

**French National Foundation on Alzheimer's disease
and related disorders**

CALL FOR OFFERS

**CREATION OF AN EXPERT CENTRE
IN ROUTINE ACQUISITION AND IMAGE PROCESSING**

Background: The role of imaging techniques like magnetic resonance imaging (MRI), positron emission tomography (PET) and single photon emission computed tomography (SPECT) in research on Alzheimer's and related diseases is essential to better characterise the evolution of the disease and to evaluate the efficacy of new treatments. Recent methodological developments in both the equipment and the signal processing and image analysis allow a few specialized laboratories to dispose of routine acquisition and image processing methods that have been optimized, standardized and adapted for monitoring injury and treatment of Alzheimer's disease and related disorders.

The aim of this call for offers is to provide the scientific and medical community working on Alzheimer's disease with such know-how, by creating a centre for image processing and data mining (expert centre). An array of imaging equipment / scanners dedicated to the study of Alzheimer's disease will thus generate large volumes of data that will be exploitable for knowledge extraction.

The expert centre will be responsible for this consortium which should include:

- The expert centre itself, consisting of MRI methodologists, image and data processing experts, and a powerful database server which should be accessible from the outside and secured.
- A network of clinical research teams and / or basic science/molecular research specialists working on Alzheimer's and related diseases and equipped with 3T MRI imaging scanners (possibly PET and / or SPECT) fully or partially dedicated to research
- Research teams in image processing and data mining actively working on or interested by Alzheimer's disease.

The expert centre should:

1. Set the standard for image acquisition, assisting in sequence implementation, managing the network, updating the machines and verifying (a priori control on each site and at posteriori at the expert centre) the quality of the MRI acquisition and the homogeneity of all batches of images generated by different imaging partners/participants of the 3T network (e.g. use of a common ghost for MRI).

2. Organize a database shared by members of the consortium and ensuring sustainability (archiving). Given the delay foreseen for the establishment and organization of the 3T equipment network, the project will rely initially upon existing tools (1.5 and 3T MRI already in use in the public and private sectors) and completed at a later stage by 3T MRI funded by the Foundation. Centres equipped with 3T MRI that integrate the network, will feed the database through a secure internet connection. Given the allocated funds, an annual maximum of 6000 sequences analyzed (80% MRI and 20% PET or SPECT exams) of about 1 200 patients per year could be envisaged. The expert centre must be "pro-active" in ensuring the quality of all images acquired by implementing a quality check procedure from the beginning of the image acquisition phases, with one or more experts likely to follow and monitor these phases continuously through regular visits to the various sites. The means/budget provided by this call for offers should allow the expert centre to have at least one or more dedicated staff interacting with each participating site of the network and delivering a technical certificate that validates the production of images of these centres

3. Implement a calculation centre using a portfolio of tools for image processing - systematically updated - with the best scientific and technical level, allowing automated analysis and taking into account both the whole brain and available or to come imaging methods. These computerized tools for image processing will allow consortium members to have access to analysis of images of high added value thanks to developments performed and validated by the expert centre itself. The centre will also have the possibility, after its own validation, of integrating software developed in collaboration with other groups of recognized methodologists or products available on the internet (SPM, freesurf, etc ...).

4. Make available to members of the consortium the raw data previously archived by the expert centre as well as the data generated by image processing and data mining tools. These results are intended to either be exploited directly by the clinical teams or to enrich the database of the consortium to allow a second level of analyses focussing, for example, on the discovery of biomarkers. In particular, the expert centre will be closely involved in the processing of data from specific cohorts of the Foundation.

5. Facilitate research in image processing and data mining within the consortium by proposing a federative environment of development. This environment, which will imply a common software platform initially under production in the expert centre, should ultimately be installed in the various sites of the network in order to facilitate contributions by on-site methodologists, or to facilitate the reading of results by clinicians. This software environment should also be applied to treatment and quantification of PET or SPECT images.

6. Make available to members of the consortium a legal committee specialized in IPR who will help the expert centre and the consortium members to manage intellectual property issues that interface with the various partners (research organizations, universities, hospital, industrial). The foundation has no mandate to hold the intellectual property, however this committee will keep the Foundation informed of the development carried out with its support and if necessary be associated with certain contracts to receive royalties.

The expert centre so constituted shall rely on:

- The network of clinical research teams and / or basic research experts working on Alzheimer's and related disorders that integrate the consortium. They should include staff assigned to dedicated 3T MRI and their satellite clinical teams. In this context, the expert centre will express its view on the issue of incorporating other apparatus dedicated to research and / or mixed clinical-research in the network of dedicated MRI.

- Research teams in image processing and data mining located in France and who have developed expertise in the field of brain imaging (especially MRI, PET or SPECT). In this configuration, the expert centre equipped with a powerful database server, secured yet accessible from outside, will be responsible for the acquisition, harmonization and sharing of data.

To manage all this, under the responsibility of a scientific committee set up by the Foundation, the centre will offer an expert organizational chart and a modus operandi to ensure standardization of all sequences and generated data, quality control of raw and processed data, management of resources and intellectual property and the availability of processed data. It will also make available to all network members, trained technicians capable of responding to needs in image processing and data mining.

Deadlines: Identification of the centre: 2009, then one to two years of development, according to the chosen site.

Funding: € 3 million for the establishment of server computing and database, recruitment of personnel dedicated to the establishment of the secure IT network.

Operating budget of the centre (by 2010): 2 M € / year for 3 years and self-financing afterwards.