

HEALTH

# MULTI-USER EQUIPMENT

ADVANCED TECHNOLOGY TO  
REACH OF RESEARCHERS

Health

## CREATION OF A MULTI-USER LABORATORY FOR THE ANALYSIS OF THREE-DIMENSIONAL IMAGES OF BIOLOGICAL TISSUES AND BIOMATERIALS (3D BIOLAB)

Adalberto Luiz Rosa

Ribeirão Preto School of Dentistry

University of São Paulo (USP)

FAPESP Grant 2009/54142-5

This project envisages creation of Multi-user Laboratory for Analysis of Three-Dimensional Images and Biomaterials (LAB 3 BIO). Our proposal has the objective of increasing research capacity at the Microscopy and Image Analysis Laboratory, which current operates within the Department of Surgery and TBMF and Periodontics at Universidade de São Paulo's School of Odontology (FORP-USP). And to also institutionalize and formalize the multi-user character of structure that has served the demands of several researchers from FORP, other USP units and other institutions. We are proposing officialization of this laboratory as a multiuser unit, according to the attached Management and Sharing Plan, with expansion of this structure in terms of physical area, number of technicians available, equipment and principally quality (and new) services available to users. The LAB 3D BIO will allow scientists to obtain, capture and analyze images of biological tissues, biomaterial and interactions among them. Currently, the equipment available, which represents part of the institutional counterparts, allows for bidimensional studies (2D) of these images and only after material is processed through histological analysis. The equipment requested represents an import complementation because it allows for tridimensional analysis of images - with microtomography images can be obtained from samples before any histological processing. The capacity for analysis, broadened by high resolution, allows for advances in micro and submicrostructure studies of mineralized tissues and its alterations due to pathological process, scarring and response to substances and biomaterials. Bringing together all these resources in one laboratory with available technical support and in the context of our institution's consolidated research groups will make LAB 3D BIO a national reference in São Paulo State.

### EQUIPMENT GRANTED

- 1172 Microtomograph, with 100 kV source and 50 mm field of view (SkyScan/Instrutécnica)

## ASSOCIATED PROJECTS

### Ribeirão Preto School of Dentistry/USP

*Osteogenesis on titanium: in vitro evaluation of the effects of different stimulatory methods*

Adalberto Luiz Rosa  
FAPESP Grant 2003/09767-0

*Effect of antimicrobial photodynamic therapy in the treatment of periodontal and peri-implant disease. A study in dogs*

Arthur Belém Novaes Junior  
FAPESP Grant 2005/60775-0

*Histological and histomorphometric analysis of the interface between bone tissue and screws (metallic or absorbable) in the 2.0-mm miniplate system. A study using rigid internal fixation in dogs*

Cássio Edvard Sverzut  
FAPESP Grant 2007/00892-8

*Evaluation of the preculture of gingival fibroblasts in the incorporation of an acellular dermal matrix (AlloDerm) in dogs*

Daniela Bazan Palioto Bulle  
FAPESP Grant 2006/03063-0

*Study of tissue mineralization by alveolar bone crest osteoblasts in contact with biodegradable polymers*

Karina Fittipaldi Bombonato Prado  
FAPESP Grant 2008/54580-0

*Histological, histomorphometric and immunohistochemical evaluation of the effects of photosensitive drugs on bone repair and osseointegration of titanium implants*

Luiz Antonio Salata  
FAPESP Grant 2007/08442-1

*In vitro osteogenesis on macroporous titanium*

Márcio Mateus Beloti  
FAPESP Grant 2006/06840-7

*Influence of experimentally induced periodontal disease on glycemic control in diabetic rats*

Mario Taba Junior  
FAPESP Grant 2007/00951-4

*Functionalizing titanium microtopography with synthetic type I collagen-derived peptides (P-15): effects on different aspects of the in vitro development of the osteogenic phenotype*

Paulo Tambasco de Oliveira  
FAPESP Grant 2008/54027-9

*Evaluation of the use of the acellular dermal matrix as a barrier in guided bone regeneration. A histomorphometric study in dogs*

Sérgio Luis Scombatti de Souza  
FAPESP Grant 2006/55566-5

### Contacts for instructions for the use of the equipment

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## ACQUISITION OF A SYSTEM OF TRANSVERSE MICRORADIOGRAPHY FOR STUDIES ON TOOTH DEMINERALIZATION AND REMINERALIZATION, ASSOCIATED OR NOT TO ADHESIVE RESTORATIONS

Ana Carolina Magalhães

Bauru School of Dentistry

University of São Paulo (USP)

FAPESP Grant 2009/53849-8

To compare the properties of artificial carious lesions, a combination of the determination of cross-sectional hardness (mechanical test) and transverse microradiography (determination of mineral content and lesion depth) must be applied to each sample evaluated. Although there have been few studies comparing microhardness testing and microradiography, some degree of correlation has been demonstrated. However, the equations for converting microhardness data into a mineral content profile differ considerably. This indicates that the calculation of mineral content based on hardness values might not be a viable technique. Although microhardness testing is widely employed in Brazil, it has certain limitations: influence of the quantity of organic material and water present in the tissue during the indentation process (critical for the dentin); lack of sensitivity for identifying alterations at the first 50  $\mu\text{m}$  of the subsurface of the dental tissue, due to the size of the indentation. Additionally, with this methodology, it is not possible to distinguish between surface and subsurface lesions, calculate the loss or gain of mineral content, and establish a minimum hardness value for the healthy tissue. In contrast, transverse microradiography is considered the gold standard for the analysis of carious lesions produced *in vitro* or *in situ*, since the mineral content values for the dental enamel are established and on the basis of which it is possible to calculate gains and losses in terms minerals. However, there is no transverse microradiography equipment available in Brazil. Therefore, the acquisition of this technology will benefit researchers throughout the country, reducing costs by eliminating the need to send graduate students abroad and significantly increasing the number of research about dental caries. Consequently, this technological knowledge will soon bring major benefits to

### EQUIPMENT GRANTED

- X-ray source (Cu:K $\alpha$ ), special obturator with time and filters (PANalytical B.V.)
- Microscope with CCD camera (Inspektor Research Systems B.V.)
- Camera with connection to the X-ray source (Inspektor Research Systems B.V.)
- Diamond wire saw system for sample preparation (Inspektor Research Systems B.V.)
- Lapper for sample refinement (Inspektor Research Systems B.V.)

the Brazilian population. In addition, this equipment will have a positive impact on competitiveness at the international level for the publication of scientific articles. The equipment will be applied in studies involving mineralized tissues (teeth and bones), making it possible for researchers at Bauru School of Dentistry to establish partnerships with those in various other areas of knowledge and universities.

## ASSOCIATED PROJECTS

### **Bauru School of Dentistry/USP**

*In vitro and in situ effects of experimental TiF4 varnish on dental erosion and abrasion compared to NaF varnish and solution and TiF4 solution*

Ana Carolina Magalhães  
FAPESP Grant 2008/07105-4

*Comparison between different methods of producing and analyzing artificial carious lesions in enamel and dentin*

Ana Carolina Magalhães  
FAPESP Grant 2009/03581-9

*In situ effects of experimental TiF4 and NaF varnishes and solutions on bovine enamel demineralization and remineralization*

Ana Carolina Magalhães  
FAPESP Grant 2009/06534-1 and 2010/09296-1

### **Ribeirão Preto School of Dentistry/USP**

*Influence of different cavity preparation methods on the removal of root caries and on the adhesion/bonding of glass ionomer restorations*

Regina Guenka Palma Dibb  
FAPESP Grant 2008/07403-5

### **School of Dentistry/USP**

*Knoop hardness of glass ionomer cement and enamel adjacent to restorations submitted to in situ cariogenic challenge*

Marcelo José Stazzeri Bonecker  
FAPESP Grant 2007/06900-2

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**Ana Carolina Magalhães**

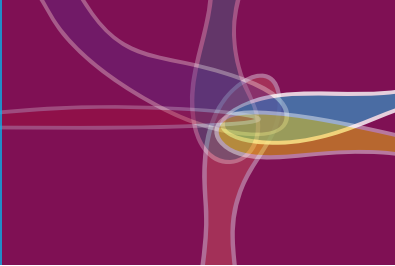
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## **ACQUISITION OF A FLOW CYTOMETER AND COMPUTED TOMOGRAPHY SCANNER FOR THE DEVELOPMENT OF A MULTI-USER FACILITY FOR OBESITY, MALNUTRITION, MITOCHONDRIAL ALTERATIONS AND INSULIN SECRETION PROCESS**

Antônio Carlos Boschero  
Institute of Biology  
State University of Campinas (Unicamp)  
FAPESP Grant 2009/54121-8

This proposal has the following objectives: 1) study of the mechanisms of pancreatic beta cell destruction during the early phases of type 2 diabetes (the search for strategies to inhibit that process, as well as to recover the cell mass in different animal models); 2) morphofunctional characterization of the pancreatic islets of mice submitted to protein restriction or to a high-lipid diet and receiving taurine supplementation; 3) energy metabolism, intracellular calcium homeostasis, and mitochondrial oxidative stress in cell death; and 4) inflammation and immune response in obesity.

### **EQUIPMENT GRANTED**

- CT Scanner (Labtec)
- Guava easyCyte 8HT Base System for flow cytometry, with Guava easyCyte Software (Millipore Corporation)

## ASSOCIATED PROJECTS

### Institute of Biology/Unicamp

*Study of the mechanisms of pancreatic beta cell destruction during the early phases of diabetes mellitus. The search for strategies to inhibit that process*

Antonio Carlos Boschero  
FAPESP Grant 2007/50365-4

*Morphofunctional characterization of the pancreatic islets of mice submitted to protein restriction or to a high-lipid diet and receiving taurine supplementation*

Everaldo Magalhães Carneiro  
FAPESP Grant 2008/53811-8

*Energy metabolism, intracellular Ca<sup>2+</sup> homeostasis and mitochondrial oxidative stress in cell death*

Anibal Eugênio Vercesi  
FAPESP Grant 2006/59786-0

### Faculty of Medical Sciences/Unicamp

*Inflammation and immune response in obesity*

Lício Augusto Veloso  
FAPESP Grant 2009/50809-5

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for the use of the equipment

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## RECENT ACQUISITION OF PREPARATIVE HIGH-PERFORMANCE LIQUID CHROMATOGRAPH FOR THE PURIFICATION AND ISOLATION OF SERINE PROTEINASES TO PRODUCE FIBRIN SEALANT

Benedito Barraviera

Center for the Study of Poison and Venomous Animals

São Paulo State University (Unesp)

FAPESP Grant 2009/53846-9

Fibrin sealant comprises two components: the first is a serine proteinase extracted from snake venom (*Bothrops neuwiedi pauloensis* or *Crotalus durissus terrificus*); and the second is a fibrinogen-rich cryoprecipitate extracted from the blood of buffaloes, cattle or sheep. These two components are combined at the time of application making up fibrin with adhesive properties. A similar product with medical and veterinary applicability has been imported and is described in the review article attached (1). Three projects in partnership have been developed. The first is dedicated to the study, standardization and structural and functional characterization of serine proteinase molecules extracted from snake venom. The second is concerned with the certification of animals, which have never consumed animal protein, to produce cryoprecipitate. The third is dedicated to its applicability in the experimental glueing of nerves in the presence or absence of stem cells. A major problem is that the sealant production is not enough to supply basic, clinical, and experimental research. In addition, the complementary projects will attempt to extract bioactive anti-snake venom components from medicinal plants for experimental tests in animals. The institutional and multidisciplinary projects will allow the definitive certification of the two components of the fibrin sealant.

### Reference

Barros LC, Ferreira RS, Barraviera SRCS, Stolf HO, Thomazini-Santos IA, Mendes-Giannini MJS, Toscano E, Barraviera B. 2009. A new fibrin sealant from *Crotalus durissus terrificus* venom: Applications in medicine. *J Toxicol Environ Health B*. **12(8)**:553-71.

### EQUIPMENT GRANTED

- ÄKTAexplorer 100 liquid chromatography system and accessories (GE Healthcare Biosciences Corp.)



## ASSOCIATED PROJECTS

### **Center for the Study of Poison and Venomous Animals/ Unesp**

*Isolation of procoagulant serine proteases from Bothrops (neuwiedii) pauloensis and Crotalus durissus terrificus venoms: functional and structural characterization*

Benedito Barraviera  
FAPESP Grant 2007/05159-7

### **Institute of Biology/Unicamp**

*Synaptic plasticity of alpha-motoneurons in MDX mice treated with granulocyte colony-stimulating factor*

Alexandre Leite Rodrigues de Oliveira  
FAPESP Grant 2009/06686-6

### **Botucatu Institute of Biosciences/Unesp**

*Stable environmental isotopes in Animal Sciences*

Carlos Ducatti  
FAPESP Grant 2008/57411-4

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## DETERMINATION OF STEROID HORMONES AND OTHER ANALYTES BY LIQUID CHROMATOGRAPHY COUPLED WITH TANDEM MASS SPECTROMETRY: IMPACT ON THE DIAGNOSIS AND INVESTIGATION OF ENDOCRINOPATHIES

Berenice Bilharinho de Mendonça

School of Medicine

University of São Paulo (USP)

FAPESP Grant 2009/54002-9

The introduction of the radioimmunoassay technique for determining the levels of hormones, including steroids, brought about a true revolution in the diagnosis and investigation of endocrine diseases. Methods were developed for the determination of steroid levels through extraction with organic solvents, sometimes followed by chromatography and, finally, radioimmunoassay. However, for such determination in large numbers of samples, there was a need to simplify these methods, which made them less specific for various steroid hormones, because there were often cross-reactions between steroids. In addition to the cross-reactivity problem, direct measurement is subject to other interfering factors, such as heterophilic antibodies in the determination of testosterone. With the growing demand for quality, these limitations have driven the development of faster methods that are less susceptible to interference, liquid chromatography-mass spectrometry being one such method. In the USP School of Medicine Laboratory of Hormone Assay and Molecular Genetics (LIM/42), we currently determine steroid levels in approximately 20,000 samples per month, serving the entire complex of the USP School of Medicine Hospital das Clínicas. Faced with such potentially overwhelming protocols, which are common to public services, there is a need, in addition to systems with high specificity and sensitivity, for automated platforms that provide faster processing of large numbers of samples, requirements that are fully met by liquid chromatography-mass spectrometry systems. Our main goal is to use liquid chromatography coupled with tandem mass spectrometry in order to develop and deliver, in a timely manner, reports regarding the levels of steroid hormones and other analytes that are essential to the study of endocrine abnormalities.

### EQUIPMENT GRANTED

- XEVO TQ MS mass spectrometer, 2777 single-injector sample manager, and accessories (Waters GmbH)

## ASSOCIATED PROJECTS

### School of Medicine/USP

*Molecular characterization of congenital endocrine diseases that affect human growth and development*

Ana Cláudia Latronico  
FAPESP Grant 2005/04726-0

*Analysis of genes that modulate the phenotype of individuals with the classical form of 21-hydroxylase deficiency*

Tânia Sartori Sanchez Bachaga  
FAPESP Grant 2008/57616-5

### Institute of Biomedical Sciences/USP

*Establishment of human adrenal tumor cell cultures for the study of gene expression, signaling, proliferation, and cell death*

Claudimara Ferini Paciocco Lotfi  
FAPESP Grant 2005/04591-7

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## HEALTH

## ACQUISITION OF AN AUTOMATED GENETIC ANALYSIS PLATFORM FOR RESEARCH AND DIAGNOSIS

Carlos Alberto Moreira Filho

School of Medicine

University of São Paulo (USP)

FAPESP Grant 2009/53863-0

The Laboratories for Medical Research (LIM) affiliated with this proposal are engaged in research and health care support services at the USP School of Medicine Hospital das Clínicas. In these laboratories, the study of DNA from biological samples, including sequencing, polymorphism studies, and fragment analysis, is essential. In particular, LIM-36, which is a referral center for clinical genetics, employs these techniques, as well as others, for research and diagnostics. The same is true for other laboratories: LIM-24 (Oncology) develops and provides genetic tests for breast cancer, as well as investigating the molecular mechanisms involved; LIM-15 (Neurology) is a referral center for all of Latin America in glycogen-storage disease type II (Pompe disease) and tumors of the central nervous system; and LIM-29 (Nephrology) leads the country in studies of polycystic kidney disease. All of these activities rely on automated DNA sequencing equipment. However, the sequencers suited to the purposes mentioned above and currently available for use by the staff of these LIMs have already surpassed (or are rapidly approaching) their estimated useful lifetimes, having been out of production for several years, a situation that threatens the continuity of research and health care service provision. The suggested replacements for such outdated equipment are the next-generation sequencers (e.g., Roche 454, Illumina Solexa, ABI SOLiD), which are designed for large-scale analyses, typically 500 MB to 2 GB per run, and are priced at over US\$ 600,000, with operating costs of US\$ 8,000 to US\$ 10,000 per run—approximately US\$ 40 per sample—precluding their use in clinical genetics. To meet the specific needs of research and clinical genetics facilities, an automated platform for small-scale DNA analysis, the Applied Biosystems 3500 Genetic Analyzer, was introduced. This proposal is aimed the acquisition of one of these platforms, which employ capillary electrophoresis for DNA sequencing and multiplex analysis of DNA fragments (up to six fluorophores). The cost of this equipment is one fifth of that of the high performance platforms, and the operating costs will be 50 to 100 times lower.

### EQUIPMENT GRANTED

- Model 3500 Genetic Analyzer and accessories (Applied Biosystems)

## ASSOCIATED PROJECTS

### School of Medicine/USP

*High resolution structural magnetic resonance and receptor imaging studies in refractory temporal lobe epilepsy: in vivo and ex vivo analyses*

Carlos Alberto Moreira Filho  
FAPESP Grant 2005/56446-0

*Heterotypic signaling between epithelial tumor cells and fibroblasts in carcinoma of the breast*

Maria Mitzi Brentani  
FAPESP Grant 2004/04607-8

*Should genetic counseling for breast cancer be a routine practice at facilities specializing in treating cancer patients?*

Mirian Hatsue Honda Federico  
FAPESP Grant 2006/51709-6

*Genotype-phenotype correlation in Pompe disease*

Suely Kazue Nagahashi Marie  
Genzyme Corporation


*The search for molecular markers related to the diagnosis and prognosis of tumors of the central nervous system*

Suely Kazue Nagahashi Marie  
FAPESP Grant 2004/12133-6

*Differential expression of PKHD1 gene transcripts: biological implications and role in the pathogenesis of autosomal recessive polycystic kidney disease*

Luiz Fernando Onuchic  
FAPESP Grant 2004/02622-0

### Contacts for instructions for the use of the equipment



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## ACQUISITION OF ECHOCARDIOGRAPHY EQUIPMENT FOR THE EVALUATION OF CARDIAC FUNCTION IN HUMANS AND ANIMALS (RATS AND MICE) AND OF VASCULAR FUNCTION IN HUMANS

Carlos Eduardo Negrão

Heart Institute (Incor)

School of Medicine Clinics Hospital/USP

FAPESP Grant 2009/53948-6

The acquisition of an echocardiography system is of fundamental importance for the continuity of studies in projects related to cardiovascular disease. This equipment will allow the evaluation of cardiac function in humans and animals (rats and mice), as necessary for the study protocols and within the period specified in the investigations. Due to great demand for patient care at the Incor, together with the absence of echocardiographs at the USP School of Physical Education and Sport and the USP Institute of Biomedical Sciences, some experiments have been lost due to an inability to assess cardiac function after a trial intervention period, involving exercise or another procedure. This is a critical point for a group that has been competitive in the international literature and, above all, contributed with highly relevant information in the field of exercise physiology and cardiology. In addition, an echocardiograph could be useful for other groups at these and related facilities or institutes that investigate cardiac function in humans and animals. There are currently a great number of investigators in the state of São Paulo dedicated to determining the effects of exercise on the cardiovascular system in normal and pathological conditions.

Via the FAPESP Multi-User Equipment Program, we are requesting a Vivid E9 echocardiography system. The system has the following features: single-beat 4D imaging, providing the full-volume acquisition data set for larger volumes in a single cycle; multiplanar imaging (biplanar, with visualization of two-dimensional images in two orthogonal planes simultaneously, and triplanar, with the acquisition of three apical images simultaneously from a single positioning of the transducer); slice mode, with six, nine or twelve cuts; 4D stress echo; special rendering maps/stereo vision; automatic LVQ tracking system for 4D calculation of ejection fraction, using temporal data, which provides results that are more reproducible and less subject to artifacts and variation in heart rate; and “Scan Assist”, with customizable protocols for optimizing cardiac

### EQUIPMENT GRANTED

- Vivid E9 echocardiography system (GE Healthcare)
- 6T transesophageal transducer (GE Healthcare)

resynchronization therapy and stress echo, automatically organizing slices, adjustments, and measurements. In addition, the system has speckle reduction imaging, an advanced technique of image processing that uses specific calculations with smoothing algorithms to maintain image definition, even for images of structures with discrete differences in echogenicity. Furthermore, with this device, a new type of software for automatic measurement of intima-media thickness, based on measurements taken at more than 100 points, can be used.

## ASSOCIATED PROJECTS

### Heart Institute (Incor) – School of Medicine/USP

*Physical exercise and autonomic control in cardiovascular  
physiopathology*

Carlos Eduardo Negrão  
FAPESP Grant 2005/59740-7

*Coupling of endoplasmic reticulum stress with oxidative  
stress in vascular cells via interaction between protein disulfide  
isomerase and NADPH oxidase*


Francisco Rafael Martins Laurindo  
FAPESP Grant 2004/13683-0

### Institute of Biomedical Sciences/USP

*Role of the beta-1, 2 and 3 adrenergic receptors in isoproterenol-  
induced alterations in vascular function and pro-inflammatory  
cytokine synthesis in mice*

Luciana Venturini Rossoni  
FAPESP Grant 2007/58853-8

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## HEALTH

## ACQUISITION OF TWO LARGE-CAPACITY DEVICES (A MILLIPLEX ANALYZER XPONENT 3 AND ACCESSORIES AND A 7900 HT FAST REAL TIME PCR SYSTEM) FOR RESEARCH CONDUCTED AT THE UNIVERSITY OF SÃO PAULO SCHOOL OF DENTISTRY AND AT OTHER RESEARCH INSTITUTES

Carlos Ferreira dos Santos

Bauru School of Dentistry

University of São Paulo (USP)

FAPESP Grant 2009/53848-1

The use of a multiplexing device, which can simultaneously analyze up to 100 proteins in a single sample, will resolve all the problems reported and will allow new studies to be designed. The real-time PCR equipment requested will be essential for the study of new drugs as well as applications such as gene expression and detection of single nucleotide polymorphisms. One update accessory requested in conjunction with the thermal cycler allows access to a powerful, easy to use tool that eliminates intensive pipetting steps and provides gene expression results to meet a high demand. The Bauru School of Dentistry currently has 76 researchers in two graduate programs, which involve the direct participation of 182 graduate students, as well as several undergraduate researchers and interns. These researchers will benefit from the acquisition of the multiplexing system and the real-time PCR equipment, as will researchers at other research centers, such as the Lauro de Souza Lima Institute (through Dr. Ana Paula Trombone) and the São Paulo State University Bauru Campus (through Dr. Sandra Lia do Amaral) and Araçatuba Campus (through Dr. Sandra Helena Penha de Oliveira). The acquisition of this equipment is of paramount importance for setting up the Laboratory of Immunology and Cell Biology and the Laboratory of Pharmacology, enabling projects in the clinical areas (dentistry, periodontics etc.), as well as in the areas of anatomy, pharmacology, immunology and microbiology, and will contribute to greater integration between researchers of this school and those of other centers.

### EQUIPMENT GRANTED

- 7900 HT Fast Real-Time PCR system and accessories (Applied Biosystems)



## ASSOCIATED PROJECTS

### Bauru School of Dentistry/USP

*Characterization of a local renin-angiotensin system in the gingival tissue of the rat*

Carlos Ferreira dos Santos  
FAPESP Grant 2004/13479-2

*Expression of type I procollagen, MIP-1 alpha, and SDF-1 alpha by Streptococcus mutans lipoteichoic acid-stimulated fibroblasts in the human dental pulp*

Carlos Ferreira dos Santos  
FAPESP Grant 2005/60167-0

*Screening for mutations in the IRF6, MSX1 and PAX9 genes in subjects with cleft lip, cleft palate and tooth agenesis*

Carlos Ferreira dos Santos  
FAPESP Grant 2008/08927-8

*Senescence and denture stomatitis: quantitative, functional and phenotypical evaluation of neutrophils*

Vanessa Soares Lara  
FAPESP Grant 2006/59612-1

*Denture stomatitis in the senescent population: evaluation of monocyte-induced activation and production of pro- and anti-inflammatory cytokines*

Vanessa Soares Lara  
FAPESP Grant 2008/03539-0

*The role of costimulatory signaling in the progression of chronic apical periodontitis*

Ana Paula Campanelli  
FAPESP Grant 2008/09973-3

*Modulation of the immune response during the development and progression of squamous cell carcinoma*

Ana Paula Campanelli  
FAPESP Grant 2008/10999-7

*Involvement of regulatory T cells in the modulation of tumorigenesis in patients with actinic cheilitis and squamous cell carcinoma of the mouth: correlation with behavior*

Ana Paula Campanelli  
FAPESP Grant 2006/04264-9

*Characterization of the role of Toll-like receptors after infection with Actinobacillus actinomycetemcomitans*

Ana Paula Campanelli  
FAPESP Grant 2006/06072-0

*Association between polymorphism of the eosinophil cationic protein gene and the tumor-related tissue eosinophilia seen in squamous cell carcinoma of the mouth*

Denise Tostes Oliveira  
FAPESP Grant 2006/03830-0

### Lauro de Souza Lima Institute/SES-SP

*Evaluation of the role of T and Th17 cells in human experimental leprosy*

Ana Paula Favero Trombone  
FAPESP Grant 2009/06122-5

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## ACQUISITION OF A PET/CT FOR THE QUANTIFICATION OF METABOLIC ACTIVITY IN LIVING TISSUE

Carmino Antônio de Souza

Faculty of Medical Sciences

State University of Campinas (Unicamp)

FAPESP Grant 2009/54065-0

The recent advent of hybrid devices employing positron emission tomography coupled with computed tomography (PET/CT) has revolutionized the study of hematologic disorders, neoplasia and neurological diseases, as well as that of normal tissues, such as the so-called brown fat. This has also opened a new playing field, the area of medical physics, which is expanding rapidly in the country and, in particular, at Unicamp. However, to date, no university in the state (or the country) has a PET/CT scanner for use in research, the availability of such scanners being restricted almost exclusively to a few private institutions. The objective of this project is to install a PET/CT scanner at Unicamp. This multi-user scientific instrument will be of continuous use to Unicamp researchers, including those at the Blood Bank, the School of Medical Sciences, the Department of Nuclear Medicine, the Institute of Physics, the Center for Women's Health Care and the Center for Biomedical Engineering. These facilities are currently developing cutting-edge research in their respective areas, including three FAPESP-funded projects (two Thematic Projects and one Young Investigators at Emerging Institutions Program project), whose future expansion depends largely on the availability of this equipment. The aim of this proposal is to provide the researchers involved, as well as other researchers interested in using the equipment in the future, with broad access to the PET/CT scanner. In exchange, Unicamp offers an extensive imaging equipment park and permanent staff for the operation of equipment requested. It also has a maintenance team, user assistance, and training already adapted to and certified for the equipment. The availability of material, financial, and human resources, as guaranteed by the Unicamp Dean's Office, will ensure that the equipment will effectively be maintained over the long-term, with minimal downtime.

### EQUIPMENT GRANTED

- PET/CT (positron emission tomography/computed tomography) scanner (Siemens AG)

## ASSOCIATED PROJECTS

### Faculty of Medical Sciences/Unicamp

*Multicenter cooperative Phase 3 study for the treatment of recently diagnosed multiple myeloma*

Carmino Antonio de Souza  
FAPESP Grant 2003/05350-8

*Bone scans with 18F-fluoride PET/CT in patients with inconclusive alterations on bone scintigraphy for the investigation of metastases*

Celso Dario Ramos  
FAPESP Grant 2009/51799-3

*Role of the IRS/PI3K/Akt/mTOR pathway in tumor development*

José Barreto Campello Carvalheira  
FAPESP Grant 2004/06064-1

*Study of the morphological, phenotypic and molecular characteristics of malignant blood diseases and their repercussions for clinical practice, patient evolution and treatment response*

Irene Lorand-Metze  
FAPESP Grant 2003/09862-3

### Contacts for instructions for the use of the equipment

**Carmino Antônio de Souza**

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## PURCHASE OF EQUIPMENT TO SET UP A MULTI-USER LABORATORY AT THE UNIVERSITY OF SÃO PAULO SCHOOL OF PHARMACEUTICAL SCIENCES

Dulcineia Saes Parra Abdalla  
School of Pharmaceutical Sciences  
University of São Paulo (USP)  
FAPESP Grant 2009/53800-9

This proposal, submitted by the USP School of Pharmaceutical Sciences of the University of São Paulo (FCF-USP) comprises the purchase of large-capacity devices. The machinery will be installed at the same faculty aiming to create a new Multi-User Laboratory. The FCF-USP is committed to implementing policies that promote research activities, development of human resources, knowledge transfer, and cooperation among researchers working in different areas of the Pharmaceutical Sciences. Therefore, the application submitted to the “FAPESP Multi-User Equipment Program” is based on the creation of a novel FCF-USP Multi-User Laboratory that could be used by both internal researchers and external collaborators, contributing to scientific and technological advances and meeting federal scientific and technological development policies. The FCF-USP Multi-User Laboratory will comprise the following equipments: 1-microPET Scan ALbira, Carestream; 2- In vivo Imaging System MSFX-PRO, Carestream. In an initial phase, users of the FCF-USP Multi-User Laboratory will share two equipments as described in this proposal. This practice will be later extended to other equipments, including those yet to be acquired, assuming that equipments in question are suited to such sharing. The creation of a Multi-User Laboratory would optimize the use and the maintenance of equipments, as well as improve overall layout and consolidate qualified technical staff expertise to support scientific and technological research at the FCF-USP.

### EQUIPMENT GRANTED

- IVIS Lumina XR in vivo imaging system, with standard filter set (Xenogen/Caliper Life Sciences)
- XGI-8 gas anesthesia system (Xenogen/Caliper Life Sciences)

## ASSOCIATED PROJECTS

### School of Pharmaceutical Sciences/USP

*Nutrigenomics: bioactive compound modulation of the expression of proteins involved in maintaining angiogenesis balance*

Dulcinea Saes Parra Abdalla  
FAPESP Grant 2008/53756-7

*Effects of serum amyloid A on human glioma cells*

Ana Campa  
FAPESP Grant 2007/07019-8

*Carbohydrates as chiral building blocks in organic synthesis: applications in asymmetric catalysis and the development of glycopeptides with potential biological activity*

Diogo Seibert Lüdtko  
FAPESP Grant 2007/02382-7

*Lyophilization of biological tissue: research from the biomaterials development point of view*

Ronaldo Nogueira de Moraes Pitombo  
FAPESP Grant 2004/09566-8

*Evaluation of hematopoiesis and the innate immune response in mice during the nutritional recovery process after protein restriction*

Primavera Borelli Garcia  
FAPESP Grant 2006/55495-0

*Study of 230 polymorphisms in 60 candidate genes and their associations with the response to atorvastatin*

Rosario Dominguez Crespo Hirata  
FAPESP Grant 2008/06667-9

*Generation of human skin equivalents and invasive melanomas as a platform for pharmacological tests*

Silvy Stuchi Maria Engler  
FAPESP Grant 2008/58817-4

*Effect of lactic acid bacteria cultures on the dynamics and functionality of the probiotic and symbiotic microbiota of petit suisse cheese during its production and storage*

Susana Marta Isay Saad  
FAPESP Grant 2009/52600-6

*Effects of dietary supplementation with Brazil nuts [Bertholletia excelsa H.B.K.] on oxidative stress in obese women and their relationship with the Pro198Leu polymorphism in the glutathione-peroxidase 1 gene*

Silvia Maria Franciscato Cozzolino  
FAPESP Grant 2007/50533-4

*Extraction of clavulanic acid from Streptomyces spp. Using aqueous two-phase systems composed of polymers and micelles*

Adalberto Pessoa Junior  
FAPESP Grant 2008/54096-0

*Characterization of the effects of amblyomin-X on angiogenesis and on macrophage function*

Sandra Helena Poliselli Farsky  
FAPESP Grant 2008/57850-8

*Systematic study of medicinal plants: pharmacotherapeutic potential of Pothomorphe umbellata*

Silvia Berlanga de Moraes Barros  
FAPESP Grant 2006/60930-8

*Cloning, production, and functional expression of bacteriocines produced by Lactobacillus sakei subsp. sakei 2a*

Bernadette Dora Gombossy de Melo Franco  
FAPESP Grant 2007/55139-2

*Molecular analysis of the fecal microbiota of children between one and twelve months of age using the 16S rRNA library*

Carla Taddei de Castro Neves  
FAPESP Grant 2008/53959-5

*Mechanisms of carbapenem resistance in gram-negative bacteria of medical interest in hospital settings: a multicenter study*

Elsa Masae Mamizuka  
FAPESP Grant 2007/59417-7

*Characterization of ORFs of unknown function involved in the antioxidant response of Saccharomyces cerevisiae*

Gisele Monteiro de Souza  
FAPESP Grant 2009/01303-1

*Reactions between nucleophilic species (potassium organotrifluoroborate salts) and electrophilic species (tellurium and organic halides)*

Hélio Alexandre Stefani  
FAPESP Grant 2007/59404-2

*Evaluation of the immunogenicity of the Plasmodium vivax apical membrane antigen 1 (pvAMA-1): heterologous prime-boost strategy using plasmid DNA or recombinant protein*

Irene da Silva Soares  
FAPESP Grant 2008/05613-2

*Production of analytical standards and development of methods for the monitoring of microcystins, in accordance with Brazilian National Ministry of Health Decree no. 518*

Ernani Pinto Junior  
FAPESP Grant 2009/51328-0

*Evaluation of the effects that conjugated isomers of linoleic acid and alpha-linolenic acid have on the tissue lipid profile and their influence on biochemical parameters in processes in rats*

Jorge Mancini Filho  
FAPESP Grant 2009/51891-7

*Development of structured lipids derived from human milk fat by continuous enzymatic interesterification*

Luiz Antônio Gioielli  
FAPESP Grant 2008/55061-6

*Ellagic acid derivatives in regional Brazilian foods: structural identification and bioavailability*

Maria Ines Genovese  
FAPESP Grant 2007/05823-4

*The transcriptome and proteome in peripheral blood: seeking new markers of cardiovascular diseases. Study of acute myocardial infarction*

Mário Hiroyuki Hirata  
FAPESP Grant 2006/03487-4

*Toxicological analysis of the bioindicators of exposure to alcohol and smoking in the meconia of neonates in the nursery of the USP University Hospital*

Mauricio Yonamine  
FAPESP Grant 2007/00465-2

## ASSOCIATED PROJECTS

### Heart Institute, School of Medicine/USP

*Lipid nanoparticles: applications in the study of the pathophysiology, diagnosis and treatment of degenerative diseases*

Raul Cavalcante Maranhão  
FAPESP Grant 2006/58917-3

*Biomolecular study of the products of Chlamydia pneumominiae and Mycoplasma pneumominiae in the progression of chronic valvular heart disease in humans*

Maria de Lourdes Higushi  
FAPESP Grant 2007/04067-1

### Adolfo Lutz Institute/SEP-SP

*Construction of a new chimeric protein from Treponema pallidum and its application in the immunodiagnosis of syphilis*

Neuza Satomi Sato  
FAPESP Grant 2005/51541-5

### University Hospital/USP

*Infectious diseases: epidemiology and diagnosis*

Marina Baquerizo Martinez  
FAPESP Grant 2008/58288-1

### Ludwig Institute for Cancer Research

*HPV and the tumor microenvironment*

Luisa Lina Villa  
FAPESP Grant 2008/03232-1

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## PLASMA CONCENTRATION OF HDL CHOLESTEROL IN HUMANS: RELATIONSHIP WITH WHOLE-BODY CHOLESTEROL METABOLISM AND WITH CHOLESTEROL METABOLISM IN MONOCYTES

Éder Carlos Rocha Quintão

School of Medicine

University of São Paulo (USP)

FAPESP Grant 2009/53865-3

Low plasma levels of HDL cholesterol are correlated with the incidence of cardiovascular disease in a much more significant manner than are high plasma levels of LDL cholesterol, which makes low HDL a more important risk factor. Although the mechanisms of LDL atherogenicity have been well elucidated, the exact mechanism by which HDL exerts its antiatherogenic effects remains unclear. One possibility is the involvement of HDL in reverse cholesterol transport, a system by which cholesterol from peripheral tissues, including the arterial intima, is captured by the liver and secreted into bile. The control of the whole-body cholesterol metabolism should have the following features: 1) more variation in function attributed to plasma HDL than to plasma LDL concentration; 2) blood monocytes reflecting the whole-body cholesterol synthesis; 3) cholesterol synthesis being inversely related to intestinal cholesterol absorption. Given these premises this proposal aims at determining the relationship between plasma HDL concentration and whole body cholesterol storage in blood monocytes and plasma markers of non-cholesterol synthesis and absorption sterols. Given these premises, this proposal is aimed at determining the relationship between plasma HDL concentrations and whole-body cholesterol storage.

### EQUIPMENT GRANTED

- Sorvall WX100 ultracentrifuge and rotors  
(Thermo Fisher Scientific Inc.)



## ASSOCIATED PROJECTS

### **USP School of Medicine and Unicamp Faculty of Medical Sciences**

*Relation between the plasma HDL-cholesterol concentration and cholesterol metabolism [whole-body and in blood monocytes] in humans*

Eder Carlos Rocha Quintão  
FAPESP Grant 2006/60585-9

### **School of Medicine/USP**

*Role of B-1 cells in the inflammatory response to lipopolysaccharide*

Francisco Gracia Soriano  
FAPESP Grant 2009/03338-7

*Influence of protein cholesteryl ester transfer protein [CETP] on the inflammatory response in an experimental model of endotoxemia*

Patricia Miralda Cazita  
FAPESP Grant 2006/56853-8

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## DEVELOPMENT OF MURINE MODELS FOR THE FUNCTIONAL STUDY OF NORMAL STEM CELLS AND CANCER CELLS AND THE COMPARATIVE TRANSCRIPTOME AND PROTEOME ANALYSIS OF THOSE CELLS AND THEIR PROGENY

Eduardo Magalhães Rêgo

Ribeirão Preto School of Medicine

University of São Paulo (USP)

FAPESP Grant 2009/54218-1

Because of their similarity to hematopoietic stem cells (HSCs), the immature progenitor cells seen in malignant tumors and the various forms of leukemia have been designated cancer stem cells (CSCs). The CSCs are capable of dividing asymmetrically, giving rise to tumor cells that are more differentiated or to identical daughter cells. Because they can repopulate the tumor after chemotherapy, CSCs are responsible for the maintenance/recurrence of the disease. In addition, CSCs are quiescent and are therefore inherently resistant to the effects of the drugs conventionally used in cancer therapy. The identification of CSCs is based on functional tests, the most common model being transplantation of cells into immunodeficient mice. Although it has been demonstrated that CSCs are present in various malignancies, the nature of these cells remains largely unknown. The objective of this proposal is to combine *in vivo* assays (using immunodeficient, genetically manipulated, or lethally irradiated animals) with methods of transcriptome and proteome analysis for the study of various stem cells. Five major projects (comprising more than 30 subprojects) will be developed: a) using murine models to identify subpopulation of cells with CSC characteristics in leukemia associated with the hybrid proteins CALM-AF10 and PML-RARA; b) identification of signaling pathways presenting aberrant activity in CSCs and their progeny in acute leukemia and breast cancer; c) analysis of the effect of topotecan blockade of the HIF-1 $\alpha$  gene in glioblastoma multiforme cell lines – *in vitro* and in mice with combined immunodeficiency after exposure to ionizing radiation; d) study of HSCs and hematopoietic precursors in a mouse model of dyskeratosis congenita (altered ribosomal function and a propensity to develop cancer); e) determination of regenerative efficiency of induced pluripotent stem cells, using retroviral vectors, in animal models; and f) identification of the pathways involved in the differentiation, quiescence and apoptosis of induced pluripotent stem cells.

### EQUIPMENT GRANTED

- Mark I Series (model 25) turntable irradiators, with 800 Ci.Cs137 sources and 3 chambers capable of holding 6 mice each (JL Shepherd & Associates)
- JSAN Cell Sorter flow cytometer with 2 lasers – blue (488 nm) and red (638 nm) – and 6 fluorescence detectors (Bay bioscience Co., Ltd.)
- 3500xL 24-capillary genetic analyzer for resequencing and fragment analysis (Applied Biosystems)

## ASSOCIATED PROJECTS

### Ribeirão Preto School of Medicine/USP

*National institute of Science and Technology in Stem Cells and Cell Therapy*

Roberto Passetto Falcão  
FAPESP Grant 2008/57877-3

*Center for Cell Therapy*

Marco Antonio Zago  
FAPESP Grant 1998/14247-6


*Study of residual disease in acute lymphoid malignancies in children and teenagers*

Carlos Alberto Scrideli  
FAPESP Grant 2005/02279-6

*Protein expression during the differentiation and proliferation of human progenitor cells and tumor cells (project affiliated with the São Paulo State Proteome Network)*

Lewis Joel Greene  
FAPESP Grant 2004/14846-0

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## ACQUISITION OF AN *IN VIVO* MICROTOMOGRAPHY SCANNER FOR USE IN THE LABORATORY FOR CHARACTERIZATION AND EVALUATION OF BIOLOGICAL RESPONSES

Elcio Marcantônio Júnior

Araraquara School of Dentistry

São Paulo State University (Unesp)

FAPESP Grant 2009/54080-0

The objective of this proposal is the acquisition of a scanner for *in vivo* computed microtomography, to be used jointly by a network of researchers investigating tissue responses. The equipment is designed to visualize and perform qualitative and quantitative *in vivo* analyses of anatomical parameters in small animals, but can also be used to run biopsy analyses. Comparatively, *in vivo* microtomography has many advantages over *ex vivo* microtomography: 1-it allows longitudinal evaluation in the same animals; 2-it reduces the number of animals per experiment, because it allows the animals to be monitored, thereby avoiding the need to sacrifice animals at every time point to be analyzed, which has obvious ethical implications; 3-it allows physiological parameters, such as breathing, heart rate, temperature, and electrocardiographic data, to be monitored in real time, guaranteeing the maintenance of animals during the procedures and providing data for research in the area; 4-it is capable of image reconstruction in real time, allowing immediate analysis of data and increasing the number of analyses that can be made in a given period of time; 5-it has an X-ray energy potential of 120 kVp, allowing better results for images of implants, with a reduction in beam hardening artifacts. This equipment will be employed by a network of laboratories that engage in molecular biology, biomechanics, histological processing and image analysis, as well as the sectioning of hard tissues and metals. Because it can be employed in various fields of study, including medicine, veterinary sciences, dentistry, physiology and biomaterials development, there is a wide range of potential users. Therefore, the researchers affiliated with this proposal (associates and collaborators) work in various areas and at various universities within the State of São Paulo. The acquisition of this equipment is justified by the breadth of the team, the broad variety of applications, the lack of similar equipment in the state of São Paulo, and the quality of analyses that can be obtained. In addition, this equipment will contribute greatly to the development of research in the State of São Paulo and in Brazil as a whole.

### EQUIPMENT GRANTED

- SkyScan 1176 high-resolution *in vivo* micro-CT system (SkyScan Systems)

## ASSOCIATED PROJECTS

### Araraquara School of Dentistry/Unesp

*Influence of dietary magnesium deficiency on bone density and osseointegration of implants in rats. Densitometric, radiographic, reverse torque and histomorphometric assessments*

Elcio Marcantonio Junior  
FAPESP Grant 2006/05774-0

*In vivo and in vitro evaluation of the effects of smoking on osteogenesis over various titanium surfaces*

Rosemary Adriana Chiéríci Marcantonio  
FAPESP Grant 2008/10159-9

*Use of a ER-CR:YSGG laser in soft tissue and bone for the treatment of experimentally induced periodontal disease. Histological and immune-inflammatory analyses in rats*

Rosemary Adriana Chiéríci Marcantonio  
FAPESP Grant 2009/00479-9

*In vivo and in vitro effect of IL-2 inhibition by FK-506 on Rankl and OPG gene expression in ligature-induced periodontal disease*

Carlos Rossa Junior  
FAPESP Grant 2006/07283-4

*Effects of orthodontic movement on inflammatory mediator expression in the periodontal tissues of healthy rats and of rats with experimentally induced periodontal disease*

Joni Augusto Cirelli  
FAPESP Grant 2008/06328-0

*Association between rheumatoid arthritis and periodontal disease. Evaluation of the IL-23/IL-17 axis*

Joni Augusto Cirelli  
FAPESP Grant 2009/00341-7

*Inhibition of MMP-13 and p38 MAPK gene expression by adenoviral-delivered shRNA in a murine model of experimentally induced periodontal disease*

Luiz Carlos Spolidorio  
FAPESP Grant 2007/05583-3

### Bauru School of Dentistry/USP

*Interactions between the development of A. actinomycetemcomitans-induced periodontitis and of pristane-induced arthritis in mice*

Gustavo Pompermaier Garlet  
FAPESP Grant 2008/03047-0

*Role of CCR5+ cells in the immunomodulation of experimental periodontal disease*

Gustavo Pompermaier Garlet  
FAPESP Grant 2006/00534-1

### Araçatuba School of Dentistry/Unesp

*Effects of laser and photodynamic therapy in the periodontal treatment of ovariectomized rats, with or without hormone replacement therapy: histomorphometric and immunohistochemical study*

Valdir Gouveia Garcia  
FAPESP Grant 2008/06218-0

### University of Guarulhos (UNG)

*Influence of type I osteoporosis on the osseointegration of immediate-loading implants*

Jamil Awad Shibli  
FAPESP Grant 2008/06972-6

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## MULTIPLEXING APPLICATIONS IN THE STUDY OF AUTOIMMUNE AND INFLAMMATORY DISEASES

Eloísa Silva Dutra de Oliveira Bonfá

School of Medicine

University of São Paulo (USP)

FAPESP Grant 2009/53860-1

Plasma and tissue levels of cytokines constitute an important parameter for the study of autoimmune and inflammatory diseases pathophysiology. The importance of cytokines as mediators is demonstrated by the recent advances in biological therapies that target their reduction. The determination of cytokine levels is standard practice in the assessment of treatment efficacy. Currently, these determinations are made by ELISA, and large volume of biological material for the individual quantification of each mediator is the major limitation of this method. This is particularly relevant in studies that involve children, small animals, or debilitated patients.

Multiplex is a new technology that significantly reduces assay time, costs and has the great advantage to require small volume for several tests performed simultaneously. The objective of this proposal is to implement cytokines determination using multiplex assay at the USP School of Medicine. The only device similar to the one requested in this project is calibrated for routine use in the Histocompatibility Laboratory and due to the high demand it is not available for research projects. The acquisition of a new multiplex device will be useful to test the effects of biological therapies in more than 5,000 samples (-70°C frozen material collected from approximately 300 rheumatology patients followed longitudinally: 2007-2009) of the Biological Center Unit. In addition, the device will be useful for the study of the effect of lipid nanoparticles combined with methotrexate in the treatment of antigen-induced arthritis in rabbits. Furthermore, the evaluation of cytokines will be relevant for determining the efficacy of vaccine therapy in HIV-infected patients. Other FAPESP-sponsored projects in development at the USP School of Medicine, will also benefit from the use of this technology. It is therefore clear that the device will facilitate the technical work of many researchers who study autoimmune and inflammatory diseases in humans and animals, as well as reducing costs and the need for specialized support staff.

### EQUIPMENT GRANTED

- Luminex 100 IS microsphere analyzer, with IS 2.3 software (Luminex Corporation)

## ASSOCIATED PROJECTS

### School of Medicine/USP

*Establishment of a multidisciplinary center for the dispensation of high-cost medication*

Eloisa Silva Dutra de Oliveira Bonfá  
FAPESP Grant 2006/61303-7

*Predictive study of the vaccine potential of dendritic cells pulsed with autologous virus in the cell response to HIV-1 infection*

Alberto José da Silva Duarte  
FAPESP Grant 2005/60346-1

### Heart Institute, School of Medicine/USP

*Lipid nanoparticles: applications in the study of the pathophysiology, diagnosis and treatment of degenerative diseases*

Raul Cavalcante Maranhão  
FAPESP Grant 2006/58917-3

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## ACQUISITION OF SERVERS FOR ORGANIZING THE COMPUTATIONAL INFRASTRUCTURE OF MULTI-INSTITUTIONAL CLINICAL RESEARCH NETWORKS

Eurípedes Constantino Miguel Filho

School of Medicine

University of São Paulo (USP)

FAPESP Grant 2009/54220-6

Despite the considerable investment made in the National Institute of Developmental Psychiatry for Children and Adolescents (INPD), an electronic data capture (EDC) program specific for prospective research has yet to be created. There are currently a wide variety of web-based programs that can be used in the development of prospective, randomized clinical trials. However, many of those programs are costly and difficult to use, or were developed for studies with specific designs. Therefore, we propose the acquisition of servers that will enable the installation of a free EDC program, developed at Duke University and designated Dados Prospective (Dados P), which will be employed in the collection of data for INPD projects. So that data collected in these studies can be merged with those of researchers at other national and international institutions, we will provide assistance to researchers in devising data collection forms that meet international data standards, such as those established by the Cancer Data Standards Repository. After the initial implementation phase and use of the Dados P and standards, the system will be made available to the scientific community at the USP School of Medicine. The use of the Dados P program for the collection of data, together with the use of data standards proposed, will facilitate research processes at the USP School of Medicine and will improve the quality of the resulting scientific production.

### EQUIPMENT GRANTED

- Servidor HP Proliant G7 DL360
- Storage HP iSCSI P2000 G34 TB HD



## ASSOCIATED PROJECTS

### School of Medicine/USP

*National Institute of Developmental Psychiatry for Children and Adolescents*

Eurípedes Constantino Miguel Filho  
FAPESP Grant 2008/57896-8

*Structuring the mental status exam: impact on quality of data and clinical practice*

Helena Paula Brentani  
FAPESP Grant 2011/05481-1

*Copy number variation in verbal and non-verbal patients with autism spectrum disorders*

Eurípedes Constantino Miguel Filho  
FAPESP Grant 2011/04956-6

Contacts for instructions  
for the use of the equipment

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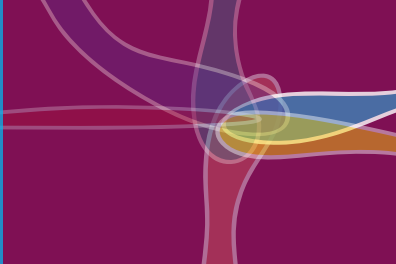
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## ACQUISITION OF A CONFOCAL MICROSCOPE FOR THE OBJECTIVE EVALUATION OF MARKERS IN ANATOMICAL PATHOLOGY

Fernando Augusto Soares

Antônio Cândido Camargo Cancer Hospital

Antônio Prudente Foundation

FAPESP Grant 2009/54204-0

One of the most powerful molecular pathology tools used in oncology is the identification of markers of the development, progression, and biological behavior of tumors, markers that can also predict the treatment response. Although the investigation of gene expression has identified a large number of genes related to these biological processes, those findings need to be validated. One of the most commonly used methods is the identification of transcripts and proteins by *in situ* hybridization, immunohistochemistry or immunofluorescence. These methods are extremely valuable but sometimes lack objective analysis. The identification of markers can reveal anomalous intracellular localizations that can be related to their intrinsic activity, just as the relationship between two markers in a signaling pathway can be important for understanding cell function. Major technological advances have been made in the objective analysis of the localization of relationships between two or more markers, as well as in the recognition of cellular colocalization, by confocal microscopy. This request aims to add quality to anatomopathological research projects at various facilities by acquiring a next-generation confocal microscope.

### EQUIPMENT GRANTED

- FV10i confocal laser scanning microscopy system (Olympus Corp.)

## ASSOCIATED PROJECTS

### Antônio Cândido Camargo Cancer Hospital/Antônio Prudente Foundation

*Antônio Prudente Cancer Research Center*

Fernando Augusto Soares  
FAPESP Grant 1998/14335-2

*Cancer of the penis: approaching a particularly Brazilian problem from morphology to molecular mechanisms*

José Vassalo  
FAPESP Grant 2009/52088-3

### School of Medicine/Unesp

*Putative markers in breast cancer: validation by large scale analysis of gene expression*

Silvia Regina Rogatto  
FAPESP Grant 2007/52632-0

*Changes in the number of copies of DNA within squamous cell carcinomas of the larynx and on their invasive front*

Silvia Regina Rogatto  
FAPESP Grant 2007/52265-7

*The PHF21B gene as a candidate for familial predisposition to cancer of the head and neck*

Silvia Regina Rogatto  
FAPESP Grant 2007/52256-8

*Variations in the number of genome copies in uterine leiomyomas in Brazilian women*

Silvia Regina Rogatto  
FAPESP Grant 2008/58835-2

*Pattern of gene expression and functional analysis of the Toll-Like Receptors [TLRs] in pelvic endometriosis*

Silvia Regina Rogatto  
FAPESP Grant 2009/50470-8

### School of Dentistry/USP

*Oral melanoma: morphologic and immunohistochemical analysis of tumor markers and adhesion molecules through tissue array*

Silvia Vanessa Lourenço  
FAPESP Grant 2006/56625-5

*Overexpression of the HOXD11 gene in squamous cell carcinoma of the mouth: gene expression profiling by microarray*

Fábio Daumas Nunes  
FAPESP Grant 2008/06223-3

### Ribeirão Preto School of Medicine/USP

*The role of tumor hypoxia in the pathogenesis of mammary carcinomas of the CD44+CD24- immunophenotype*

Alfredo Ribeiro da Silva  
FAPESP Grant 2008/06461-1

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## FLUOROMETRY AND CYTOFLUOROMETRY IN THE INVESTIGATION OF TRANSMITTED DISEASES

Heitor Franco de Andrade Júnior

School of Medicine

University of São Paulo (USP)

FAPESP Grant 2009/54219-8

Several research groups at the USP School of Medicine supported by LIM - Laboratories for Medical Research and also affiliated with the São Paulo Institute of Tropical Medicine (IMTSP) – have long been devoted to the study and control of transmissible diseases. We are mainly involved in the study of tropical and neglected diseases, in all their aspects, as experimental models, vaccine and drug development and diagnostic and immunopathology assays. Our laboratories are well-equipped to perform conventional molecular and cellular biology techniques, as well as immunopathology and immunodiagnostics. We have also used modern techniques of fluorescence detection, such as flow cytometry luminescence, and other spectrofluorometry techniques, in collaboration with other USP research groups. The support of FAPESP allows us to implement a multiuser facility to avoid a number of problems that have restricted the use of external collaborative resources, as scheduling in congested multi-user systems and biosafety, as alleged contamination of the equipment by transmissible agents. This has restricted the progress of some quite promising projects in the area, that guides our proposal to FAPESP Multi-User Equipment Program. The creation of a multiuser facility in advanced fluorescence techniques, namely, spectrofluorometry and flow cytometry, will expand the technological arsenal of researchers working in the field of communicable diseases, bringing them on the forefront of world science. This facility is perfect both for data collection but also for training staff, with a cluster of partially overlapping devices in constant operation – essential in a world in which research has become increasingly more competitive and data must be promptly published. Those 10 laboratories that are active in the study of transmitted diseases, and offer an area of 15 m<sup>2</sup>, with anteroom and one trained staff member with two small flow cytometers with 4 color array and a high-performance flow cytometer, with

### EQUIPMENT GRANTED

- FACSCalibur flow cytometry system with FACStation Mac Pro computer and accessories (Becton Dickinson)
- Gemini EM Fluorescence microplate reader (Molecular Devices Inc.)

three lasers and 11 color arrays, aside to a multiplate spectrofluorometer accepting plates with up to 384 wells. This facility provide equipments for studies of cellular markers, studies on components of intracellular signaling pathways, studies on markers of cell death or cell proliferation, studies on intracellular production of cytokines, chemokines, and all events on pathogen-host cell interactions, allowing the simultaneous analysis of multiple parameters. There are also studies on the development of multiplex diagnostic tests, for facilities such as blood banks for the control for neglected diseases and other tests to assess the effectiveness of vaccines, by detecting cell immune responses.

## ASSOCIATED PROJECTS

### São Paulo Institute of Tropical Medicine/USP

*Determination of the haplotypes of CXCL12-CXCR4/CXCR7 axis in malaria patients in Brazil and Africa*

Heitor Franco de Andrade Junior  
FAPESP Grant 2009/05738-2

*Prevalence of human papillomaviruses in urine samples of male patients infected with HIV-1 in São Paulo, Brazil*

Jorge Simão do Rosário Casseb  
FAPESP Grant 2006/53135-7

### School of Medicine/USP


*Predictive study of the vaccine potential of dendritic cells pulsed with autologous virus in the cell response to HIV-1 infection*

Alberto José da Silva Duarte  
FAPESP Grant 2005/60346-1

*Molecular characterization of Trypanosoma cruzi: parasitemia and cytokine levels in HIV-infected patients with Chagas disease*

Maria Aparecida Shikanai Yasuda  
FAPESP Grant 2004/07368-4

### Contacts for instructions for the use of the equipment



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## ACQUISITION OF EQUIPMENT FOR THE DEPLOYMENT OF MULTI-USER LABORATORY FOR MULTIMODAL MOLECULAR ANALYSIS OF TISSUES IN THE FCM/UNICAMP

Íscia Teresinha Lopes Cendes

Faculty of Medical Sciences

State University of Campinas (Unicamp)

FAPESP Grant 2009/54114-1

This proposal focuses on the establishment of a laboratory to support projects in several areas of biomedical sciences. The equipment requested will allow the analysis of tissues obtained from various sources (biopsies, surgical procedures, animal models etc.), as well as samples obtained from cell cultures or microdissected tissue. Numerous biomedical research projects will benefit from the equipment requested here, because molecular analysis of tissue at various levels is of great importance for the understanding of the complex biological phenomena that underlie normal and pathological mechanisms affecting humans. This proposal is supported by three Thematic Projects led by three researchers from different departments of the Unicamp School of Medical Sciences (Medical Genetics, Neurology and Clinical Medicine) which underscores the institutional (as opposed to personal) character with which we wish to imbue the Multi-User Laboratory for Multimodal Molecular Analysis of Tissues. These experienced researchers will also be responsible for joint management of the laboratory that will be directly affiliated to the Unicamp School of Medical Sciences Chamber of Research, rather than with any particular department. In addition, the great interest in the research methodologies that will be provided with the equipment requested is evidenced by the significant number of complementary projects that accompany this proposal. It is noteworthy that we are including projects of 17 faculty members from 11 Unicamp School of Medical Sciences departments, together with projects being undertaken by the Unicamp Institute of Biology, Center for Molecular Biology and Genetic Engineering, Faculty of Dentistry of Piracicaba, as well as by other institutions (e.g., the Federal University of São Paulo Paulista School of Medicine).

### EQUIPMENT GRANTED

- 3500xL 24-capillary genetic analyzer (upgrade from the current 8-capillary system)
- OpenArray Real-Time PCR platform with AccuFill system (Applied Biosystems)
- Axio Observer Z1 inverted microscope (motorized Z axis), prepared for laser capture microdissection, and accessories (Carl Zeiss AG)
- VTA-110CC Tissue Arrayer (Veridiam)
- Odyssey Protein Array imaging system (LI-COR Biosciences)
- GeneChip Hybridization Oven 645 (Affymetrix Inc.)
- PowerEdge T710 servers for up to 8 hard drives and systems (Dell Inc.)

## ASSOCIATED PROJECTS

### Faculty of Medical Sciences/Unicamp

*Identification and characterization of the etiology, mechanisms of injury, neuronal dysfunction and molecular defects in mesial temporal lobe epilepsy and their relationship with treatment response*

Íscia Lopes Cendes  
FAPESP Grant 2003/13424-1

*CInAPCe Multimodal center for neuroimaging studies in epilepsy*

Fernando Cendes  
FAPESP Grant 2005/56578-4

*Functional investigation and characterization of the involvement of novel target genes and new therapies for myelodysplastic syndromes and in leukemia cell lines*

Sara Teresinha Olalla Saad  
FAPESP Grant 2005/51681-1

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## ACQUISITION OF A NUCLEIC ACID SEQUENCER FOR USE IN PROJECTS IN THE AREA OF MICROBIAL DIVERSITY AND BIOPROSPECTING

Itamar Soares de Melo

Environmental Division

Brazilian Agricultural Research Agency

FAPESP Grant 2009/54086-8

Among living beings, microorganisms play a distinctive role, making the sequencing of their DNA important for their study, as well as for the description of species and genes of biotechnological interest. The projects associated with or complementary to this proposal all involve the description of microbial communities in different habitats, and pursue the characterization of genes and mechanisms found in the natural resources studied. The area within which this proposal falls is clearly growing in the world, as well as in Brazil, where the description of microbial diversity is of great importance. At the national level, the comprehensive and accurate description of natural resources is urgently needed in order to enable a better understanding of the biological basis on which new processes can be developed. This proposal seeks to acquire a nucleic acid sequencer for installation in the Laboratory of Environmental Microbiology, at the Brazilian Agricultural Research Agency - Environmental Division, located in the city of Jaguariúna (State of São Paulo). In addition to the laboratory, where the equipment will be housed, this acquisition will also serve the other research groups involved. The groups involved in this proposal are of great importance in the field of microbiology in the State of São Paulo, and have a history of collaboration on previous projects, which will facilitate the inter-facility use of the multi-user equipment.

### EQUIPMENT GRANTED

- Model 3500 8-capillary Genetic Analyzer (Applied Biosystems)



## ASSOCIATED PROJECTS

### Brazilian Agricultural Research Agency – Environmental Division

*Biodiversity and functional activities of microorganisms from the mangroves of the State of São Paulo, Brazil*

Itamar Soares de Melo  
FAPESP Grant 2004/13910-6

*Molecular ecology of groups of bacteria and archaea functional in the State of São Paulo, Brazil*

Itamar Soares de Melo  
FAPESP Grant 2007/56360-4

### Integrated Biotechnology Center/University of Mogi das Cruzes

*Identification of Burkholderia sp. genes associated with the biological control of Pectobacterium carotovorum*

Wellington Luiz de Araújo  
FAPESP Grant 2007/52407-9

*Genetic diversity of microorganisms associated with terrestrial and aquatic species of the carnivorous plants in the genus utricularia (family Lentibulariaceae)*

Wellington Luiz de Araújo  
FAPESP Grant 2007/58277-7

### Center for Multidisciplinary Research in Agricultural Chemistry/Unicamp

*Communities of anaerobic microbes in oil- and petroleum-contaminated water in the Campos Basin of Brazil: metagenomic studies and investigation of biocatalytic potentials*

Valéria Maia de Oliveira  
FAPESP Grant 2006/57401-3

*Prospecting the activity of phenol degradation in the microbial metagenome from oil refinery effluent*

Valéria Maia de Oliveira  
FAPESP Grant 2006/50959-9

*Bioprospecting of genes involved in the synthesis of biosurfactants from the anaerobic microflora of oil reservoirs*

Valéria Maia de Oliveira  
FAPESP Grant 2008/52355-9

*Diversity assessment and quantification of catabolic genes involved in the biodegradation of hydrocarbons in oil samples*

Valéria Maia de Oliveira  
FAPESP Grant 2008/53903-0

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## ACQUISITION OF A GENETIC ANALYZER FOR AUTOMATED DNA SEQUENCING

João Renato Rebello Pinho

São Paulo Institute of Tropical Medicine

University of São Paulo (USP)

FAPESP Grant 2009/53946-3

The availability of a next-generation DNA genetic analyzer for DNA sequencing, to be used by several laboratories of the USP School of Tropical Medicine and São Paulo Institute of Tropical Medicine is very important, because there is no such device currently available at either institution. The device requested in this proposal will replace the ABI 377 sequencers currently in use, which produce sequences of good quality. However, those devices require much more care, and technical assistance will soon be discontinued. Another advantage of the new sequencers is the new software used for the interpretation of sequences: whereas the ABI 377 and ABI 3100 DNA sequencers use the ABI basecaller program, model 3500 uses the KB basecaller program. The KB basecaller program allows the identification of mixed bases, which has to be done manually with the ABI basecaller program. In addition, this new software version has its own method of evaluating the quality of sequences, which can dispense with the need for other software, such as Phred and Phrap, with the advantage that the new software already assesses the quality of sequences with mixed bases. Although sequences with mixed bases are found in eukaryotic organisms that are heterozygous, sequences with mixed bases are found much more frequently in the sequencing of viral populations, such as those viruses that replicate through enzyme activity without revising, such as the viruses that replicate RNA-dependent DNA polymerase (reverse transcriptase) or RNA-dependent RNA polymerase. Therefore, the acquisition of this device will meet the needs of laboratories working with viruses and will also be used for the sequencing of nucleic acids and the genomic study of polymorphisms of microsatellites (short tandem repeat polymorphisms), all of which are quite important for the analysis of the human host. The device will be operated by a team with extensive experience in the sequencing of viral nucleic acids and will be of great benefit to the groups involved, who will be able to conduct their studies in a more timely manner.

### EQUIPMENT GRANTED

- Model 3500 Genetic Analyzer Sequence Typing & Fragment Analyses and accessories (Applied Biosystems)

## ASSOCIATED PROJECTS

### School of Medicine/USP

*Wilson's disease: demographic and phenotypic aspects related to the ATP7B genotype*

Marta Mitiko Deguti  
FAPESP Grant 2006/00499-1

*Frequency of the UGT1A1\*28 allele [Gilbert's syndrome] in patients with chronic liver disease and in healthy controls*

Suzane Kioko Ono-Nita  
FAPESP Grant 2008/54346-7

*Clinical and nutritional evaluation in teenaged patients with inflammatory bowel disease: correlation with serum nutrients [macro- and micro-], height, and the NOD2/CARD15 genetic polymorphism*

Maraci Rodrigues  
FAPESP Grant 2009/02004-8

### School of Medicine/Federal University of the ABC (UFABC)

*Genotype distribution and mutations in the polymerase region in the hepatitis B genome and chronic hepatitis B patients treated in the Greater ABC region of the State of São Paulo, Brazil*

Maria Cássia Jacintho Mendes Corrêa  
FAPESP Grant 2008/57146-9

### São Paulo Institute of Tropical Medicine/USP

*Molecular characterization of human polyomavirus JC in Aids patients with and without progressive multifocal leukoencephalopathy in São Paulo, Brazil*

Cláudio Sérgio Panutti  
FAPESP Grant 2007/04681-1

*Investigation of PLAC4 gene polymorphisms in the Brazilian population*

José Eduardo Levi  
FAPESP Grant 2008/06853-7

*Urinary excretion of polyomavirus in HIV-infected children and adolescents*

Daisy Maria Machado  
FAPESP Grant 2007/06687-7

*Comparative immunogenicity study of alternative schedules of influenza vaccination in hematopoietic stem-cell transplant recipients*

Clarisse Martins Machado  
FAPESP Grant 2008/00282-8

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## ACQUISITION OF A FLOW CYTOMETER AND LIQUID SCINTILLATION (BETA RADIATION) COUNTER FOR THE PHENOTYPIC AND FUNCTIONAL ANALYSIS OF IMMUNE SYSTEM CELLS IN EXPERIMENTAL MODELS OF CANCER

José Daniel Lopes

Paulista School of Medicine

Federal University of São Paulo (Unifesp)

FAPESP Grant 2009/53837-0

This proposal aimed the acquisition of a flow cytometer and a microplate counter. The devices will be integrated into the equipment park of the Department of Microbiology, Immunology and Parasitology at the Unifesp Paulista School of Medicine. This request is based on three associated projects and ten complementary projects. Among the associated projects are three FAPESP-funded projects (two Thematic Projects and one Young Investigators at Emerging Institutions Program project). Although addressing various topics in immunology, such as cancer, infections caused by fungi or parasites, autoimmunity and transplantation, all associated and complementary projects supporting this proposal have a common need to examine the phenotypic and functional characteristics of the cells, lymphoid or not, involved in each of those processes. In this context, methodological procedures such as cytometry and beta radiation quantitation become essential.

### EQUIPMENT GRANTED

- FACSCanto II flow cytometer (Becton Dickinson)
- MicroBeta2 liquid scintillation plate counter (PerkinElmer Inc.)

## ASSOCIATED PROJECTS

### Paulista School of Medicine/Unifesp

*Study of the modulation of the adaptive immune response by the sympathetic nervous system: emphasis on autoimmunity, Th17 cells, and FOXP3+ T regulatory cells*

Alexandre Salgado Basso  
FAPESP Grant 2008/58564-9


*Characterization and role of B1 cells in experimental models: murine melanoma and Paracoccidioides brasiliensis infection*

José Daniel Lopes  
FAPESP Grant 2007/51501-9

*Peptides and peptidases: biological activities in infectious diseases and cancer*

Luiz Rodolpho Raja Gabaglia Travassos  
FAPESP Grant 2006/50634-2

### Contacts for instructions for the use of the equipment



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## ACQUISITION OF AN ULTRACENTRIFUGE FOR THE VIROLOGY RESEARCH CENTER AT THE UNIVERSITY OF SÃO PAULO RIBEIRÃO PRETO SCHOOL OF MEDICINE

Luiz Tadeu Moraes Figueiredo

School of Medicine at Ribeirão Preto

University of São Paulo (USP)

FAPESP Grant 2009/54215-2

The Virology Research Center (VRC) at the USP Ribeirão Preto School of Medicine organizes a number of research projects in the area of virology. Here, in a building solely dedicated to virology, research is conducted by five research group heads, several postdoctoral students, dozens of graduate or undergraduate students, laboratory technicians, technical support staff and interns. The studies conducted here are related to a number of different viruses, with an emphasis on emerging viruses and viruses transmitted by arthropods or rodents, as well as respiratory viruses and those causing congenital infections. It often becomes necessary to generate purified virus by ultracentrifugation, which in turn necessitates a separate ultracentrifuge building, as a basic biosafety requirement. Although we can always count on the support of colleagues in another building (which is about 600 m away), where there is an ultracentrifuge to produce gradients of viruses that can be handled without special biosafety requirements, the procedure itself is prone to the generation of aerosols and could result in the unnecessary exposure of other individuals. In addition, some viruses essential to the work performed here simply can not be transported off the VRC premises. In addition, the transport of gradients of purified viruses between buildings, in the open air, often results in the mixing or breakdown of gradients obtained after hours of ultracentrifugation. Therefore, for a number of reasons, chief among which is the issue of biosafety, the VRC staff should have a ultracentrifuge dedicated to their work with viruses.

### EQUIPMENT GRANTED

- Sorvall WX 90 ultracentrifuge, with 3 rotors for separate tubes (Thermo Fisher Scientific Inc.)

## ASSOCIATED PROJECTS

### Ribeirão Preto School of Medicine/USP

*Studies on emerging viruses, including arboviruses, rodent-borne viruses, respiratory viruses and viruses transmitted congenitally, conducted at the Virology Research Center of the University of São Paulo Ribeirão Preto School of Medicine*

Luiz Tadeu Moraes Figueiredo  
FAPESP Grant 2008/50617-6


*Study of individual viral aspects involved in the pathogenesis of the different clinical manifestations of dengue*

Benedito Antonio Lopes da Fonseca  
FAPESP Grant 2007/04326-7

*Perinatal or early postnatal infection with cytomegalovirus in preterm newborn infants receiving unprocessed maternal milk*

Marisa Márcia Mussi Pinhata  
FAPESP Grant 2007/07315-6

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## HEALTH

## FLOW CYTOMETRY FOR THE CHILDREN'S HOSPITAL AND THE INSTITUTE FOR TREATMENT OF CHILDHOOD CANCER AT THE UNIVERSITY OF SÃO PAULO SCHOOL OF MEDICINE (FMUSP)

Magda M. S. Carneiro-Sampaio

School of Medicine

University of São Paulo (USP)

FAPESP Grant 2009/53864-7

The Children's Hospital (ICr) and its Service of Onco-Hematology, located at the Institute for Treatment of Childhood Cancer (ITACI), which are part of FMUSP Clinics Hospital (HC), have in recent years actively sought to implement research activities, based on their significant cases of children and adolescents with complex and rare diseases, working in concert with the LIM-36, Laboratory for Medical Research 36, which is dedicated to studies in Clinical Pediatrics. With the support of two Thematic Projects funded by FAPESP (grant nos. 2002/05880-4 and 2008/58238-4), their research in the field of primary immunodeficiencies (PIDs) is well established, involving the Divisions of Pediatric Immunology and Pediatric Rheumatology, and focuses primarily on the study the autoimmune and inflammatory manifestations of PIDs. Recently, the ICr entered into a partnership with the HC Heart Institute to implement the functional investigation of the human thymus. The ICr also has a genetics clinic, which follows significant numbers of children with different monogenic defects, generating data that is also valuable for investigating the human immune response. The Itaci, for its part, has partnered with the Department of Immunology of the USP Institute of Biomedical Sciences to investigate the pathophysiology of dendritic cells for immunotherapy of neuroblastoma, a type of cancer that typically affects children and for which the Itaci is a referral center, receiving approximately 10% of all cases occurring in Brazil. Twenty years after the first bone marrow transplant procedure was performed at the ICr (27/10/1989), the São Paulo Center for Pediatric Hematopoietic Stem Cells Transplantation is being built at the Itaci, with funding from the state government. The Center will be launched in 2012, and will also receive patients with severe PIDs. Therefore, the deployment of a flow cytometry platform in LIM-36 would be of immense value in a number of areas: i) PIDs (emphasis on inflammatory diseases, autoimmune disorders, and genetic syndromes causing an impaired immune response); ii) pediatric oncology (emphasis in neuroblastoma and leukemia – 60 new cases/year); and iii) cell transplantation in children with hematopoietic malignancies, PIDs and other diseases.

### EQUIPMENT GRANTED

- FACSCanto II flow cytometer with 2 lasers and 8 color detectors, monitor and work station (Becton Dickinson)



## ASSOCIATED PROJECTS

### School of Medicine/USP

*Rubinstein-Taybi Syndrome: a human model to study the importance of the CREBBP gene in the regulation of the immune response*

Magda M. S. Carneiro-Sampaio  
FAPESP Grant 2007/56491-1

*Assessment of thymic function in healthy subjects of different ages and in patients with diseases that cause disturbances of central tolerance*

Cristina Miuki Abe Jacob  
FAPESP Grant 2008/58238-4

*Clinical and genetic study of hereditary autoinflammatory syndromes: a multicenter project in Brazil*

Clóvis Artur Almeida da Silva  
FAPESP Grant 2008/58866-5

### Institute of Biomedical Sciences/USP

*Functional modulation of dendritic cells in different pathophysiological conditions*

José Alexandre Marzagão Barbuto  
FAPESP Grant 2004/09956-0

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## SEPSIS AND SEPTIC SHOCK: FUNCTIONAL AND MORPHOLOGICAL CHANGES IN THE HEART. AN EXPERIMENTAL STUDY IN MICE

Marcos Antônio Rossi

Ribeirão Preto School of Medicine

University of São Paulo (USP)

FAPESP Grant 2009/54010-1

Sepsis produces pathophysiological changes, with marked hypotension, cardiac depression and decreased systemic perfusion, which contributes to multiple organ dysfunction. Although the cause of death in septic shock is probably multifactorial, myocardial dysfunction is a common complication, occurring prior to the shock. Even if studies in humans suggest the absence of ischemic myocardial alterations in sepsis, abnormal microcirculation induces a disturbance in regional blood flow and poor tissue oxygenation, which could cause relative ischemia in various organs, including the heart. The occurrence of microvascular changes is an issue that has been raised recently in our laboratory: the microcirculation might be implicated in the mechanism of myocyte cell injury, with subsequent cardiac dysfunction and death. Therefore, the objective of this project is to use the model of sepsis induced by the technique of cecal ligation and puncture (CLP) in mice to assess functional, structural and morphological characteristics of myocardial.

### EQUIPMENT GRANTED

- VeVo 2100 (120v) echocardiograph (VS 11945) and accessories (Visualsonics Inc.)

## ASSOCIATED PROJECTS

### Ribeirão Preto School of Medicine/USP

*Sepsis and septic shock: functional and morphological changes in the heart. An experimental study in mice*

Marcos Antonio Rossi  
FAPESP Grant 2004/14578-5

*Cardiocirculatory regulation in physiological and pathophysiological conditions*

Helio Cesar Salgado  
FAPESP Grant 2009/50389-6

*Characterization of elastase-2 as an angiotensin II-converting enzyme*

Maria Cristina de Oliveira Salgado  
FAPESP Grant 2009/52418-3

*Effect of estrogen replacement on the autonomic and morphometric adaptations cardiovascular after aerobic physical exercise in rats submitted to chronic blockade of nitric oxide synthase*

Hugo Celso Dutra de Souza  
FAPESP Grant 2007/03194-0

### São José do Rio Preto School of Medicine

*Development of instrumentation and data processing algorithms for the production of scintigraphic images of small animals, with spatial and temporal resolution*

Jorge Mejia Cabeza  
FAPESP Grant 2007/50339-3

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## MULTI-USER EQUIPMENT FOR MULTIPARAMETRIC ANALYSIS IN CELL MODELS WITH POTENTIAL USE IN THE IDENTIFICATION OF THERAPEUTIC TARGETS AND OF TOXICANTS

Maria José Soares Mendes Giannini

Araraquara School of Pharmaceutical Sciences

São Paulo State University (Unesp)

FAPESP Grant 2009/54222-9

This proposal is aimed at the acquisition of a cell analyzer capable of performing multiparametric analysis in large-scale cell models, in real time, in fixed material and *in vivo*. The system requested can analyze a large volume of data and is therefore categorized as a high-content analysis device. This proposal will further studies that assess real-time host-fungus interaction, determining various parameters: the activation of different signaling pathways, cellular localization of proteins and functional studies; prospecting and identification of molecules with therapeutic potential and the effects of different toxicants; the evaluation of the biocompatibility of different materials; basic studies of cellular transcription and tumor markers; risk assessment of compounds proven to have toxic or genotoxic effects; and toxicity tests in cell models to assess the dose-response relationship. The analyses can be performed in real time with high quality images, and multiple markers can be analyzed simultaneously in a single sample, providing accuracy and speed in obtaining multiple cell parameters. The interpretation of data is facilitated by a software package containing multifunctional tools that can be used on a network shared between centralized multi-user laboratories and their associates, qualifying as one of the Unesp Multi-User Facilities. The Finep Infrastructure Project provided the funding for the construction of this center, as well as for part of equipment, including a system of maldi-tof-tof mass spectrometry. This acquisition is essential to improving the research environment and to fostering studies in various fields of application related to this proposal, as well as to supplying the analytical sciences center on the Araraquara campus, and will extend and integrate the research capacity of Unesp (at the intersector level and across campuses) and of other universities. In addition, this will lead to integration among areas and specialties, promoting transdisciplinarity.

### EQUIPMENT GRANTED

- IN Cell Analyzer 2000 and accessories (GE Healthcare Life Sciences)

## ASSOCIATED PROJECTS

### Araraquara School of Pharmaceutical Sciences/Unesp

*Analysis of genes differentially expressed during contact of P. brasiliensis with extracellular matrix components, pneumocytes, and keratinocytes*

Maria José Soares Mendes Giannini  
FAPESP Grant 2009/52046-9

*Phenotypic characterization and differentially expressed genes from Cryptococcus neoformans after interaction with pneumocytes and extracts*

Maria José Soares Mendes Giannini  
FAPESP Grant 2007/53253-2

*Analysis of cDNA differentially expressed during the infection process and molecular typing of Trichophyton rubrum*

Maria José Soares Mendes Giannini  
FAPESP Grant 2005/6005-5

*Signaling events in the interaction of P. brasiliensis with epithelial cells and mononuclear cells involved in the response*

Maria José Soares Mendes Giannini  
FAPESP Grant 2002/07306-3

*Study of the DNA repair effects of ethanolic extract and compounds isolated from Casearia sylvestris*

Christiane Pienna Soares  
FAPESP Grant 2009/52481-7

*Bioguided tracking of the chemopreventive effects of Eugenia jambolana, Garcinia xanthochimus and Alchornea glandulosa in the hepatocellular carcinoma cell line*

Christiane Pienna Soares  
FAPESP Grant 2009/52716-4

*Identification and functional characterization of molecular markers involved in the formation of head and neck tumors by analysis of the differential methylation pattern*

Sandro Roberto Valentini  
FAPESP Grant 2003/09497-3

*Involvement of the translation initiation factor 5A (eIF5A) in translational control*

Sandro Roberto Valentini  
FAPESP Grant 2006/61013-9

*Influence of the TLR-2 and TLR-4 receptors in the host defense against Sporotrichum schenckii*

Iracilda Zeppone Carlos  
FAPESP Grant 2009/11999-3

### Institute of Chemistry/Unesp

*Conservation and sustainable use of the biodiversity of the Cerrado and the Atlantic Forest: diversity, chemistry and bioprospecting*

Maysa Furlan  
FAPESP Grant 2003/02176-7

*Biosynthesis in Celastraceae, Hippocrateaceae and Piperaceae species. Metabolome-proteome analysis of secondary metabolites with biological potential*

Maysa Furlan  
FAPESP Grant 2003/11524-9

*Photoelectrocatalytic oxidation of dye textile and tannery dyes in nanoporous Ti/TiO<sub>2</sub> electrodes*

Maria Valnice Boldrin Zanoni

FAPESP Grant 2006/06763-2

### Araraquara School of Dentistry/Unesp

*Study of the effectiveness of antimicrobial photodynamic therapy in the inactivation of Candida spp. and in fungal cell damage*

Ana Claudia Pavarina  
FAPESP Grant 2008/03994-9

*Study of the feasibility of photodynamic therapy using in the control of denture stomatitis*

Ana Claudia Pavarina  
FAPESP Grant 2005/03226-3

*In vitro and in vivo cytotoxic effect of photodynamic therapy*

Ana Claudia Pavarina  
FAPESP Grant 2007/04376-4

*Effectiveness of microwave disinfection of full dentures in the treatment of denture stomatitis associated with Candida spp. in patients with Diabetes mellitus*

Carlos Eduardo Vergani  
FAPESP Grant 2006/028425

*Microwave disinfection of full dentures. Effect of irradiation frequency in the treatment of denture stomatitis*

Carlos Eduardo Vergani  
FAPESP Grant 2006/02842-5

*In vitro cytotoxicity of monomers, plasticizer and degradation products released from prompt relines resins*

Ana Lúcia Machado  
FAPESP Grant 2007/06710-9

*Effectiveness of the experimental light-cured coatings in reducing the experimental hydrophobicity and adhesion of Candida albicans in a resin denture base*

Ana Lúcia Machado  
FAPESP Grant 2006/06842-0

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## ACQUISITION OF A HYBRID MASS SPECTROMETER WITH QUADRUPOLE AND *TIME-OF-FLIGHT* ANALYZERS TO IDENTIFY PEPTIDES, PROTEINS AND METABOLIC PRODUCTS

Marília Afonso Rabelo Buzalaf

Bauru School of Dentistry

University of São Paulo (USP)

FAPESP Grant 2009/53852-9

This FAPESP Multi-User Equipment Program proposal is aimed at the acquisition of a mass spectrometer with nanoelectrospray ionization and two mass analyzers, one quadrupole and one time-of-flight. This equipment is coupled to an ultra-performance liquid chromatograph (UPLC), which allows high-resolution chromatographic separations due to the small inner diameter of its columns. After the separation step, the UPLC injects the samples into the mass spectrometer. An important distinguishing feature of the equipment requested is the ionization system (nanoelectrospray), which allows injection of nanoliters of sample, increasing the sensitivity of the equipment and hence the likelihood of identifying the analyte. This configuration gives the equipment broad applicability in diverse fields such as physics, chemistry, medicine, pharmacy, dentistry, geology, nuclear sciences, material sciences, archeology, petroleum industry, environmental science and forensic science, because its high resolution allows the identification of small molecules as well as intact proteins. Therefore, it is quite versatile and can be used by professionals in proteomics in general, as well as by researchers in other fields, which makes it the ideal multi-user equipment, as evidenced by the diversity of lines of research involved in the proposal. The acquisition of this equipment is strategic because the resulting analyses will constitute a major step toward increasing the flow of projects involving proteomic analysis. That flow has been limited due to a shortage of equipment with the appropriate configuration for such analysis, as well as to the high rate of maintenance of these devices, which are highly sensitive. The equipment will be installed in the 7<sup>th</sup> administrative region of the state of São Paulo (the city of Bauru), and will serve associated projects underway in regions 8 (Sao Jose do Rio Preto) and 4 (Botucatu), where there are no mass spectrometers of any type, as well as other interested parties who satisfy the conditions of the management of use plan presented.

### EQUIPMENT GRANTED

- Xevo QTof MS mass spectrometer and accessories (Waters GmbH)

## ASSOCIATED PROJECTS

### **Bauru School of Dentistry/USP**

*Proteomic analysis in the body fluids and soft tissues of rats receiving fluoride treatments*

Marília Afonso Rabelo Buzalaf  
FAPESP Grant 2008/03489-2

### **São José do Rio Preto School of Medicine**

*Markers of aggressiveness in head and neck tumors*

Eloisa Helena Tajara da Silva  
FAPESP Grant 2004/12054-9

### **Institute of Biosciences/Unesp**

*Development of analytical methods for assessment of metalloproteins in Nile tilapia (Oreochromis niloticus)*

Pedro de Magalhães Padilha  
FAPESP Grant 2007/59778-0

### **Bauru School of Sciences/Unesp**

*Anti-inflammatory effect and leukocyte metabolism of methylcatechols: correlation between structure and inhibition of activation of NADPH oxidase*

Valdecir Farias Ximenes  
FAPESP Grant 2004/12860-5

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## ACQUISITION OF SUPER HIGH-RESOLUTION COMPUTED TOMOGRAPHY EQUIPMENT FOR EVALUATING AND MEASURING BONE STRUCTURES AND DENTAL BONE IN THREE-DIMENSIONAL IMAGES IN CLINICAL RESEARCH IN DENTISTRY

Marina Helena Cury Gallottini de Magalhães

School of Dentistry

University of São Paulo (USP)

FAPESP Grant 2009/53982-0

This proposal is for the purchase of super high-resolution computed tomography (CT) for dental purposes, to be linked to the new Clinical Research Center, being created at the USP School of Dentistry. The device is of the latest generation and is produced by a company that is unique in the world market. It will be the first device with such resolution to be imported into Brazil. This equipment was chosen due to its great versatility in different areas of dentistry; it combines the benefits of earlier generations of CT in the evaluation of large structures with the advantages of being able to evaluate specific areas (because of its higher resolution). This will extend the benefits of the device to smaller areas such as oral surgery, periodontics, pediatric dentistry, and cariology. The new device can also measure bone structure and dental structure. This device will be of benefit to ongoing projects, thereby increasing the possibility of publications in high-impact journals. In one project, the equipment will enable the quantitative evaluation, with analysis of bone density and repair after tooth extraction in patients with diabetes. In another project, the device will allow a more sensitive CT analysis of the effect that smoking cessation has on periodontal parameters and on bone loss around implants. In the field of orthodontics, the device will allow the assessment of the temporomandibular joint space in subjects with temporomandibular disorders to be compared with earlier-generation CT scans. Finally, the device will serve to validate, *in vivo*, caries in dentin, in a study that proposes to assess different methods of diagnosis in primary molars, show the association of certain parameters obtained from the volumetric CT scan, and determine if the CT scan shows some parameters associated with active caries in those teeth. Given this, and the possible use of the equipment requested in several areas within dentistry, advancing the research institution and other institutions in the country, the acquisition of this equipment is of great importance.

### EQUIPMENT GRANTED

- Accuitomo F8 cone beam X-ray CT (J. Morita Mfg. Corp.)



## ASSOCIATED PROJECTS

### School of Dentistry/USP

*Alveolar repair after tooth extraction in patients with diabetes*

Marina Helena Cury Gallottini de Magalhães

FAPESP Grant 2009/10934-5

*Effect of smoking cessation on periodontal conditions in smokers*

Claudio Mendes Pannuti

FAPESP Grant 2007/54494-3

*Comparative study of certain craniofacial characteristics, muscle condition, temporomandibular joints, sleep architecture and respiratory aspects*

Solange Mongelli de Fantini

FAPESP Grant 2005/60076-4

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## ACQUISITION OF AN ULTRACENTRIFUGE AND AN ECHOCARDIOGRAPH TO EQUIP A CENTRALIZED MULTI-USER LABORATORY

Marina Politi Okoshi

Botucatu School of Medicine

São Paulo State University (Unesp)

FAPESP Grant 2009/54102-3

The project aims to equip a multi-user centralized laboratory at the Botucatu School of Medicine (FMB), designated the Unipex (Experimental Research Unit). The Unipex is an experimental research laboratory and research unit for animal experiments, funded with support from the Ministry of Science and Technology and the Financing Agency for Studies and Projects (grant nos. 0112007 and 0112008) and through partnerships with the São Paulo State University and the FMB Foundation for Physician and Hospital Development. The researchers have extensive experience in the study of cardiac remodeling and its systemic consequences in different experimental models of heart injury. The analysis of cardiac structures and ventricular function is typically assessed *in vivo* by echocardiography. Because echocardiography is noninvasive, it is possible to perform longitudinal studies of serial evaluations of the heart, with animals under light anesthesia. Currently, echocardiographic examinations in animal experiments are conducted on equipment located in the FMB Clinics Hospital. However, that equipment, which is used for clinical and experimental research by investigators at the FMB and at the Botucatu Institute of Biosciences, has reached the end of its useful life and relevance as a technological resource. We therefore request a new echocardiograph to be included within the Unipex equipment park. The study of the mechanisms involved in cardiac remodeling and their systemic consequences involves the evaluation of intracellular signaling pathways. For analysis of intracellular signaling in structures such as nuclei, mitochondria and membranes, there is a need for ultracentrifugation in order to separate and obtain intracellular components. As the FMB has no ultracentrifuge, its members will also benefit from the acquisition of this equipment for the Unipex, where it will be available to researchers in various areas, including those working in clinical research.

### EQUIPMENT GRANTED

- Sorvall WX 90 ultracentrifuge, with T890 and T1250 rotors, tube set, and tube lids (Thermo Fisher Scientific Inc.)
- Vivid S6 cardiovascular ultrasound system (GE Healthcare)

## ASSOCIATED PROJECTS

### Botucatu School of Medicine/Unesp

*Myosin composition and expression of myogenic regulatory factors in the diaphragm of rats with chronic heart failure*

Marina Politi Okoski  
FAPESP Grant 2008/58655-4

*Evaluation of the evolution of doxorubicin-induced oxidative stress in rats: a study of the mechanism of injury*

Ana Lúcia dos Anjos Ferreira  
FAPESP Grant 2007/07455-2

*Role of angiotensin II in ventricular remodeling and myocardial insulin resistance in obese rats*

Antonio Carlos Cicogna  
FAPESP Grant 2008/55339-4

*Influence that time of exposure to obesity has on cardiac function, proteins that regulate calcium transport and the extracellular matrix*

Antonio Carlos Cicogna  
FAPESP Grant 2007/53267-3

*Influence of glucose oxidation on myocardial function in obese rats*

Antonio Carlos Cicogna  
FAPESP Grant 2007/59747-7

*Evolution of morphological and functional cardiac changes in the process of chronic adaptation to experimental acute aortic insufficiency*

Beatriz Bojikian Matsubara  
FAPESP Grant 2009/51222-8

*Influence of food restriction on cardiac remodeling induced by acute myocardial infarction in rats*

Katashi Okoshi  
FAPESP Grant 2008/50418-3

*Influence of taurine on ventricular remodeling after myocardial infarction*

Leonardo Antonio Mamede Zornoff  
FAPESP Grant 2008/10711-3

*Myocardial remodeling and ventricular function in spontaneously hypertensive rats observed during aging*

Luiz Shiguero Matsubara  
FAPESP Grant 2006/00880-7

*Effects of exposure to cigarette smoke and dietary supplementation with beta carotene on intercellular communication in rat cardiomyocytes*

Sérgio Alberto Rupp de Paiva  
FAPESP Grant 2005/52568-4

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## ACQUISITION OF EQUIPMENT FOR RESEARCH PROJECTS IN PATHOPHYSIOLOGY AND CELLULAR MOLECULAR BIOLOGY, WITH A SPECIAL EMPHASIS ON KIDNEY DISEASES

Nestor Schor

Paulista School of Medicine

Federal University of São Paulo(Unifesp)

FAPESP Grant 2009/54039-0

The inflammatory and hormonal mechanisms involved in acute kidney injury (AKI) have been, recently, the focus of intense research, because the new methodologies and better understanding of this complex pathophysiological entity indicate that such issues are central to the advancement of knowledge and potential clinical interventions. This project aims to evaluate, using different complementary strategies, the factors involved in AKI. These strategies are as follows. First, we will evaluate cell signaling pathways related to apoptosis in human mesangial cells immortalized with LPS and uric acid, both of which are known to stimulate various inflammatory and vasoactive substances. Second, given that the number of stem cell studies has shown explosive growth, because, in experimental terms, various results stimulate the search for pathophysiological mechanisms, especially paracrine hormonal events involved in the administration of these cells, our lab has developed projects using mesenchymal stem cells in several models of AKI, such as gentamicin, cyclosporine and acyclovir nephrotoxicity, as well as sepsis induced by LPS and by inoculation of nephritogenic *Escherichia coli*. Preliminary results are quite indicative of paracrine events, requiring the evaluation and measurement of various inflammatory and anti-inflammatory substances. Third, because, in the specific field of renal diseases, the effects of mesenchymal stem cells have been studied most intensely, and yet there are experimental findings of significant effects of endothelial progenitor stem cells (predominantly angiogenic) and stem cells derived from adipose tissue, we have cultured these cells which, together with mesenchymal cells and hematopoietic cells, constitute a bank of stem cells, which we will make available to the scientific community as well as to test the pathophysiological mechanisms in order to identify

### EQUIPAMENTOS CONCEDIDOS

- LABChip GXII sample processor (Caliper Life Sciences)
- MILLIPLEX Analyzer 3.1 xPONENT System and accessories (Millipore)
- ML880B107 Telemetry SNA and Pressure Foundation System, with TRCsbbp blood pressure consumable pack (ADInstruments)

the best cell line or cell line mixture. Fourth, in that same line of research (inflammatory mechanisms), we have studied induced AKI in animals and in kidney cells of Chagas disease *in vitro*, in which the inflammatory process is very intense, involving cytokines and pro and anti-inflammatory factors. All of these projects will benefit from the acquisition of the equipment requested.

## ASSOCIATED PROJECTS

### Paulista School of Medicine/Unifesp

*Molecular, cellular, and pathophysiological mechanisms of acute kidney injury*

Nestor Schor

FAPESP Grant 2004/08311-6

*The role of invariant natural killer T cells in the development of glomerulonephritis: mechanisms and perspectives*


Alexandre de Castro Keller

*Removal of inflammatory mediators by hemofiltration in patients with acute kidney injury*

Miguel Cendoroglo Neto

FAPESP Grant 2004/08311-6

### Contacts for instructions for the use of the equipment



#### Nestor Schor

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## ACQUISITION OF A MASS SPECTROMETER FOR THE GENERATION OF IMAGES AT THE MASS SPECTROMETRY CENTER OF THE UNIVERSITY OF SÃO PAULO RIBEIRÃO PRETO SCHOOL OF PHARMACEUTICAL SCIENCES: STUDIES OF MOLECULAR LOCALIZATION OF BIOLOGICALLY ACTIVE SUBSTANCES

Norberto Peporine Lopes

Ribeirão Preto School of Pharmaceutical Sciences

University of São Paulo (USP)

FAPESP Grant 2009/54098-6

Nearly five years ago, we obtained, with the help of FAPESP, a high-resolution electrospray ionization mass spectrometer as part of a Thematic Project. On that occasion, Prof. José Fernando Perez, who was then the scientific director of FAPESP, suggested that we attempt to create a facility system such as those existing in more highly developed countries. On that basis, we created, within the USP Ribeirão Preto School of Pharmaceutical Sciences, a system of shared use, designated the Mass Spectrometry Center. Today, the equipment, at six years of age, is in operation seven days a week year round, and provides a large number of researchers throughout the state with access to high-resolution data. In recent years, it was possible to expand that access to include more than 29 federal universities, covering the entire country. This was only possible due to planning and to the training of a specialist dedicated exclusively to the mass spectrometry facility. In the current proposal, we intend to expand this center, with the purchase of imaging equipment that is as yet unavailable in the state of Sao Paulo: the maldi-tof-tof imaging system. As can be seen in the introduction of this proposal, the capacity of this equipment will bring advancements in various fields of research. We opted for a laser with greater power and resolution, in order to provide greater support to projects in the medical field, as well as for detection in the tissues of insects, thereby meeting the needs of biologists. The expectation of identifying secondary metabolites in plant tissues and the possible correlation with their effects might provide a qualitative leap in research conducted in the state. For the biochemists who are already using normal maldi, access to such equipment will allow them to “photograph” areas of study and propose a number of mechanisms of action. As can be seen, this is perhaps one of the most universal types of equipment, and we therefore elected to gather a group of researchers from various institutions to demonstrate that this machine is suited to use in different areas and applications.

### EQUIPMENT GRANTED

- MALDI-TOF/TOF mass spectrometer with system for micromolecules and macromolecules imaging (Bruker Daltonics)

## ASSOCIATED PROJECTS

### Ribeirão Preto School of Medicine/USP

*Neuroscience and epilepsy. Characterization of the War strain and interdisciplinary models of epilepsy correlated*

Carlos Alberto Scrideli  
FAPESP Grant 2007/50261-4

*Neuroethological characterization, video-EEG and anatomy of the behavioral and neurotoxic effects of ingestion of star fruit juice in rats*

Carlos Alberto Scrideli  
FAPESP Grant 2007/50261-4

### Institute of Chemistry/USP

*Redox processes in biomedicine (item: metabolism of algae exposed to environmental pollutants)*

Pio Colepicolo Neto

*Biodiversity, distribution and life history of agricultural algae and fungi combined with the tracking of abiotic, biochemical and microbiological indicators on the peninsula*

Pio Colepicolo Neto  
National Council for Scientific and Technological Development (CNPq)

*Biomonitored study to obtain the main chemical constituents with antioxidant, antifungal and antibiotic effects in macroalgae along the coast of Brazil – Algae Network*

Pio Colepicolo Neto  
Capes

*Aspects of biochemical adaptation to stress of pollutants in marine microalgae and macroalgae: modulation of cellular oxidants and expression of defense proteins*

Pio Colepicolo Neto  
FAPESP Grant 2001/13482-6

### Ribeirão Preto School of Pharmaceutical Sciences/USP

*Conservation and sustainable use of the plant diversity in the Cerrado and in the Atlantic Forest: diversity, chemistry and bioprospecting – Phase2*

Vanderian da Silva Bolzani  
FAPESP Grant 2003/02176-7

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## CREATION OF A DIGITAL PATHOLOGY LABORATORY USING A HISTOLOGICAL SLIDE SCANNER

Oslei Paes de Almeida

Faculty of Dentistry of Piracicaba

State University of Campinas (Unicamp)

FAPESP Grant 2009/53839-2

The major equipment requested is a digital scanner model with a five-slide capacity, each slide being scanned completely in approximately three minutes. The image quality, low noise generation, small file sizes and speed in the process of scanning by columns make this unit unique in the market. We intend to establish a Digital Pathology Laboratory, the infrastructure of which will allow basic research, teaching, consulting and training of human resources. This slide scanner will allow a leap in how pathology research is carried out. By digitizing the images from slides stained with H&E or immunohistochemistry, together with the use of software for ploidy analysis, immunohistochemical quantification of nuclear or cytoplasmic staining, tissue microarray and blood vessel microdensity, the scanner will enable the rapid advancement of knowledge in pathology. The acquisition of this equipment will allow the generation of multi-user scientific works in digital pathology and allow a shift in teaching histology to undergraduate and graduate students at the colleges involved, because image analysis will be faster and images will be more easily stored. The prospect is that the Digital Pathology Laboratory of the Unicamp Faculty of Dentistry of Piracicaba might soon achieve excellence in providing services to pathology laboratories, nationally and internationally. To that end, 12 professors/researchers from various national and international colleges gathered and compiled this FAPESP Multi-User Equipment Program request. There are two FAPESP Thematic Projects associated with this request. We would also like to point out that the researchers involved are full professors of the Graduate Program in Oral Pathology/Stomatology at the Unicamp Faculty of Dentistry of Piracicaba, which is currently the only such program to have received a level 6 grade from the Brazilian National Office for the Advancement of Higher Education (7 being the highest possible grade).

### EQUIPMENT GRANTED

- ScanScope CS digital scanner system with 5-slide capacity (Aperio Technologies Inc.)



## ASSOCIATED PROJECTS

### **Piracicaba School of Dentistry/Unicamp**

*Correlation between clinicopathological and immunohistochemical aspects of cancer of the mouth*

Oslei Paes de Almeida  
FAPESP Grant 2006/55734-5

*Analysis of the participation of endogenous fatty acids in the mechanisms of apoptosis, metastasis and vasculogenesis in melanoma*

Edgard Graner  
FAPESP Grant 2008/57471-7

*Study of angiogenesis in salivary carcinomas with and without myoepithelial differentiation*

Albina Messias de Almeida Milani Altemani  
FAPESP Grant 2007/55336-2

*Analysis of histological grading and immunohistochemical expression of Mcm2, Mcm5, p-53, Ki-67 and Maspin in proliferative verrucous oral leukoplakia and squamous cell carcinoma of the mouth*

Márcio Ajudarte Lopes  
FAPESP Grant 2006/06385-8

*Microscopic analysis of the influence of auxiliary chemical solutions and intracanal dressings on the repair process of teeth in dogs with periapical lesion*

Alexandre Augusto Zaia  
FAPESP Grant 2005/53996-0

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## IMAGING PLATFORM IN THE AUTOPSY ROOM

Paulo Hilário Nascimento Saldiva

School of Medicine

University of São Paulo (USP)

FAPESP Grant 2009/54323-0

The Imaging platform in the Autopsy Room proposal seeks to implement a structure that links the São Paulo Municipal Death Verification Service to an adjacent imaging equipment park, allowing the development of scientific research activities with anatomical, radiological, and post mortem correlations with their respective clinical counterparts. The project includes lines of research in the area of respiratory diseases, cardiovascular diseases, neurological diseases and aging, as well as providing for the inclusion of animal experimentation protocols. The strategy of linking an imaging equipment park to the largest autopsy service in the world will bring numerous benefits, not only in the understanding of many diseases but also in evaluating the possibility of carrying out advanced research in the areas of pathology and radiology, as well as evaluating the use of virtual autopsy as a real possibility in Brazil. The project includes approximately 80 researchers, from 11 USP School of Medicine departments, as well as from other USP sectors. The institution will also offer a great return, providing various devices, such as CT and Doppler ultrasound, as well as all of the necessary infrastructure for the installation, operation, and maintenance of the imaging equipment park, which, after its establishment, will be integrated into the USP School of Medicine multi-user equipment network.

### EQUIPMENT GRANTED

- Signa HDxt 3.0T magnetic resonance imaging scanner and accessories (GE Healthcare)

## ASSOCIATED PROJECTS

### School of Medicine/USP

*Analysis of the chemical signatures of particulate matter emitted from different concentrations of diesel/biodiesel and their toxic effects on biological systems*

Paulo Hilário Nascimento Saldiva  
FAPESP Grant 2007/57747-0

*Mechanisms of lung inflammation in asthma: clinical and experimental studies*

Milton Arruda Martins  
FAPESP Grant 2002/08422-7

*Autoimmunity in children: investigation of the cellular and molecular bases of early onset*

Magda Maria Sales Carneiro Sampaio  
FAPESP Grant 2008/58238-4

*The cognitive reserve in a population with a low level of education*

Wilson Jacob Filho  
FAPESP Grant 2009/09134-4

*Neuroscience imaging center at the University of São Paulo School of Medicine*

Giovanni Guido Cerri  
FAPESP Grant 2005/56464-9

*Endorectal sonographic evaluation and needle biopsy of the prostate: sensitivity of the method in measuring volume and detecting cancer based on the true prevalence...*

Giovanni Guido Cerri

*Analysis of the occurrence of apoptosis in the thoracic aorta wall due to systemic arterial hypertension*

Carlos Augusto Gonçalves Pasqualucci  
FAPESP Grant 2007/50042-0

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## ACQUISITION OF A CAPILLARY SEQUENCER TO MEET THE DNA SEQUENCING NEEDS OF THE PROFESSORS AND RESEARCHERS AT THE STATE UNIVERSITY OF CAMPINAS FACULTY OF DENTISTRY OF PIRACICABA

Ricardo Della Coletta

Faculty of Dentistry of Piracicaba

State University of Campinas (Unicamp)

FAPESP Grant 2009/54068-0

There has long been a demand for a capillary sequencer at the Unicamp Faculty of Dentistry of Piracicaba. The acquisition of this equipment will allow the large-scale generation of multi-user data with high-performance, economically viable, and technically more efficient sequencing methods, thereby meeting the DNA sequencing needs of several ongoing and future projects. This will allow researchers to focus more intensely on the analysis and interpretation of data, performing experiments specifically required for their projects, based on the sequencing data generated. The perspective is that the Laboratory of Genomics at the Unicamp Faculty of Dentistry of Piracicaba might soon achieve excellence in providing DNA sequencing services, not only to the local teaching and research community, but also to the entire scientific community in the region. To that end, 11 professors/researchers at the Unicamp Faculty of Dentistry of Piracicaba, most affiliated with the Excellence Concept Graduate Programs, which scored 6 out of 7 on the grading system established by the Brazilian National Office for the Advancement of Higher Education, have gathered and compiled the submission of this FAPESP Multi-user Equipment Program request. It is noteworthy that among the projects that support this proposal, there are three FAPESP-funded projects (two Thematic Projects and one Young Investigators at Emerging Centers Program project).

### EQUIPMENT GRANTED

- Model 3500 8-capillary Genetic Analyzer and accessories (Applied Biosystems)

## ASSOCIATED PROJECTS

### Faculty of Dentistry of Piracicaba/Unicamp

*Comparison between fibroblasts and myofibroblasts of the stroma of oral squamous cell carcinomas: morphology, proliferation, collagen synthesis, and matrix metalloproteinases*

Ricardo Della Coletta  
FAPESP Grant 2007/04134-0

*Defects in tooth formation*

Sergio Roberto Peres Line  
FAPESP Grant 2004/10994-4

*Investigation of the microbiota of infected root canals of symptomatic teeth by culture, cloning and 16S rRNA sequencing*

Brenda Paula Figueiredo de Almeida Gomes  
FAPESP Grant 2007/58518-4

*Analysis of microbial communities associated with occlusal caries and periodontal pockets by denaturing gradient gel electrophoresis and sequencing of the 16s gene*

Reginaldo Bruno Gonçalves  
FAPESP Grant 2006/07120-8

*Analysis of the differential regulation of genes associated with the phosphate metabolism of pulp cells in the periodontal ligament of otherwise healthy individuals with hypophosphatasia*

Francisco Humberto Nociti Junior  
FAPESP Grant 2008/00534-7

*Isolation and characterization of genes of virulence of and resistance to bacteria in periodontopathogenic biofilm: metagenomics approach by heterologous expression*

Daniel Saito  
FAPESP Grant 2008/00534-7

*Analysis of the immune response of children during colonization by Streptococcus mutans and molecular-genetic factors involved in the consequent biofilm formation*

Renata de Oliveira Mattos Graner  
FAPESP Grant 2002/07156-1

*Genetic analysis of the biological function of the Streptococcus mutans glucan binding protein B*

Renata de Oliveira Mattos Graner  
FAPESP Grant 2007/56100-2

*Effect of inactivation of regulatory genes and exposure to murine macrophages on the expression of glucosyltransferases B and C, and on glucan-binding protein B in Streptococcus isolates*

Renata de Oliveira Mattos Graner  
FAPESP Grant 2007/57454-2

*Analysis of promoter methylation in the IL-8, iNOS, TIMP-2, and TIMP-3 genes in smokers and nonsmokers with chronic periodontitis*

Ana Paula de Souza Pardo  
FAPESP Grant 2007/02488-0

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## HIGH-RESOLUTION PERIPHERAL QUANTITATIVE COMPUTED TOMOGRAPHY (HR-PQCT) ASSESSMENT OF TRABECULAR AND CORTICAL BONE MICROARCHITECTURE IN THE ELDERLY, IN CHILDREN WITH IMMUNE-INFLAMMATORY DISEASES, AND IN EXPERIMENTAL MODELS OF BONE DISEASES

Rosa Maria Rodrigues Pereira

School of Medicine

University of São Paulo (USP)

FAPESP Grant 2009/54200-5

Osteoporosis and its main consequence, fracture, is a public health problem worldwide, partly due to the increase in the number of people over 65 years of age. Bone mineral density obtained by densitometry is still the gold standard for the diagnosis of this disease. However, it is not the ideal measure for predicting fracture risk and response to therapy. High-resolution peripheral computed tomography can be used in order to characterize the bone microarchitecture in 3D without the need for bone biopsy. The following parameters can be obtained with this equipment: trabecular number, trabecular separation, trabecular thickness, bone volume to total volume ratio, cortical porosity, cortical thickness etc. These parameters will help evaluate the 3D macrostructure and microstructure of bone, as well as the biomechanics, none of which are detected by densitometry or even by bone histomorphometry (the latter due to a limited amount of tissue). High-resolution peripheral computed tomography therefore allows a better understanding of the mechanism of fracture. The purpose of this proposal/project is to assess the incidence of fractures in a population of 1,016 elderly individuals in the Butantã community who participated in the initial study, which received financial support from FAPESP and ended in July of 2009, resulting so far in two articles published in international journals with good impact factors ( $> 2$ ). High-resolution peripheral computed tomography is also used to evaluate bone health in children with immune-inflammatory diseases who are treated with glucocorticoids. The equipment will also be useful in determining bone status in mice with allergic lung inflammation (induced by ovalbumin administration) or chronic obstructive pulmonary disease (induced by administration of elastase or exposure to cigarette smoke) and subjected to a protocol of physical conditioning, as well as in an experimental animal model of bone disease secondary to renal failure.

### EQUIPMENT GRANTED

- XtremeCT high-resolution quantitative computed tomography scanner (Scanco Medical)

## ASSOCIATED PROJECTS

### School of Medicine/USP

*Prevalence of osteoporosis and vertebral fractures in a population of individuals aged 65 years or older in the Butantã neighborhood*

Rosa Maria Rodrigues Pereira  
FAPESP Grant 2003/09313-0

*Health-related quality of life in patients with autoimmune diseases: low bone mass, periodontitis and hyperlipidemia*

Magda Maria Sales Carneiro-Sampaio  
FAPESP Grant 2008/58238-4

*Mechanisms of pulmonary inflammation and asthma: clinical and experimental studies*

Milton de Arruda Martins  
FAPESP Grant 2002/08422-7

*Assessment of cardiovascular tissues and bone in uremic parathyroidectomized rats receiving continuous parathyroid hormone infusion and fed with different concentrations of calcium*

Vanda Jorgetti  
FAPESP Grant 2004/13435-6

### Contacts for instructions for the use of the equipment

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## ACQUISITION OF A FLOW CYTOMETER FOR THE SPECIFIC SEPARATION OF CELLS

Sérgio Henrique Ferreira

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FAPESP Grant 2009/54012-4

The acquisition of a flow cytometer will be of key importance to quantitatively and qualitatively maximize the scientific production of the USP Ribeirão Preto School of Medicine and of other schools on the campus. This equipment will allow the purification of different cell types, which are used in investigations of cell-cell interaction, host-parasite interaction and intracellular mechanisms involved in controlling microbial infections. It will also allow the identification of cells that are sources or targets of inflammatory mediators in different models of inflammatory diseases, sepsis and inflammatory pain, as well as to determine the mechanisms of action of anti-inflammatory, analgesic and antimicrobial drugs. These studies could culminate in the identification of the pathophysiological mechanisms involved in these diseases and contribute to the development of new drugs. Approval of this FAPESP Multi-user Equipment Program request will also contribute to the development of theses and dissertations by students in various postgraduate programs, including pharmacology, immunology, biochemistry, molecular biology, cellular biology and clinical medicine.

### EQUIPMENT GRANTED

- FACSria II flow cytometer, with 7,000 colors and 9 parameters and accessories: 488-nm Coherent Sapphire laser and 633-nm HeNe JDS Uniphase laser (Becton Dickinson)



## ASSOCIATED PROJECTS

### Ribeirão Preto School of Medicine/USP

*Mediators involved in the genesis of pain, leukocyte migration and leukocyte migration in sepsis*

Sergio Henrique Ferreira  
FAPESP Grant 2007/51247-5

*The role of Th17 and regulatory T cells in controlling immunity against infections, tumors and autoimmune diseases*

João Santana da Silva  
FAPESP Grant 2007/53940-0


*Study of the control of gene expression and genetic plasticity in Leishmaniasis*

Angela Kaysel Cruz  
FAPESP Grant 2006/50323-7

*Recognition of bacterial pathogens by intracellular receptors and their importance in controlling microbial infection*

Dario Simões Zamboni  
FAPESP Grant 2006/52867-4

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## ACQUISITION OF AN OPTICAL IMAGE CAPTURE AND PROCESSING SYSTEM FOR THE ANALYSIS OF HUMAN MOVEMENT IN THE MULTIDISCIPLINARY CENTER FOR MOVEMENT ANALYSIS

Tania de Fátima Salvini

Department of Physical Therapy, Health and Biological Sciences Center  
Federal University of São Carlos (UFSCar)  
FAPESP Grant 2009/54221-2

This proposal is aimed at the acquisition of an optical motion capture system. The FAPESP Multi-user Equipment Program equipment was allocated in the Núcleo Multidisciplinar de Análise do Movimento (NAM, Multidisciplinary Center for Movement Analysis), which is affiliated with the Department of Physical Therapy and Graduate Program in Physical Therapy of the Federal University of São Carlos. This proposal arose from the need of researchers for a reliable and versatile optical system that enables the analysis of human movement. Before the acquisition of the optical system, most of studies developed at the NAM employed simple cameras. This method is time-consuming in terms of assembly, configuration and calibration, as well as, especially, data processing and analysis. The new system can increase competitiveness in terms of publication in international journals, effectively increasing scientific production and facilitating the development of human resources. The proposal is supported by six associated projects and 18 complementary projects. Although each of those projects study different aspects of motion, they all contribute to the construction of scientific knowledge, regarding the prevention and correction of impaired human movement. In general, the results could lead to better quality of life for patients of all ages who have musculoskeletal involvement or neurological impairment, as well as those with occupational diseases or work-related injuries. Although there are limitations on the availability of equipment, the scientific production, as expressed by the numbers of articles published in indexed journals, theses, dissertations and basic research reported in the *curricula vitae* of the proponents of this request, attests to the development of studies in this area. These projects have secured funding, which speaks to the technical and scientific capability of the group.

### EQUIPMENT GRANTED

- Optical motion capture system, image processing and accessories: Oqus 300 basic camera; 10 mm external trigger; calibration kit; communication and power cables (Qualisys Motion Capture Systems); Visual 3D software

## ASSOCIATED PROJECTS

### **Department of Physical Therapy, Health and Biological Sciences Center/UFSCar**

*Physical therapy and functional evaluation in patients with  
subacromial impingement syndrome*

Tania de Fátima Salvini  
National Council for Scientific and Technological Development  
(CNPq)

*Electrical stimulation and stretching in the treatment of denervated  
skeletal muscle – implications for rehabilitation*

Tania de Fátima Salvini  
FAPESP Grant 2007/03160-8

*Evaluation of neck and shoulder movement in electricians during  
occupational activity*

Helenice Jane Cote Gil Coury  
FAPESP Grant 2008/10372-4

*Association between sensorimotor control, presence of cytokines  
and joint morphology in individuals with grade 1 or 2 osteoarthritis*

Stela Márcia Mattiello Gonçalves Rosa  
FAPESP Grant 2007/08691-1

*Dynamics of reaching in infants with Down syndrome at 4 to 6  
months of age*

Nelci Adriana Cicuto Ferreira Rocha  
FAPESP Grant 2008/00636-4

*Development of exploratory and manipulative skills in infants  
and children with Down syndrome*

Nelci Adriana Cicuto Ferreira Rocha  
FAPESP Grant 2009/08004-0

### Contacts for instructions for the use of the equipment

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## EQUIPMENT FOR THE MULTI-USER ORAL BIOLOGY LABORATORY OF THE UNIVERSITY OF SÃO PAULO SCHOOL OF DENTISTRY

Victor Elias Arana-Chavez

School of Dentistry

University of São Paulo (USP)

FAPESP Grant 2009/53947-0

This is a request to outfit the USP School of Dentistry Multi-user Oral Biology Laboratory (MOBL) with devices that, due to their cost, would be difficult to acquire under a Regular Research Grant. These devices are to be installed in the MOBL, inaugurated on 16 September 2009, which acts as a centralized laboratory for applied basic research across all departments and disciplines at the USP School of Dentistry. The MOBL has 400 m<sup>2</sup> of floor space and includes a vivarium for animals (rats and mice) used in experimentation. Construction began in 2007 with funds from the FAPESP Institutional Technical Reserve (Grants 07/50786-0 and 08/51284-0) and from USP itself. Currently, the lab has equipment and material that were in the USP Biosciences Institute Biology of Mineralized Tissue Laboratory, which was decommissioned due to the transfer of Professor Arana-Chavez to the USP School of Dentistry, together with equipment from the USP School of Dentistry Laboratory of Oral Biochemistry, implemented by Professor José Nicolau, who became an USP School of Dentistry collaborator in 1996, after his retirement from the USP Institute of Chemistry. The creation of the MOBL is leading to the optimization and upgrading of microscopy and biochemistry as effective tools of basic research applied to clinical areas. The USP School of Dentistry has a transmission electron microscope and a scanning electron microscope, acquired via FAPESP Grant 95/05281-8 (coordinated by Prof. Vera de Araújo). The use of both microscopes is currently coordinated by Prof. Arana-Chavez, head of the MOBL and coordinator of this proposal. The specimens for electron microscopy are being processed in the MOBL. However, microscopy at the USP School of Dentistry is not limited to electron microscopy but also includes light microscopy and fluorescence microscopy, both of which are employed in the study of oral tissue morphology, such as the location of structural molecules in health and disease. In immunostaining, confocal laser

### EQUIPMENT GRANTED

- 720 ES ICP inductively coupled plasma atomic emission spectrometer (Varian Inc./Agilent Technologies)
- Orius SC1000 image digitizing systems: for an Olympus BX60 light microscope and for a JEOL electron microscope (Gatan Inc.)

scanning microscopy offers important advantages for the further expansion of such studies. In addition, we are requesting a spectrometer in order to support the complementary structural biology and biochemistry studies currently underway at the USP School of Dentistry.

## ASSOCIATED PROJECTS

### School of Dentistry/USP

*Immunohistochemistry, immunofluorescence and Western blot study of noncollagenous matrix proteins induced with mineralizing factors in human pulp cell culture*

Victor Elias Arana-Chavez  
FAPESP Grant 2006/50153-4

*Diabetes: relationship with salivary glands and saliva in rats treated with streptozotocin*

José Nicolau  
FAPESP Grant 2006/00998-8

*Initial phase of the pattern of bone healing on titanium surfaces that have been machined or treated with titanium oxide after en bloc insertion of an autogenous graft covered with resorbable membrane*

Luiz Antônio Pugliesi Alves de Lima  
FAPESP Grant 2006/50450-9

*Analysis of the AKT pathway in the protein expression of MDM2 in salivary gland tumors*

Suzana Cantanhede Orsaini Machado de Sousa  
FAPESP Grant 2008/03831-2

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