics, State University of Maringá, Maringá – PR

12	Santos PR et al	Z-Scan Measurements of Human Low Density Lipoprotein from Dyslipidemic and Athletes Donors	Institute of Physics, University of São Paulo, São Paulo, Brazil
13	Silva AG et al	Experimental investigation f phase transiions in a lyotropic liquid crystal.	Departamento of Physics, State University of Maringá, Maringá – PR
14	Teixeira da Siva ER. et al	Supramolecular Structures of Dna in lamellar phases of Zwitterionic lipids	Complex Fluids Group from IFUSP.

Two of the mini-courses were in English, presented by professors Reihard Richter (Germany) and Carsten Svaneborg (Denmark). The other mini courses were given in portughese. All minicourses were transitted in real time by TV USP, and also recorded in video to be available in the website do INCT-FCx, together with the material from the talks. This will allow that person participating or not in the course may view and access the themes presented.

Among the students participating in the School, 60% were physicists, and the rest from other fields: chemistry, biosciences, biology, medicine and nuclear technology. The inscribed students were 34% post-graduate students in master and doctorate programs.

Students as well as some invited speakers received financial support for their participation. The presence of students was controlled in the two daily periods of the School and certificates were given only to those with minimal 75% attendance to the school activities. Travel and local expenses of the foreign invited speakers were financed.

As mentioned**,** in this edition of the school the interested students were asked to candidate for 20 min oral presentations on their research theme, which also received a certificate. This procedure gave very positive results in view of the quality of the presentations and discussions.

During the period of the School the students could establish contact with researchers from different areas and international speakers, with good exchange of ideas and discussions on the subjects presented.

To sum up, we consider that these activities shall be repeated next year, with characteristics similar to those mentioned in this report.

Students participating in the Summer School (universities given in local names)

Nº	Student names	Field of Graduation	Póst-Graduation	University	City of origin
1	Adriana da Silva Melo	Biomedicine		Faculdades Metropolitanas Unidas - FMU	São Paulo/SP
2	Alexsander Ramos Duarte	Physics	Phyics (Complex Fluids)	Universidade de São Paulo - USP	São Paulo/SP
3	Allan Gonçalves da Silva	Physics		Universidade Estadual de Maringá	Maringá/SP
4	Ana David Cruz de França		Biomedicin	Universidade Federal de São Paulo - UNIFESP	São Paulo/SP
5	Andrei Sakai	Chemistry		Universidade Federal de São Paulo - UNIFESP	São Paulo/SP
6	Barbara Bianca Gerbelli	Physics		Universidade de São Paulo - USP	São Paulo/SP
7	Breno Ferraz de Oliveira		Physics	Universidade Federal da Paraíba - UFPB	João Pessoa/PB
8	Bruno Correia Guerrieri	Chemistry		Universidade Bandeirante de São Paulo - UNIBAN	São Paulo/SP
9	Celso Luiz Sigoli Risi	Physics	Materials Engineering	Universidade de São Paulo - USP	São Paulo/SP
10	Celso Oviedo da Silva Lopes		Máster in Automation	Instituto Federal de Educação, Ciência e Tecnologia de São Paulo - IFSP	São Paulo/SP
11	Cleidilane de Oliveira Sena		Physics	Universidade de São Paulo - USP	São Paulo/SP
12	Cristianne Silva			Universidade Federal do Paraná - UFPR	Curitiba/PR
13	Daniel Perez Vieira		Nuclear Technology	Instituto de Pesquisas Energéticas e Nucleares - IPEN	São Paulo/SP
14	Danielle da Costa Silva		Doctorate in chemistry	Universidade Federal do ABC - UFABC	São Paulo/SP
15	Danilo da Silva Olivier	Physics		Universidade Federal de Mato Grosso do Sul	Ribeirão Preto/SP
16	Dayany da Silva Alves Maciel	Farmacy		Universidade Bandeirante de São Paulo - UNIBAN	São Paulo/SP

17	Elayne Cristinny Tenório Silva	Engineering		Universidade Federal Rural de Garanhuns	Garanhuns/ PE
18	Emerson Rodrigo Teixeira da Silva		Doutorate in Physics	Universidade de São Paulo - USP	São Paulo/SP
19	Everton Bonturim		Nuclear Technology	Instituto de Pesquisas Energéticas e Nucleares - IPEN	São Paulo/SP
20	Fabiane Luiz Ribeiro	Pharmacy		Universidade Bandeirante de São Paulo - UNIBAN	São Paulo/SP
21	José Maria Clemente da Silva Filho	Physics		Universidade Federal de Alagoas - UFAL	Maceió/AL
22	Jozismar Rodrigues Alves	Physics		Universidade de São Paulo - USP	São Paulo/SP
23	Juan Carlo Villalba		Chemistry	Universidade Estadual do Centro-Oeste - UNICENTRO	Guarapuava -PR
24	Juliana Camilla de Souza Muniz	Engineering		Universidade Federal Rural de Pernambuco	Garanhuns/ PE
25	Juliana Zacharias Paukowski	Physics		Universidade Federal do Rio Grande do Sul - UFRGS	Porto Alegre/RS
26	Keyde Cristina Martins de Melo		Biotechnology	Programa Interunidades em Biotecnologia-USP/Butantan	São Bernardo do Campo/SP
27	Lady Diana Lopes Freire Almeida	Medicine		Escola Superior de Ciências da Santa Casa de Misericórdia de Vitória - EMESCAM	Cariacica/ES
28	Leticia Bonfante Sicchieri		Physics (Condensed Matter)	Universidade Bandeirante de São Paulo - UNIBAN	São Paulo/SP
29	Leticia Bonfim	Physics		Instituto Federal de Educação, Ciência e Tecnologia de São Paulo - IFSP	São Paulo/SP
30	Luiz Henrique da Silva	Physics		Universidade de São Paulo - USP	São Paulo/SP
31	Marco Vivacqua	Physics		Università della Calabria – UNICAL	Itália
32	Maria Aparecida dos Santos	Farmacy		Universidade Bandeirante de São Paulo - UNIBAN	São Paulo/SP

33	Mariana Sacrini Ayres Ferraz		Master Physics	Universidade Estadual de Campinas - UNICAMP	Campinas/SP
34	Marina Berardi		Master Medical Physics	Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto da USP - FFCLRP-USP	Ribeirão Preto/SP
35	Michel Corci Batista	Physics		Universidade Estadual de Maringá - UEM	Maringá/SP
36	Murilo Wallace de Santana	Engeneering of Production		Universidade Nove de Julho - UNINOVE	São Paulo/SP
37	Odete Venancio Pereira	Odontology a		OSEC	São Paulo/SP
38	Pedro Leonidas Oseliero Filho	Physics		Universidade Bandeirante de São Paulo - USP	Santa de Parnaiba/SP
39	Priscilla Natalli Stachera		Physics	Universidade Estadual de Ponta Grossa - UEPG	Ponta Grossa/PR
40	Priscila Ribeiro dos Santos		Physics	Universidade de São Paulo - USP	São Paulo/SP
41	Rafael Leite Rubim	Physics		Universidade de São Paulo - USP	São Paulo/SP
42	Raphael Lima Sodre	Physics		Universidade Estadual do Sudoeste da Bahia - UESB	Itapetinga/BA
43	Renata Naporano Bicev	Physics		Universidade de São Paulo - USP	Taboão da Serra/SP
44	Renato Ribeiro Guimarães	Physics		Universidade Estadual de Maringá - UEM	Maringá/SP
45	Rodrigo Aparecido dos Santos	Chemistry		Universidade Bandeirante de São Paulo - UNIBAN	São Paulo/SP
46	Sandro Minarrine Cotrim Schott	Physics		Universidade Bandeirante de São Paulo - USP	São Paulo/SP
47	Sara Raquel de Souza Silva	Physics		Universidade Federal de Alagoas - UFAL	Maceió/AL
48	Saulo Rocha Sales	Biothecnology		Universidade Federal da Bahia - UFBA	Vitória da Conquista/BA
49	Sergio Leandro Espindola Preza		Physics applied to Medicine snd Biology	Universidade de São Paulo - USP	Ribeirão Preto/SP

50	Silvia Cristina Ramos			Universidade Federal de São Paulo - UNIFESP	São Paulo/SP
51	Tamires de Araujo Mora	Physics		Instituto Federal de Educação, Ciência e Tecnologia de São Paulo - IFSP	São Paulo/SP
52	Thiago Petrucci Rodrigues	Physics		Universidade Estadual de Maringá - UEM	Maringá/SP
53	Tiago Gualberto Bezerra de Souza	Physics		Universidade de São Paulo - USP	São Paulo/SP
54	Vinícius Mariani Lenart		Physics	Universidade Estadual de Ponta Grossa - UEPG	Ponta Grossa/PR
55	Vivian Vieira	Physics		Universidade de São Paulo - USP	São Paulo/SP
56	Wallance Moreira Pazin	Biological Physics		Faculdade de Filosofia, Ciências e Letras de Ribeirão Preto da USP - FFCLRP-USP	Ribeirão Preto/SP

Participant teachears

Nº	*Namer*	*University*	*Observations*
1	Amando Ito	FFCL - USP Ribeirão Preto	Course speaker
2	Antonio Figueiredo	Universidade de São Paulo - USP	
3	Carsten Svaneborg	FLinT @ University of Southern Denmark	Course speaker
4	Claudete J. Valduga	Universidade de São Paulo - USP	
5	Cristiano Oliveira	Universidade de São Paulo - USP	coordinator
6	Débora Levy	Universidade de São Paulo - USP	Course speaker
7	Fernando C. M. Freire	Universidade Estadual de Maringá - UEM	
8	Hatsumi Mukai	Universidade Estadual de Maringá - UEM	
9	Jorge Ruiz	Universidade de São Paulo - USP	Course speaker
10	Kaline Coutinho	Universidade de São Paulo - USP	Course speaker
11	Karin Riske	Universidade Federal de São Paulo	Course speaker
12	Luciana Morganti	Universidade de São Paulo - USP	Course speaker

13	Nagila R. T. Damasceno	Universidade de São Paulo - USP	Course speaker
14	Reinhard Richter	University of Bayreuth/Ger,amu	Course speaker
15	Sayuri Miyamoto	Universidade de São Paulo - USP	Course dpeaker
16	Sérgio Bydlowski	Universidade de São Paulo - USP	Course speaker

Vídeos for divulgation

1) A. Tufaile, A. P. B. Tufaile, G. Liger-Belair
“Chaoticscatterer.wmv”
http://www.youtube.com/watch?v=RfM64Xcto5U
About caleidoscopes and hiperbolic prismes and light scattering in foams, 23/12/2010.

2) A. Tufaile and A. P. B. Tufaile
“Ferrofluido 0002”
http://www.youtube.com/watch?v=ECAG74hfBQ8&feature=related
Demonstration on ferrofluids, 22/12/2010.

3) A. Tufaile and A. P. B. Tufaile
“Ferrofluid.wmv”
http://www.youtube.com/watch?v=oIb-VG0k8u4&feature=channel_video_title
Demonstration of magnetovertebrates using magnetic fields and ferrofluids. First with a Hele-Shaw cell, afterwards in a free surface, 13/03/2011.

4) A. Tufaile and A. P. B. Tufaile
“Ferrofluid2.wmv”
http://www.youtube.com/watch?v=SywcHgEzcT4&feature=relmfu
Demonstration of magnetovertebrates using magnetic fields from coils and ferrofluids, 04/02/2011.

5) A. Tufaile and A. P. B. Tufaile
“Filme.wmv”
http://www.youtube.com/watch?v=DlJ_sYy6iMs&feature=mfu_in_order&list=UL
Experimental Double pendulum, 15/12/2010.

6) A. Tufaile
“Penduloduplo1.mpg
http://www.youtube.com/watch?v=rEM_V10PCHc&feature=related
Simulation showing the chaotic Double pendulum, 10/12/2010.

7) A. Tufaile
“penduloduplo2”
http://www.youtube.com/watch?v=NWqbU7aP6e4&feature=bf_prev&list=UL50nXmuoHFi0&index=2
Simulation showing the sensibility of double pendulum to the initial conditions, 10/12/2010.

8) A. Tufaile
“Bobinas.wmv”
http://www.youtube.com/watch?v=kd-yjMwwCBo&feature=autoplay&list=UL50nXmuoHFi0&index=4&playnext=1
The firat coils we did to work with ferrofluids, 19/12/2010.

9) A. Tufaile
“Antibubble.wmv”
http://www.youtube.com/watch?v=_CqlhSl7Lk4&feature=relmfu
On antibubbles, 31/01/2011.

Thematic Meetings on LDL (São Paulo)

Two thematic meetings about research on LDL have been made in the year period, with all groups involved in the subject (physics, chemistry, immunology, medicine, dentistry, public health and mathematics). The group from public health has been recently integrated to INCT. We discussed the different works being done and designed new experiments which could be done, in particular involving the use of statins in the control of hypercholesterolemia, the study of the quality of the LDL from athletes with high performance and the proposal of verification of the effect of Ômega 3, 6 and 9 in the quality of the LDL of patients.

(INCT-FCx) Appendices III

Technical report of the Nanobiotechnology event

I ADVANCED SCHOOL OF NANOBIOTECHNOLOGY WITH PERSPECTIVE IN MEDICINE

Nanobiotechnology Group of the Institute for Teaching and Research Albert Einstein **(IIEPAE)**

and

National Institute of Science and Technology on Complex Fluids **(inctFCx)**

I) INTRODUCTION

This report provides information for 1ST ADVANCED SCHOOL OF NANOBIOTECHNOLOGY WITH PERSPECTIVE IN MEDICINE which was held from 21 to 26 February 2011 at the Hospital Israelita Albert Einstein. This event was made as an initiative of Nanobiotechnology Brain Institute (INCE) Group's of the Jewish Institute of Teaching and Research Albert Einstein (IIEPAE) and the National Institute of Science and Technology on Complex Fluids (INCT-FCX).

The aim of the School was to acquaint the participants with new strategies for action in the field of nanobiotechnology applied to medicine, taking into account that the event provided to each participant, in practical classes developed in mini-courses, individualized activities ensuring the assimilation of the content of discussed topics.

The subjects were approached from a practical point of view (for the first time in Brazil) thereby contributing to a better learning of the methods, as well as the implementation of those methodologies by the participants and collaborations that were being carried out in some laboratories.

The School was composed of three mini-courses (20% of theory and 80% of practice):

- Mini-course I: Animal models of brain tumors, stroke and epilepsy and possible applications of nanoparticles for therapeutic studies.

- Mini-course II: Cell labeling with magnetic nanoparticles and quantitative assessment by Magnetic Resonance Imaging: study on mesenchymal stem cells from human umbilical cord wall, glioblastoma tumor cells and phagocytes.

- Mini-course III: Implementation of methods for assessing *in vitro* cytotoxicity of nanostructured systems.

Upon completion of the event, the output was assessed by participants whose results were: regular approval 0%, satisfactory approval, 16%, and excellent approval, 84%.

II) DETAILS OF THE EVENTS

PERIOD

MINI-COURSE I
21 to 24 February 2011
CETEC – Centro de Experimentação e Treinamento em Cirurgia

MINI-COURSE II
21 to 23 February 2011
CESAS – Centro de Educação em Saúde Abram Szajman

MINI-COURSE II
21 to 23 February 2011
CESAS – Centro de Educação em Saúde Abram Szajman

REALIZATION

Nanobiotechnology Brain Institute (INCE) Group's

National Institute Science and Technology on Complex Fluids (INCT-FCX)

SUPPORT

. Clinical Board of Hospital Israelita Albert Einstein

. Board of Medical Practice of Hospital Israelita Albert Einstein

. Life Technologies (Invitrogen)

. FAPESP

COORDINATORS

Dr. Lionel Fernel Gamarra Contreras

Dr. Antonio Martins Figueiredo Neto

ORGANIZING COMMITTEE

. Dr. Edson Amaro Júnior

. Drª. Lorena Favaro Pavon

. Drª. Tatiana Tais Sibov

. Dr. André Cesar da Silva

. Dr. Javier Bustamante Mamani

. Dr. Francisco Romero Cabral

COLLABORATORS

. Andréa Vieira dos Santos

. Liza Aya Miyaki

. Marta Jardim

. Drª. Valéria Vieira Chida

SPEAKERS

MINI-COURSE 1

. Dr. André César da Silva
. Dr. Francisco Romero Cabral
. Drª. Klena Sarges Marruaz
. Profª. Margareth Rose Priel
. Drª. Sylvia Mendes Carneiro
. Dr. Javier Bustamante Mamani
. Dr. Lionel Fernel Gamarra

MINI-COURSE 2

. Dr. Lionel Fernel Gamarra Contreras
. Dr. Javier Bustamante Mamani
. Liza Aya Miyaki
. Drª. Lorena Favaro Pavon
. Drª. Luciana C. Marti
. Dr. Luiz Roberto Sardinha
. Drª. Tatiana Tais Sibov

MINI-COURSE 3

. Andréa Vieira dos Santos
. Dr. Lionel Fernel Gamarra Contreras
. Dr. Javier Bustamante Mamani
. Liza Aya Miyaki
. Marta Jardim
. Prof. Dr. Rilton Alves de Freitas
. Profª. Rita de Cássia Ruiz

PARTICIPANTS

TOTAL REGISTRATION:

. MINI-COURSE 1: **11**

. MINI-COURSE 2: **13**

. MINI-COURSE 3: **12**

VENUE: LOCAL OF THE EVENT

Centro de Educação em Saúde Abram Szajman of Instituto Israelita de Ensino e Pesquisa Albert Einstein

Av. Albert Einstein, 627 – 1ºSS – Bloco A

Morumbi – São Paulo – SP – CEP 05652-900

Centro de Experimentação e Treinamento em Cirurgia of Instituto Israelita de Ensino e Pesquisa Albert Einstein

Av. Professor Francisco Morato, 4.293

Butantã – São Paulo – SP – CEP 05521-000

FINANCIAL SUPPORT

In order to encourage the participation of researchers from all Brazilian states and cities in the event, the scientific committee selected three participants* for each short course for financial support the full cost of expenditure on accommodation and transportation, by air or by road, according to the following criteria:

- affinity between the candidate's area of expertise and the short course of interest;
- be registered for the event; and
- have the Lattes curriculum sent for analysis until 31/01/2011

It was received 16 requests for financial assistance and of these, 9 were awarded the grant.

MINI-COURSE 1

Camila Vizentini Silva – CPF: 386.358.208-00 - Ribeirão Preto/SP

Juliana Bagatini Klein – CPF: 008.051.400-69 - Itapema/SC

MINI-COURSE 2

Fernando Lucas Primo – CPF: 046.011.076-44 - Ribeirão Preto/SP

Renata Raele – CPF: 074.872.024-37 - Recife/PE

Rafael Bini – CPF: 036.540.149-84 - Araraquara/SP

Rodrigo Vellasco Duarte Silvestre – CPF: 583.847.662-15 - Ananindeua/PA

MINI-COURSE 3

Ieda Maria Martinez Paino – CPF: 251.614.358-36 - São Carlos/SP

Sandra Eloisi Denardi – CPF: 278.861.208-76 - Araras/SP

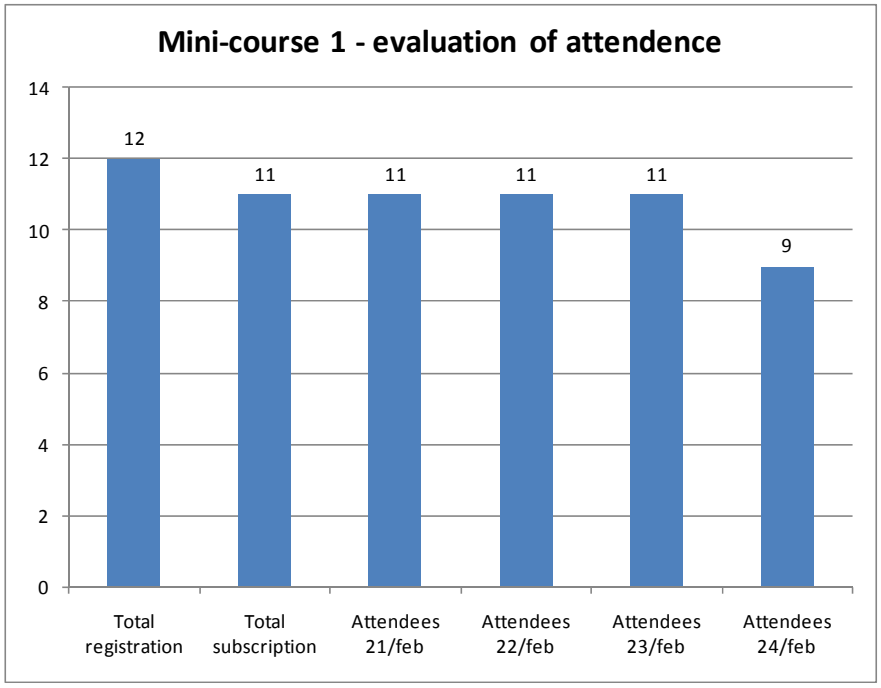
Thiago Caon – CPF: 042.048.259-82 - Florianópolis/SC

III) EXPLOITATION

MINI-COURSE 1

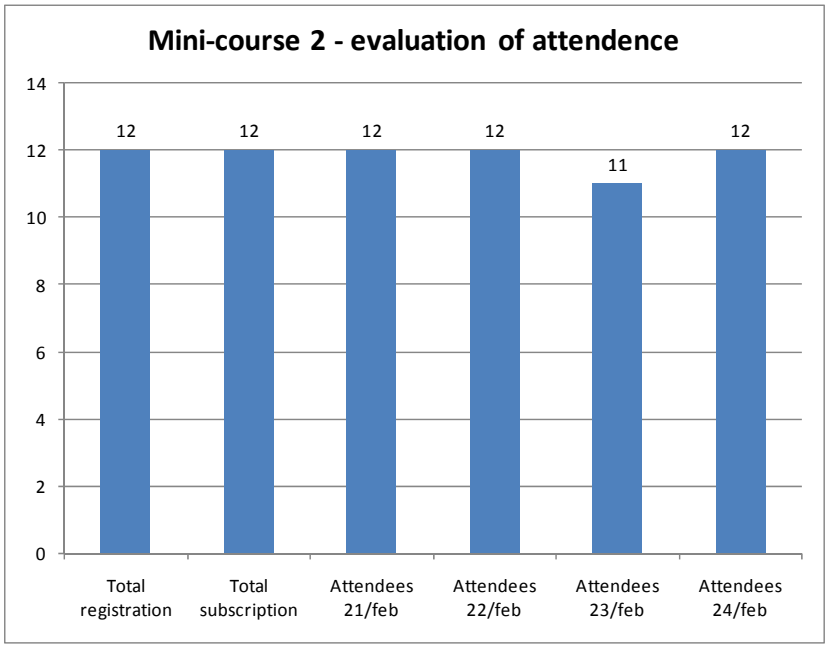
From 21 to 23 February, all registered participants attended a mini-course, and only two participants did not attend because of the need to return to their hometowns due to work commitments, on February 24.

Thus, the rate of absenteeism of this short course was 4.5%.



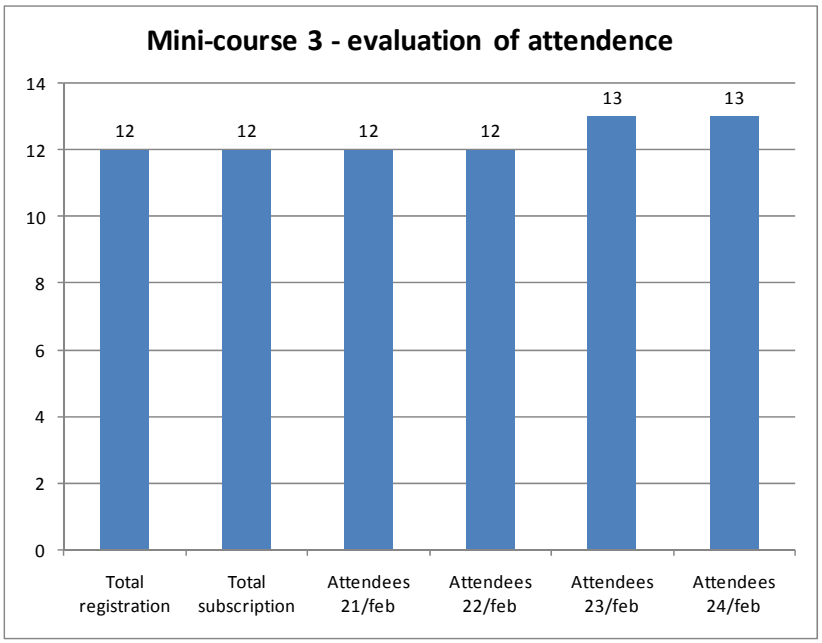
MINI-COURSE 2

During the second mini-course, only a participant did not attend the event on February 22, as illustrated below:

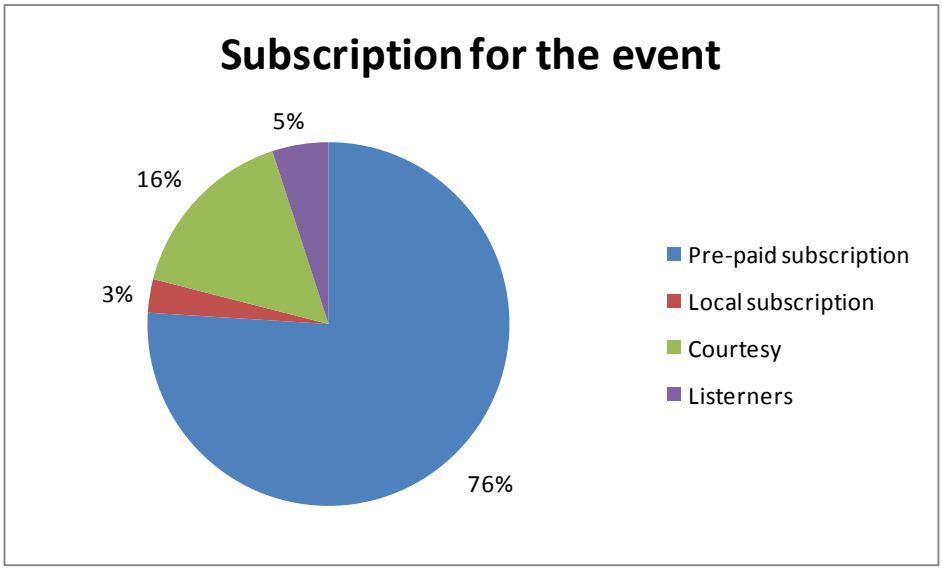


MINI-COURSE 3

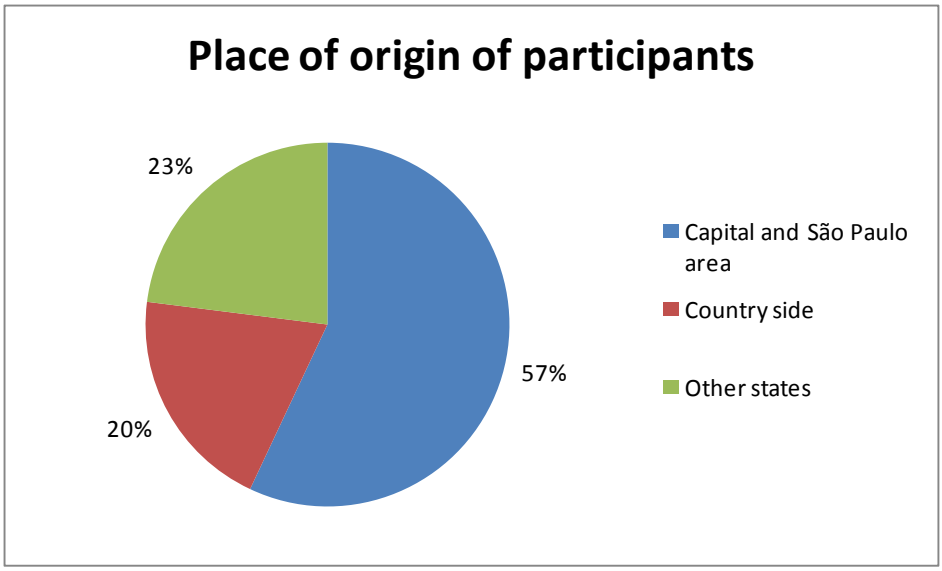
In the period of 24 to 26 February, during the mini-course 3, only one participant that had a previously confirmed registration was not present during the event. However, as previously indicated under "Participants" item, the mini-course 3 had more participants than offered places since the scientific committee of the event invited Dra Claudia C. F. Barros (INCE researcher) and Cristina M. Keyde de Melo (registered for mini-course 1) to attend it.



The 1st Advanced School in Nanobiotechnology with Perspectives in Medicine offered a total of 36 places, and of these, 29 were paid (79%) and 08 were provided free of charge (6 participants received a registration by courtesy and 2 participants in category "listener"), representing 21% of total enrollment.

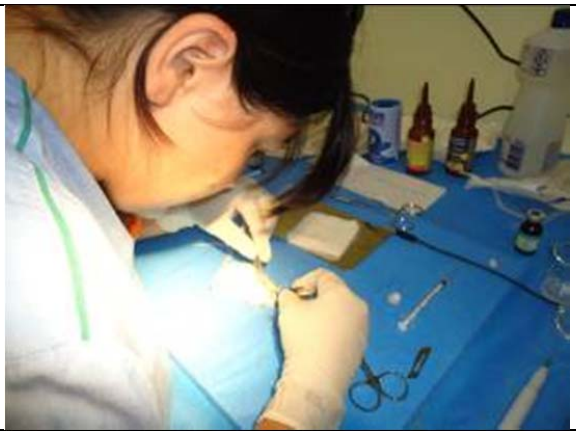


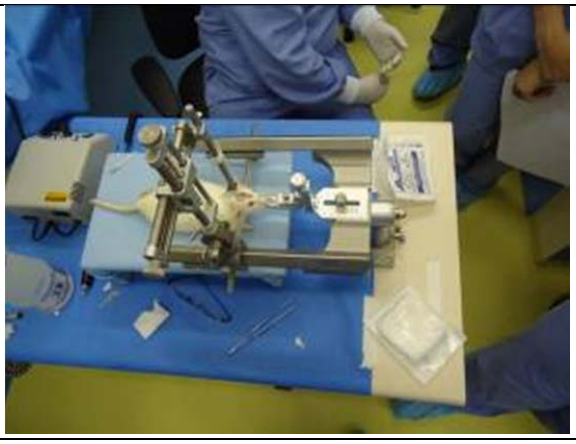
Of the total subscribers, we observed the following distribution by place of origin:

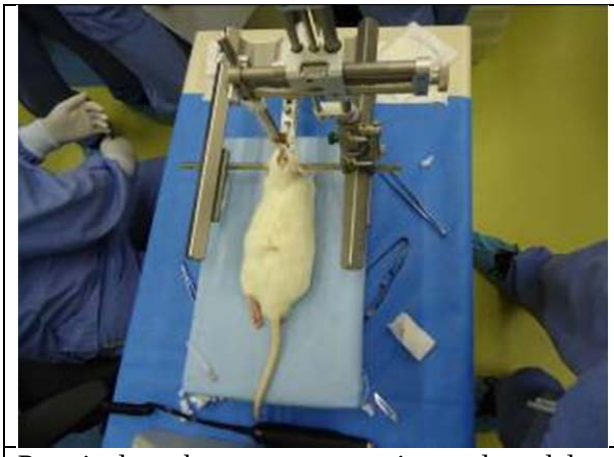


IV) EXAMPLES OF ACTIVITIES DURING THE EVENT

Mini-course I

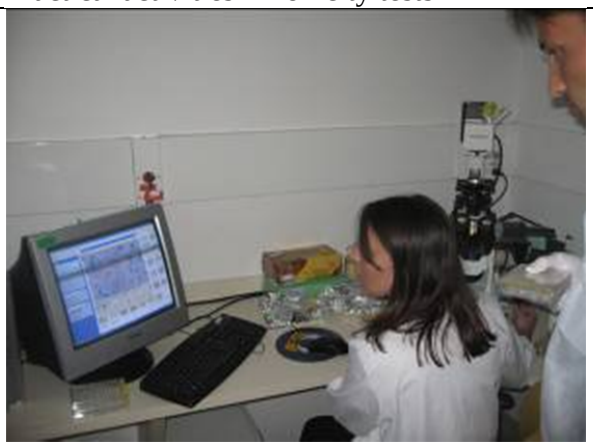
	
Participants in mini-course I	Participants in mini-course II
	
Initially, they were divided in groups to design the project that will be developed during the mini-course	Participants discussing how the project would be conducted during the mini-course I
	
Individual practical work in animal model	Individual practical work in animal models of

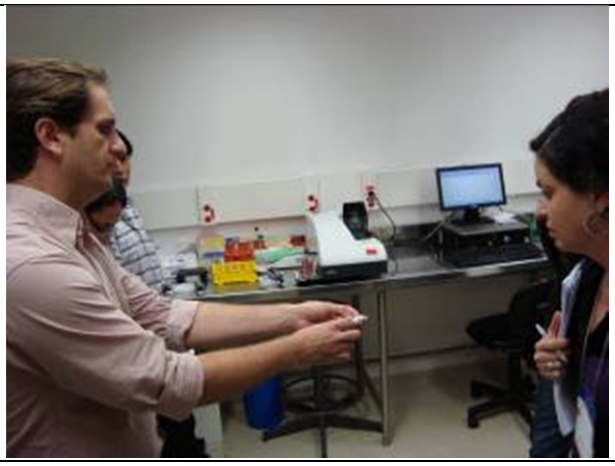
	stroke
	
Lectures on nanobiotechnology applied to experimental stroke model	Lectures on nanobiotechnology applied to tumor experimental model
	
Lectures on nanobiotechnology applied to experimental epilepsy model	Participants in the short course lectures
	
Lecture on microscopy	Practical work on tumor experimental model

	
Practical work on tumor experimental model	Participants of the short course presenting the obtained data

Mini-course II and III

	
Participants of the mini-course II	Participants of the mini-course III

	
Practical activities - Stability tests	Practical activities – Toxicity tests
	
Practical activities - Preparing samples to the magnetic resonance studies	Evaluation of labeling of stem cells with magnetic nanoparticles
	
Lectures – Mini-course II	Lectures – Mini-course III

	
Lectures – Mini-course III	Practical activities - Stability tests
	
Practical activities - Stability tests	Practical activities – Toxicity tests
	
Practical activities – Toxicity tests	Practical activities – Toxicity tests

	
Practical activities – Toxicity tests	Practical activities – Toxicity tests

		
Sample Preparation for Molecular Imaging	Cellular labeling for Magnetic Resonance Analysis	Cellular labeling for Magnetic Resonance Analysis

V) DISCLOSURE

Internet: The event was announced on the official site of Hospital Israelita Albert Einstein (http://ensino.einstein.br - Link "Training Events") and the hospital's institutional site (www.einstein.br - Link "Events") and at INCT-FCX website for registration through the 20 December 2010 to 11 February 2011.

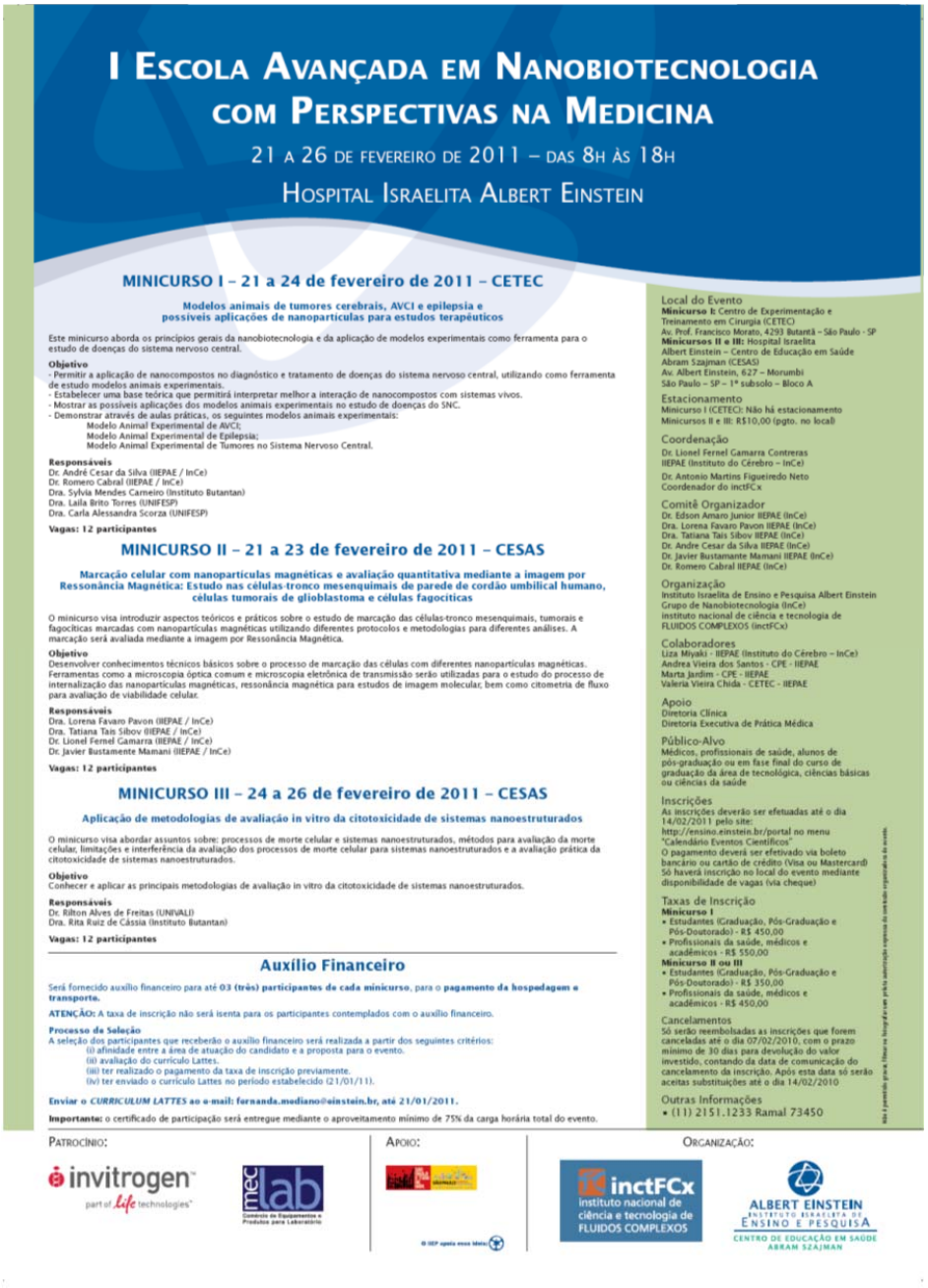
Posters: For this edition of the event, it was made 100 A3 posters displayed at the Hospital Israelita Albert Einstein and at institutions:

- Hospital Israelita Albert Einstein –Morumbi Unit:

IIEP Library
Medical doctor parking lot – 5º ss – Bloco A
Unit of Intensive Care
Surgery room
Medical doctor rooms
Anesthesiology rooms

- Hospital Israelita Albert Einstein – Preventive Medicine Diagnostic Unit Jardins: 03 posters - A/C Maria Padula
- Hospital Israelita Albert Einstein – Unit Perdizes: 03 posters - A/C Leonélia Costa
- Centro de Gestão e Estudos Estratégicos (CGEE) – Brasilia: 05 posters - A/C Juliana Marinho
- Pharmacy department of Universidade do Vale do Itajaí (UNIVALI): 05 posters – A/C Prof. Rilton Alves de Freitas
- Instituto de Microbiologia Paulo de Góes and Centro de Ciências da Saúde (CCS) of Universidade Federal do Rio de Janeiro (UFRJ) – 05 posters – A/C Prof. Alexandre Rosado
- Chemistry Department of UNESP: 05 posters – A/C Shirley Ana Maria Costa
- UNESP: 20 posters – A/C Rosangela Moraes – The posters were delivered throughout all university campus.
- UNIFESP: 10 posters – A/C Patricia Semedo

Poster Layout:



E-mail Marketing: It was created a model of e-mail marketing that was sent weekly from 21 December 2011 to February 14, 2011.

E-mail marketing layout:

Mailing: It was also used some internal HIAE e-mail network to publicize the event, as listed below:

. Biomedical

. Nursing Department

. Events**.** IEP – Clinical research

. IEP: Experimental research

. Brain Institute

. M'Boi Mirim Laboratory

. Physician – Imagem department

. Neuro - Einstein

To reach the external public, it was used the mailing of the "First Workshop on Nanobiotechnology Applied in Medicine" that was held in October 2009. The Department of Scientific Events also requested assistance in publicizing the event to the following institutions:

- São Paulo Convention & Visitors Bureau – added to the event in its official calendar. Link: http://www.visitesaopaulo.com/seu-evento-detalhe.asp?cod=9615
- Portal and Eletronic journal *Saúde Business* – added brief description of the event in its homepage and in the electronic edition of the newspaper
  Link: http://www.saudebusinessweb.com.br/agenda/index.asp?mes=2
- National Institute of Science and Technology Complex Fluids (inctFCx) – added to the event in its' course schedules. "Link: http://fluidos.usp.br/detalhe.php?id=9
- FAPESP – Created specific page of the event, on its website "Agenda ".
  Link: http://www.agencia.fapesp.br/materia/13305/agenda/1-escola-avancada-em-nanobiotecnologia-com-perspectivas-na-medicina.htm

VI) ADVERTISING

Banner: Three banners were made with the purpose of addressing the participants of each short course to the venue of the event.

Advertising banner layout:

<u>Display with the visual identity of the event</u>: For mini-courses 2 and 3, performed on the premises of CESAS, two acrylic table displays were used as part of the advertising the event so that subscribers could easily identify the secretary.

Display layout:

I ESCOLA AVANÇADA EM NANOBIOTECNOLOGIA COM PERSPECTIVAS NA MEDICINA

21 A 26 DE FEVEREIRO DE 2011 – DAS 8H ÀS 18H

HOSPITAL ISRAELITA ALBERT EINSTEIN

Prazo prorrogado para envio do Curriculum Lattes até 31/01/11

MINICURSO I – 21 a 24 de fevereiro de 2011 – CETEC

Modelos animais de tumores cerebrais, AVCI e epilepsia e possíveis aplicações de nanoparticulas para estudos terapêuticos

Este minicurso aborda os princípios gerais da nanobiotecnologia e da aplicação de modelos experimentais como ferramenta para o estudo de doenças do sistema nervoso central.

Objetivo
- Permitir a aplicação de nanocompostos no diagnóstico e tratamento de doenças do sistema nervoso central, utilizando como ferramenta de estudo modelos animais experimentais.
- Estabelecer uma base teórica que permitirá interpretar melhor a interação de nanocompostos com sistemas vivos.
- Mostrar as possíveis aplicações dos modelos animais experimentais no estudo de doenças do SNC.
- Demonstrar através de aulas práticas, os seguintes modelos animais experimentais:
  Modelo Animal Experimental de AVCI;
  Modelo Animal Experimental de Epilepsia;
  Modelo Animal Experimental de Tumores no Sistema Nervoso Central.

Responsáveis
Dr. André Cesar da Silva (IIEPAE / InCe)
Dr. Romero Cabral (IIEPAE / InCe)
Dra. Sylvia Mendes Carneiro (Instituto Butantan)
Dra. Laila Brito Torres (UNIFESP)
Dra. Carla Alessandra Scorza (UNIFESP)

Vagas: 12 participantes

MINICURSO II – 21 a 23 de fevereiro de 2011 – CESAS

Marcação celular com nanopartículas magnéticas e avaliação quantitativa mediante a imagem por Ressonância Magnética: Estudo nas células-tronco mesenquimais de parede de cordão umbilical humano, células tumorais de glioblastoma e células fagocíticas

O minicurso visa introduzir aspectos teóricos e práticos sobre o estudo de marcação das células-tronco mesenquimais, tumorais e fagocíticas marcadas com nanopartículas magnéticas utilizando diferentes protocolos e metodologias para diferentes análises. A marcação será avaliada mediante a imagem por Ressonância Magnética.

Objetivo
Desenvolver conhecimentos técnicos básicos sobre o processo de marcação das células com diferentes nanopartículas magnéticas. Ferramentas como a microscopia óptica comum e microscopia eletrônica de transmissão serão utilizadas para o estudo do processo de internalização das nanopartículas magnéticas, ressonância magnética para estudos de imagem molecular, bem como citometria de fluxo para avaliação de viabilidade celular.

Responsáveis
Dra. Lorena Favaro Pavon (IIEPAE / InCe)
Dra. Tatiana Tais Sibov (IIEPAE / InCe)
Dr. Lionel Fernel Gamarra (IIEPAE / InCe)
Dr. Javier Bustamente Mamani (IIEPAE / InCe)

Vagas: 12 participantes

MINICURSO III – 24 a 26 de fevereiro de 2011 – CESAS

Aplicação de metodologias de avaliação in vitro da citotoxicidade de sistemas nanoestruturados

O minicurso visa abordar assuntos sobre: processos de morte celular e sistemas nanoestruturados, métodos para avaliação da morte celular, limitações e interferência da avaliação dos processos de morte celular para sistemas nanoestruturados e a avaliação prática da citotoxicidade de sistemas nanoestruturados.

Objetivo
Conhecer e aplicar as principais metodologias de avaliação in vitro da citotoxicidade de sistemas nanoestruturados.

Responsáveis
Dr. Rilton Alves de Freitas (UNIVALI)
Dra. Rita Ruiz de Cássia (Instituto Butantan)

Vagas: 12 participantes

Auxílio Financeiro

Será fornecido auxílio financeiro para até **03 (três) participantes de cada minicurso**, para o **pagamento da hospedagem e transporte.**

ATENÇÃO: A taxa de inscrição não será isenta para os participantes contemplados com o auxílio financeiro.

Processo de Seleção
A seleção dos participantes que receberão o auxílio financeiro será realizada a partir dos seguintes critérios:
(i) afinidade entre a área de atuação do candidato e a proposta para o evento.
(ii) avaliação do currículo Lattes.
(iii) ter realizado o pagamento da taxa de inscrição previamente.
(iv) ter enviado o currículo Lattes no período estabelecido (21/01/11).

Enviar o *CURRICULUM LATTES* ao e-mail: fernanda.mediano@einstein.br, até 21/01/2011.

Importante: o certificado de participação será entregue mediante o aproveitamento mínimo de 75% da carga horária total do evento.

Local do Evento
Minicurso I: Centro de Experimentação e Treinamento em Cirurgia (CETEC)
Av. Prof. Francisco Morato, 4293 Butantã – São Paulo - SP
Minicursos II e III: Hospital Israelita Albert Einstein – Centro de Educação em Saúde Abram Szajman (CESAS)
Av. Albert Einstein, 627 – Morumbi
São Paulo – SP – 1º subsolo – Bloco A

Estacionamento
Minicurso I (CETEC): Não há estacionamento
Minicursos II e III: R$10,00 (pgto. no local)

Coordenação
Dr. Lionel Fernel Gamarra Contreras
IIEPAE (Instituto do Cérebro – InCe)
Dr. Antonio Martins Figueiredo Neto
Coordenador do inctFCx

Comitê Organizador
Dr. Edson Amaro Junior IIEPAE (InCe)
Dra. Lorena Favaro Pavon IIEPAE (InCe)
Dra. Tatiana Tais Sibov IIEPAE (InCe)
Dr. Andre Cesar da Silva IIEPAE (InCe)
Dr. Javier Bustamante Mamani IIEPAE (InCe)
Dr. Romero Cabral IIEPAE (InCe)

Organização
Instituto Israelita de Ensino e Pesquisa Albert Einstein
Grupo de Nanobiotecnologia (InCe)
Instituto nacional de ciência e tecnologia de FLUIDOS COMPLEXOS (inctFCx)

Colaboradores
Liza Miyaki - IIEPAE (Instituto do Cérebro – InCe)
Andrea Vieira dos Santos - CPE - IIEPAE
Marta Jardim - CPE - IIEPAE
Valeria Vieira Chida - CETEC - IIEPAE

Apoio
Diretoria Clínica
Diretoria Executiva de Prática Médica

Público-Alvo
Médicos, profissionais de saúde, alunos de pós-graduação ou em fase final do curso de graduação da área de tecnológica, ciências básicas ou ciências da saúde

Inscrições
As inscrições deverão ser efetuadas até o dia 14/02/2011 pelo site:
http://ensino.einstein.br/portal no menu "Calendário Eventos Científicos"
O pagamento deverá ser efetivado via boleto bancário ou cartão de crédito (Visa ou Mastercard)
Só haverá inscrição no local do evento mediante disponibilidade de vagas (via cheque)

Taxas de Inscrição
Minicurso I
- Estudantes (Graduação, Pós-Graduação e Pós-Doutorado) - R$ 450,00
- Profissionais da saúde, médicos e acadêmicos - R$ 550,00

Minicurso II ou III
- Estudantes (Graduação, Pós-Graduação e Pós-Doutorado) - R$ 350,00
- Profissionais da saúde, médicos e acadêmicos - R$ 450,00

Cancelamentos
Só serão reembolsadas as inscrições que forem canceladas até o dia 07/02/2010, com o prazo mínimo de 30 dias para devolução do valor investido, contando da data de comunicação do cancelamento da inscrição. Após esta data só serão aceitas substituições até o dia 14/02/2010

Outras Informações
• (11) 2151.1233 Ramal 73450

PATROCÍNIO: life technologies™ | mec lab Comércio de Equipamentos e Produtos para Laboratório

APOIO:

ORGANIZAÇÃO: inctFCx instituto nacional de ciência e tecnologia de FLUIDOS COMPLEXOS | ALBERT EINSTEIN INSTITUTO ISRAELITA DE ENSINO E PESQUISA | CENTRO DE EDUCAÇÃO EM SAÚDE ABRAM SZAJMAN

VII) SUPPORT

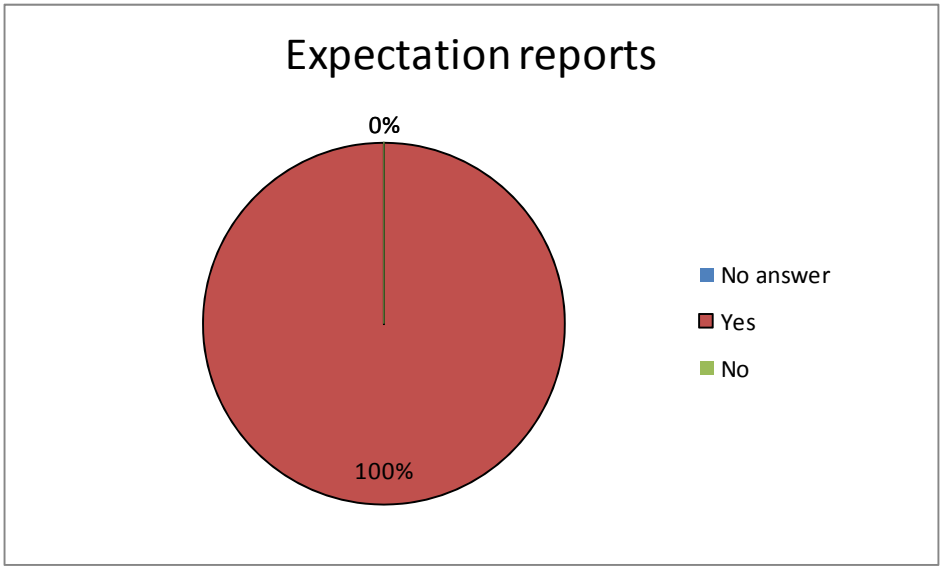
National Institute of Science and Technology on Complex Fluids (INCT-FCx): Support provided through financial assistance to eight selected attendees by the scientific committee of the event, through the analysis of their Lattes curriculum.

VIII) EXPECTATION AND SATISFACTION

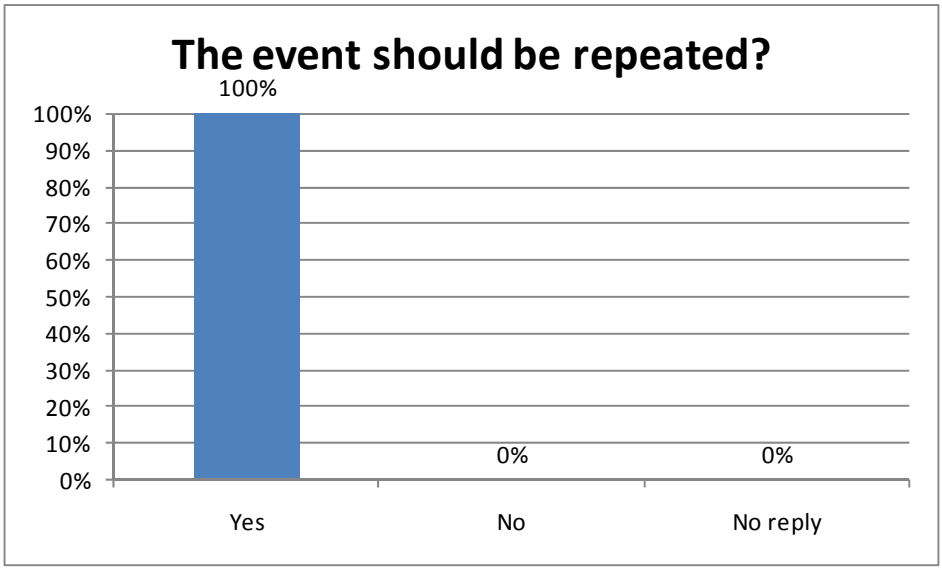
To the participants of the event, it was provided an evaluation form of the short courses in order to identify the degree of public satisfaction.

MINI-COURSE 1

Of the total eleven participants enrolled in mini-course 1, eight of them delivered the completed evaluation form, namely 73% of subscribers responded to the questionnaire.

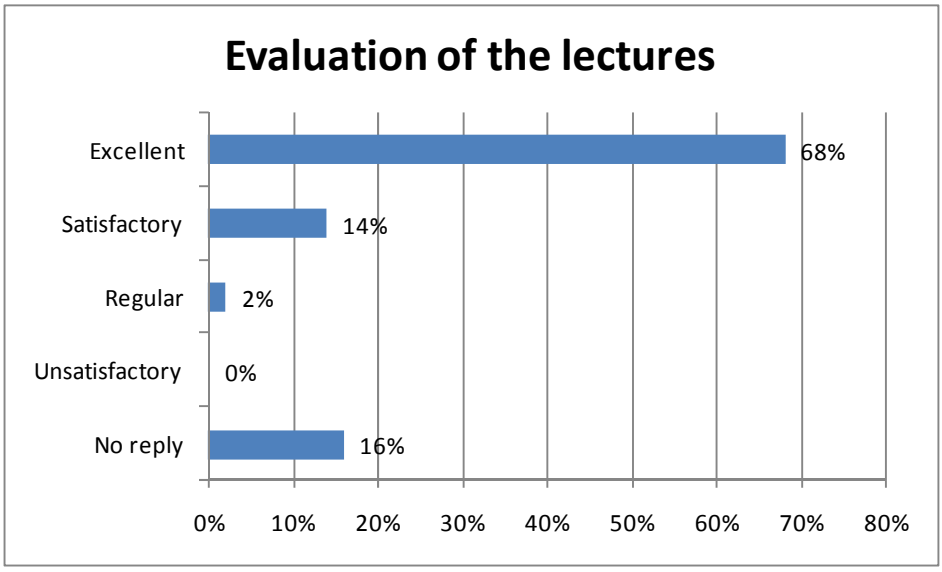


Mini-course 1



Mini-course 1

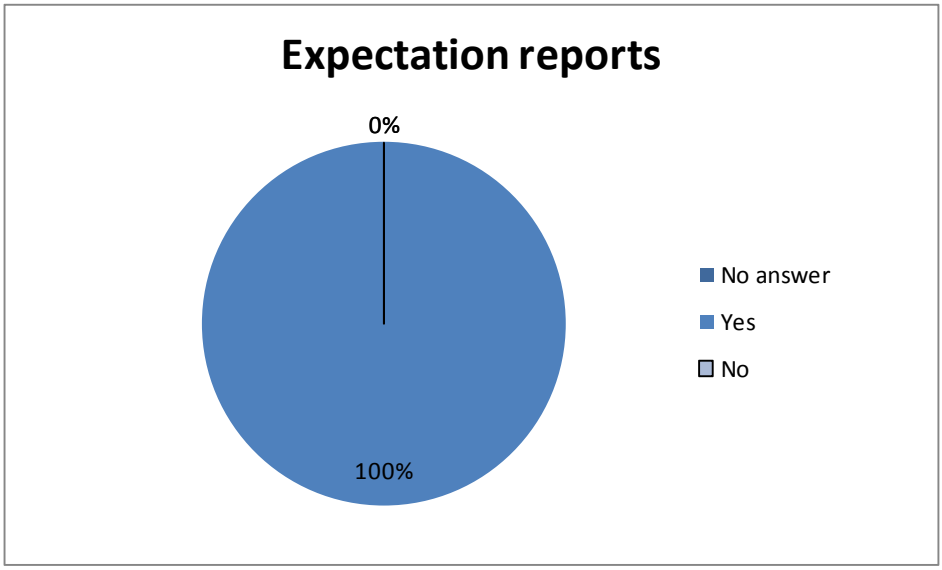
As presented in the graphs above, the short course met the expectations of the public in a unanimous way, and they indicated that the event should have a next edition.



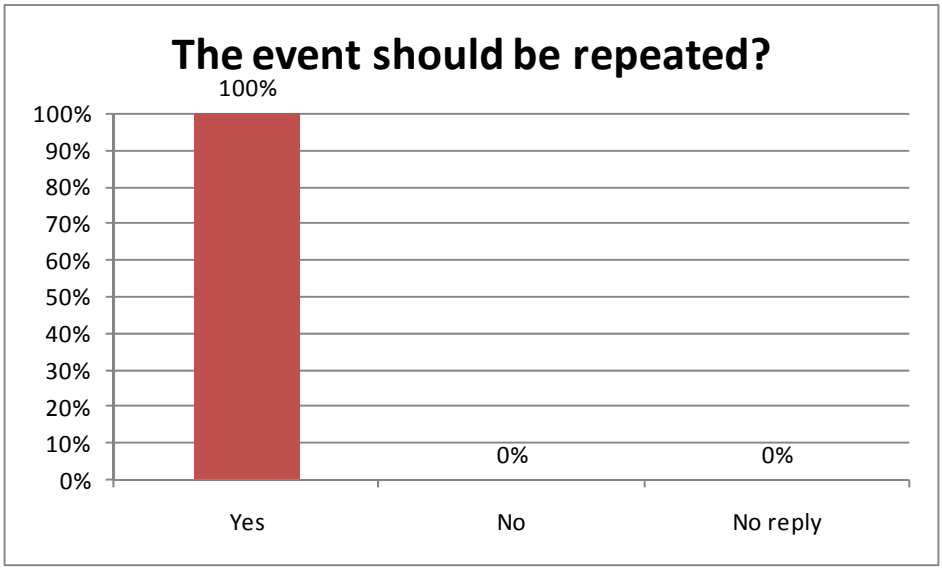
By examining the educational content of the short course, 68% of participants found the lectures and practical stations excellent and 14% considered it satisfactory. Thus, it can be stated that 82% of the public rated the event in a satisfactory manner. It is worth noting that 16% of subscribers - who answered the questionnaire – did not rate this item.

Mini-course 2

Of the total of twelve participants enrolled in Mini-course 2, six of them rendered the evaluation form completed, representing 50% of the public event.

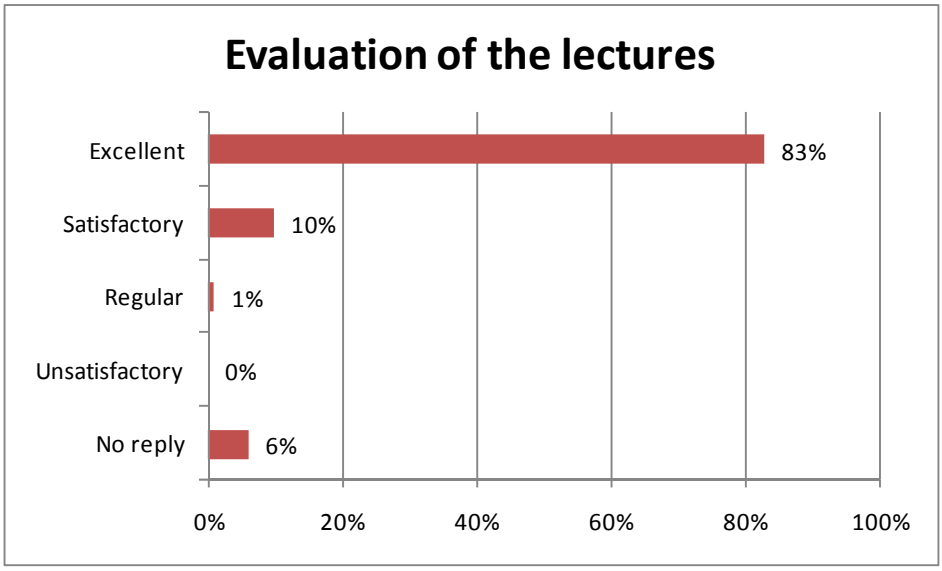


Mini-course 2



Mini-course 2

All participants who completed the questionnaire reported that the second short course met the expectations and that it must be repeated.

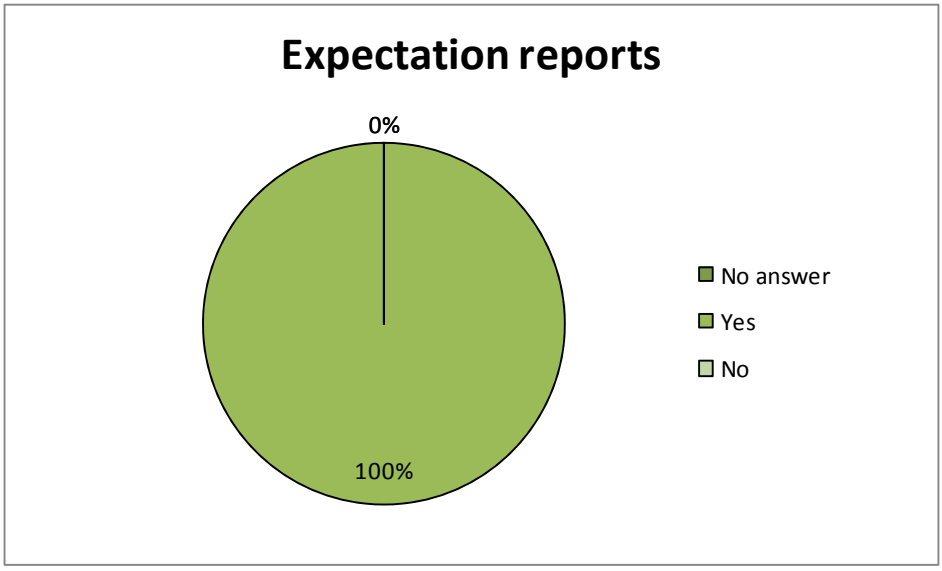


Mini-course 2

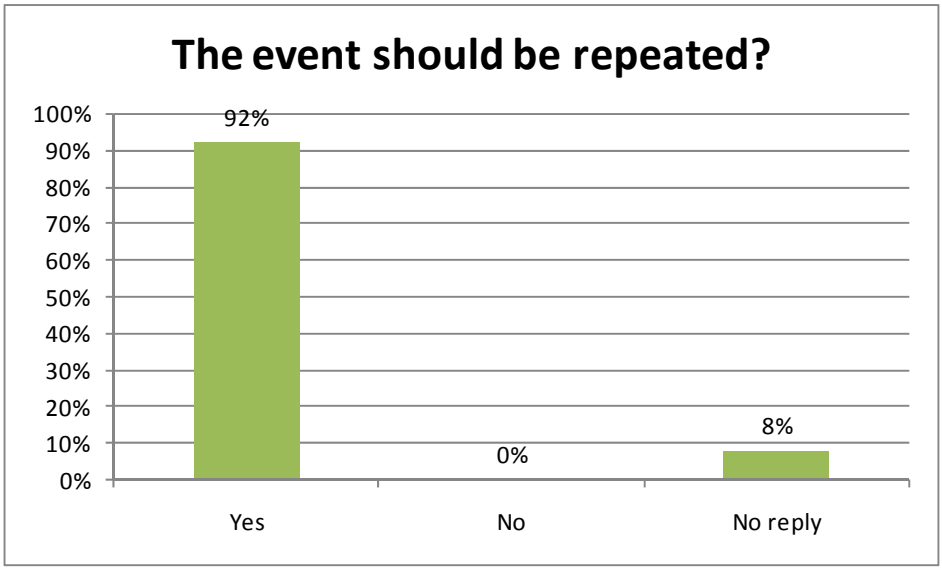
Concerning the analysis of the content and adopted methodology during the second short course of lectures, 83% indicated that the talks were excellent and 10% rated it as satisfactory. Six percent of the total participants who completed the questionnaire did not rate this subject.

Mini-course 3

Twelve participants of mini-course 3 responded the questionnaire and, according to the chart below, were unanimous that the short course met the expectations.



Mini-course 3



Mini-course 3

Although all participants responded the questionnaire, 8% had no opinion of whether the event should be repeated or not. The remaining percentage (92%) reported that the event must have another issue.

X) FINAL CONSIDERATIONS

According to the analysis of the event, we conclude the 1st ADVANCED SCHOOL OF NANOBIOTECHNOLOGY WITH PERSPECTIVE IN MEDICINE was successful, based on the quality of information of the short courses as well as by the presence of renowned lecturers in the field of nanobiotechnology.

The event allowed the interaction between the participants and different research groups in Brazil in the area of Nanobiotechnology, and also stimulated them to take initiative in starting collaboration with the Research Group in Nanobiotechnology of Albert Einstein Hospital. The event also encouraged the interest of some research groups to put in practice the various materials developed in their laboratories.

For the data presented in "Expectation and Satisfaction", it is possible to observe the high degree of satisfaction and enjoyment of the participants of the 1st ADVANCED SCHOOL OF NANOBIOTECHNOLOGY WITH PERSPECTIVE IN MEDICINE.

Due to the lack of courses in this area that address the issue in a practical providing a link between Nanobiotechnology and Health, it is imperative that new editions should be held in the future.