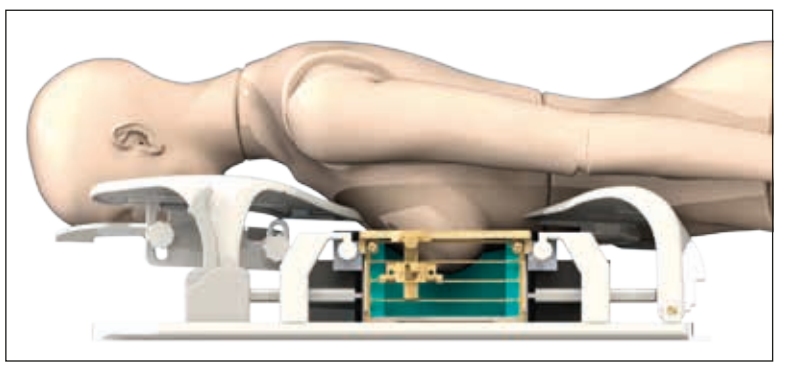
BY KATHARINA KRISCHAK AND MICHAEL CREAN

Three EU-funded cancer projects underway with support from EIBIR

The European Institute for Biomedical Imaging Research (EIBIR) was founded in 2006 by the European Society of Radiology (ESR) to support researchers in applying for funding and in managing collaborative research projects.



This image shows a patient model on the patient rest (white). The HYPMED PET detector sensors (green) are adjustable in the feet-head direction in order to immobilise the breast for the examination. The biopsy device (brown) allows for minimally invasive biopsy of suspicious tissue.

Over the last ten years, EIBIR has helped researchers secure more than €67 million in funding, going on to become part of more than a dozen research projects. Many of these projects have been aimed at improving the diagnosis or treatment of various types of cancer. A special session, today at ECR 2017, will cover the work of the most recent EIBIR-supported projects related to cancer.

The project **GlucoCEST Imaging in Neoplastic Tumours (GLINT)** is expected to have a major impact on European clinical oncology practice and beyond. It aims to develop an innovative image-based metabolic evaluation technique which will allow for less invasive, more reliable and earlier cancer diagnosis. This ground-breaking novel MRI method builds on recent research revealing the sensitivity of a technique named glucose-based chemical exchange saturation transfer (glucoCEST) to detect native (D-glucose) glucose uptake in tumours and that glucose analogues, such as 3-oxy-methyl-D-glucose (3OMG), can be used as potential non-metabolisable tracers using the same technique.

Currently, clinicians use fluorodeoxyglucose (FDG) PET to detect glucose uptake and metabolism in tumours and determine whether cancer treatment is working. The GLINT method will avoid the use of expensive radiolabelled compounds and develop an innovative radiation-free MRI technique. This will significantly reduce patient exposure to radiation and allow for closer monitoring of tumour progression and treatment, leading to improved clinical decisions and outcomes. By offering a less expensive complementary method to FDG-PET, the GLINT project will also contribute to the sustainability of healthcare systems throughout Europe.

The GLINT method will also open the field of metabolic imaging to a multitude of non-cancer diseases. It is anticipated that the project's results will facilitate the development of other MRI techniques, increasing the potential applications of this important diagnostic tool.

Another EIBIR-supported project addresses the current lack of sensitivity and specificity of current screening methods in thyroid cancer diagnosis, where a large number of non-diagnostic and false positive results leads to numerous unnecessary cost-intensive surgeries. The project **Laser and Ultrasound Co-analyzer for Thyroid Nodules (LUCA)** is working on a new solution for thyroid nodule screening and an improved and more accurate diagnosis of thyroid nodules.

By combining traditional ultrasound with an optical system based on diffuse correlation spectroscopy (DCS) and an optical system based on time resolved near-infrared spectroscopy (TRS), the LUCA partners aim to develop a portable and low-cost device for simultaneous multiparametric ultrasound imaging with optical measurement of tissue haemodynamics and composition of the thyroid nodules. This new device will help to reduce the number of invasive diagnostic and therapeutic procedures and provide enhanced information for clinical decision making.

The LUCA project is expected to have a major impact on the effectiveness, cost and speed of medical diagnosis in the field of thyroid cancer and beyond. The device has the potential to represent a very innovative tool for the diagnosis, screening and therapy monitoring of other types of cancer in areas of the body accessible to both ultrasound and near-infrared diffuse optical technologies and is expected to have a major impact on society.

The EU-funded project **Digital Hybrid PET/MRI for Enhanced Diagnosis of Breast Cancer (HYPMED)** aims to design, build and test a ground-breaking PET radiofrequency (RF) insert that will vastly improve breast cancer imaging. This new device will also facilitate guided biopsy through a combination of high-resolution/ultra-high sensitivity PET and structural and functional MR. With the molecular and functional PET-RF imaging developed by the HYPMED project, physicians will have more information for selecting appropriate and individualised treatment, which will lead to improved survival and quality of life for women with breast cancer.

With the new insert, any regular clinical MR machine can be turned into a hybrid system when required. The insert will be created by integrating an innovative and fully digital MRI-transparent PET detector into a multichannel PET-transparent MRI surface coil.

The impact of this technology on breast cancer diagnosis, prediction, monitoring and assessment of treatment response will be evaluated by a clinical study that will test established and novel PET tracers in patients. Imaging data will be correlated with established and novel molecular biomarkers, the results will be compared to those obtained from whole-body PET/MRI and PET/CT.

The project is made of ten partners which include leading universities, research organisations and industry from across Europe. EIBIR serves as project coordinator and leads project management and dissemination activities. The project's proposal earned the top score from the European Commission evaluators and received proposal preparation support from the EIBIR Team.

EIBIR Session

Friday, March 3, 08:30–10:00, Room M 2
EIBIR Session 2
EU Research on cancer imaging
Moderator: Y. Liu; Brussels/BE

» **Introduction**
Y. Liu; Brussels/BE

» **Multimodal imaging with diffuse optics for cancer theranostics**
T. Durduran; Barcelona/ES

» **Hybrid PET/MRI for breast cancer detection**
C.K. Kuhl; Aachen/DE

» **Using GlucoCEST MRI to visualise cancer**
X. Golay; London/UK