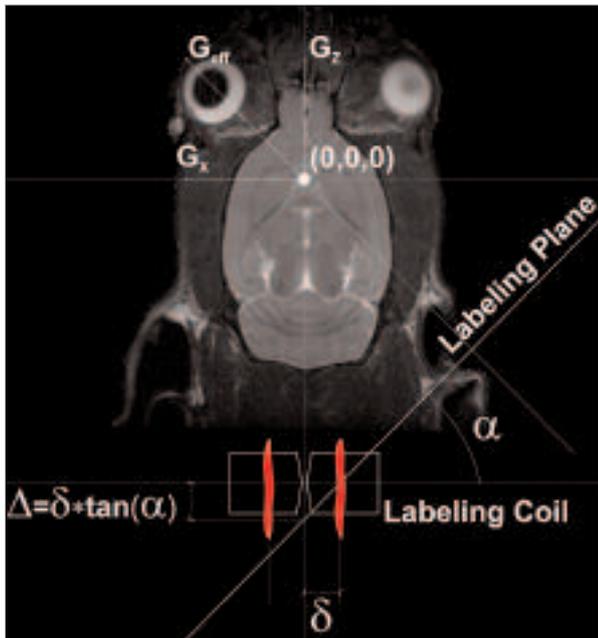


CENTER FOR IMAGING AND *IN VIVO* MAGNETIC RESSONANCE SPECTROSCOPY FOR STUDYING ANIMAL MODELS

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Example of technological interface: Arterial Spin Labeling measurement of Arterial Perfusion Territories by using a localized labeling RF coil. The figure shows the diagram of the labeling scheme used to label blood flowing in just one of the carotid arteries of a Sprague-Dawley rat

CInAPCe is an abbreviation for the Portuguese expression *Cooperação Interinstitucional de Apoio a Pesquisas sobre o Cérebro* (Inter-institutional Cooperation to Support Brain Research).

The central biological question of our proposal is the investigation of basic mechanisms that lead to epilepsy and related seizure disorders. Our goals are to develop new methods and techniques to improve the understanding of mechanisms of damage, plasticity and repair in epilepsy; and to apply these results to improve diagnosis, prevention and treatment of patients with epilepsy. The main motivation to constitute the CInAPCe Project came from the necessity of approaching this relevant and complex biological problem by combining the expertise of research groups with distinct and complementary backgrounds.

Our mission is to host the center for Animal Model studies as a Main Research Center (MRC) of the Fapesp/ CInAPCe program at the São Carlos Physics Institute – University of São Paulo (IFSC – USP). The proponent group of researchers and collaborators will be responsible for the definition of requirements of this high field Magnetic Resonance animal system, its operation and the hardware and software developments necessary to carry out the experiments for animal studies. Also under the responsibility of the researchers at this center development and adaptation of MRI/MRS methodologies to be used on the other centers of the CInAPCe network where human studies are being conducted.

SUMMARY OF RESULTS TO DATE AND PERSPECTIVES

The Center associated to this project is on its very beginning. All necessary equipment to perform most of the proposed experiments is still in the process of acquisition, and the main impact is expected upon the installation of the new MRI/MRS spectrometer electronics, expected for August 2008. Our team of researchers is already running preliminary tests of the experimental methods using the existing, limited performance equipment that is installed in our laboratory. Preliminary results were obtained on two of our main lines of research: understanding vascular territories by using Arterial Spin Labeling and NMR Instrumentation for MRI/MRS experiments. Our interest on Arterial Spin Labeling (ASL) started early in 2003 as the CInAPCe network began to take form. To perform studies on ASL we found necessary a "turn key" MRI spectrometer, different from all others developed locally at our Institute. Following the period between our proposal and the effective contract of the project by FAPESP, we decided to seek an alternative path to fulfill both our urge for results in this very competitive field and the necessary material and data for one of our students. Most of the results on this line of research are related to the application of the concepts of ASL and its continuous variant CASL to study vascular territories mapping by using a dedicated labeling coil. Another line of research was on NMR Instrumentation for MRI/MRS experiments. Since we intend to use the acquired spectrometer, initially with an existing magnet at our laboratory (31cm/2.0 Tesla) and later on with the recently acquired one (33cm/4.7 Tesla), and since we were granted with resources that allow us to purchase only the electronics for this spectrometer, we spend a great effort on the development of resonating structures to be used as NMR probes for animal studies. Our group has a wide and long time experience on NMR instrumentation, and one of the main missions of this center is its contribution to the CInAPCe network with technologically oriented lines of research. All important results generated by these research topics are described on the papers and conference communications as listed below.

MAIN PUBLICATIONS

- Paiva FF, Tannus A, Silva AC. 2007. Measurement of cerebral perfusion territories using arterial spin labeling. *NMR in Biomedicine*. **20**:633-642.
- Paiva FF, Tannus A, Talagala SL, Silva AC. 2007. Arterial Spin Labeling of Cerebral Perfusion Territories Using a Separate Labeling Coil. *Journal of Magnetic Resonance Imaging*. (in press).
- Papoti D, Vidoto ELG, Martins MJ, Tannus A. Effects of Crossing Saddle Coil Conductors: Electric Length X Mutual Inductance (to be submitted to the *Journal of Magnetic Resonance*).
- Bachiega JC, Blanco MM, Perez-Mendes P, Maria SC, Covolan L, Mello LE. 2008. Behavioral characterization of pentylenetetrazol seizures in the marmoset. *Epilepsy & Behav*. (in press).
- Perez-Mendes P, Blanco MM, Calcagnotto ME, Maria SC, Bachiega JC, Papoti D, Tannus A, Covolan L, Mello LE. Development of an animal model of temporal lobe epilepsy in a non-human primate (to be submitted to *Nature Medicine*).
- Hamani C, Hodaie M, Chiang J, Del Campo M, Andrade DM, Sherman D, Mirski M, Mello LE, Lozano AM. 2008. Deep brain stimulation of the anterior nucleus of the thalamus: effects of electrical stimulation on pilocarpine-induced seizures and status epilepticus. *Epilepsy Res*. **78(2-3)**:117-23.
- Bittencourt S, Pereira CM, Avedissian M, Delamano A, Mello LE, Castilho BA. 2008. Distribution of the protein IMPACT, an inhibitor of GCN2, in the mouse, rat, and marmoset brain. *J. Comp Neurol*. **507(5)**:1811-30.
- Queiroz CM, Mello LE. 2007. Synaptic plasticity of the CA3 commissural projection in epileptic rats: an in vivo electrophysiological study. *Eur J Neurosci*. **25(10)**:3071-9.

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