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Mr Research at Aarhus Hospital

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The Aarhus University Hospital is responsible for the clinical education of more than 250 medical students per year. It covers basic and clinical research in more than fifty local or central laboratories spread over seven hospitals. 323 PhD students were registered at the Faculty of Health Sciences in 2004. A strong partnership with national and European institutions enables us to pursue cutting-edge research activities. In fact, over 1,100 peer-reviewed publications are produced annually by the University of Aarhus, comprising 1.5-2% of the world's publications in health science. Due to the fact that in Denmark, it is planned that clinical departments and research activities will be housed in one enlarged hospital facility, we now face the challenge of managing our widespread activities in an innovative way. The University Hospital is managed by a Board of Directors from the University of Aarhus and by regional county governments. The education/ research budget includes 15m Euro, with about 7m Euro allocated to research and developmental activities. 45m Euro per year is granted for research from private organisations.

Cross-Disciplinary Management Policies

It is the main strategy of the Centre to provide a broad platform of MR techniques, thus welcoming a broader spectrum of scientific specialists with a common interest in applying MR to their fields of research. Imaging modalities include CT, PET/CT, Ultrasound, Gamma cameras and IR optical imaging. We also have fifteen MR scanners, three to four of which are used daily for research. Being situated in a Hospital, of course, relevant clinical research programmes have high priority, which can be seen in the themes of our research groups: Molecular Imaging in Cancer, Neurophysiology/ Neuropsychology, Cardiovascular MRI, Kidney Functionality, etc. Our cross-institutional organisational model secures a wide variety of disciplines, with the most up-to-date clinical regimes. In the experimental and clinical radiological departments, facilities allow for cross-disciplinary activities for example, engineers, physicists, chemists, psychologists and researchers, who work together under a common goal.

MR Research: Unified Research Strategies

In Denmark, we try to remain on the cutting edge of our scientific research endeavours. For example, within MR research, the main focus is on quantification of organ functionality of the heart, brain, liver, kidneys and musculoskeletal system. In oncology, this includes quantification of viability in tumour cells subjected to various anti-tumour and tumour vasculature-disrupting therapies. The MR area is pursuing unified research strategies. One of these is "Molecular Imaging and Therapy: design of intelligent molecules for combined magnetic resonance imaging and cancer treatment". Based on new interdisciplinary research achievements, molecular imaging and therapy is directed towards focused therapy based on particles designed for targeting specific pathologic tissues. The technique relays the latest achievements within non-invasive in-vivo imaging methods, nano- and gene technology, immunology, molecular biology, oncology and biomedical engineering. New developments in these fields will result in more effective treatment regimes and preventive measures for diseases like cancer, diabetes, obesity, atherosclerosis and degenerative diseases of aging. Thus our cross-departmental approach to our research enables a wider field of possible long-term benefits in a wide range of diseases.

Here at the Research Centre, we are dedicated to developing new chemo- and radiotherapy regimes implementing molecular imaging-guided treatment that specifically targets abnormal cells. Importantly, molecular imaging has the potential for localising all malignant cells of a specific type, including even small remote metastases. When restricting anticancer therapy to malignant cells only, the debilitating side effects of conventional chemo- and radiotherapy will be reduced and a more comprehensive therapy that will improve virtually every clinical and quality-of-life marker becomes available. In addition, molecular imaging and therapy offers navigational assistance for targeted procedures facilitating unique precision in biopsy procedures.

Conclusion

Each of these steps requires a multi-disciplinary approach that results not only in a superior level of research and a wider target group of research subjects, but that attracts the foremost experts in the field, thus enabling the widest possible implications for improving healthcare and disease control in Europe.

