

Moving towards personalised cancer treatment

Increasingly precise scanning technologies are of key importance to the diagnosis and treatment of cancer patients. Researchers at the Department of Clinical Physiology, Nuclear Medicine & PET are in the process of developing novel, targeted tracers, which could become a feature of individualised cancer therapy of the future.

The Department of Clinical Physiology, Nuclear Medicine & PET at Rigshospitalet receives referrals from across the country, as well as from abroad. Conducting more than 61,000 examinations and producing over 100 scientific publications per year, the department is very active in provision of treatment and research.

“All our research is driven by the clinical needs of the patients. Take, for example, the need to be able to predict whether a certain cancer will spread using a PET scan. We transfer that need or that task from the clinic to the research laboratory, where we develop a new method, which we then bring back to clinic. From bed to bench and back again, so to speak,” explains Senior Consultant Professor Andreas Kjær.

Strong international cooperation

The department is primarily involved in international research collaboration projects, and Andreas Kjær and his colleagues work with researchers from the US, India, the EU and China. In a joint project involving researchers from Stanford University in the US, they have developed a series of new so-called PET ligands – molecules that emit radioactive signals and bind to certain structures of the cells.

“Our research is dependent on our international network. Without it we wouldn’t be able to develop the new, advanced methods we apply in practice, as it requires a diverse range of different skills. This is where we complement one another across the research groups,” says Andreas Kjær.

Early diagnosis and precision treatment

Andreas Kjær highlights the development of a particular PET tracer able to detect relatively rare neuroendocrine tumours as one of the department’s most significant achievements in recent years. At present, it has been used to scan about 150 cancer patients, with far better results than previously used tracers.

“This is an apt example of bed to bench to bed. First we defined a molecular target of the cancer. We then developed a radioactive ligand that binds to this structure and which can be detected in PET scans. After rigorous testing on animals, we were able to introduce it into our clinical work with the patients,” explains Andreas Kjær, who stresses that further research at the department will continue along the same route.

“The development of new PET tracers is the key to early and precise diagnosis of several cancers. These tracers could also play a significant role in the ability to predict whether a certain treatment will work in the case of one particular type of cancer. In this way, PET tracers are also crucial for developing more personalised treatments for the individual patient,” Andreas Kjær concludes.

Department of Clinical Physiology, Nuclear Medicine & PET at a glance

With around 100 permanent staff and an additional 50 PhD students, postdocs etc., the Department of Clinical Physiology, Nuclear Medicine & PET is well equipped to deal with the over 61,000 patient examinations carried out at the department every year. As part of Rigshospitalet, Copenhagen University Hospital, the department serves as a cross-departmental unit, carrying out examinations for other departments at the hospital. The department also receives patients from other parts of the country and abroad for specialised examinations. It has some of the most advanced diagnostic imaging equipment in the world, worth over DKK 500 million, and has an impressive research output of over 100 peer-reviewed articles annually. The department won a Global Excellence award in 2011.



Professor Andreas Kjær, Department of Clinical Physiology, Nuclear Medicine and PET, Rigshospitalet

Facts about Global Excellence – in Health

The Global Excellence programme seeks to recognise and highlight the leading research and therapy environments in the field of healthcare in the hospitals and universities of the Capital Region of Denmark. The programme was established in 2010 in close cooperation with the University of Copenhagen and The Technical University of Denmark (DTU). The purpose of this initiative is to encourage internationalisation of the Region's excellent research and therapy environments with a view to attracting international partners, researchers, talents and both private-sector and public funding for research. The programme comprises the awarding of one or two prizes each year, followed up with focused support in the form of consultancy, tools, website development, conferences, etc.

The Global Excellence award is given to the hospital and university environments in the region that perform first-rate international level research leading to the development and implementation of new, pioneering healthcare services, treatment methods and products for the benefit of patients. The selected Global Excellence environments have been chosen by the executive committee of the Capital Region of Denmark on the basis of evaluations by a specialist review committee of national as well as international experts. The awardees are characterized by unique efforts within one or more areas such as: The extent and quality of their research and development, teaching, examination and treatment of patients, and innovation and dissemination of the new knowledge. In addition to the Global Excellence distinction, which is valid for a period of five years, the awardees each receive a grant of EUR 200,000 to help strengthen and further their international profile.



Facts about the Capital Region of Denmark

The Capital Region of Denmark is one of five regional administrative units in Denmark. The Capital Region of Denmark, provides healthcare, mental healthcare, carries out research and regional development for 1.7 mio. people or approx. 30% of the population in Denmark. In addition to hosting the largest health care system in Denmark, the region is also home to one of the world's strongest life science clusters, and 70% of Denmark's biotech companies are located in the area.

The Capital Region is home to a number of specialist environments at the nine university hospitals in the region that perform world-class health research and have the ability to translate this new, innovative knowledge into pioneering health care services and treatment of the highest international standard. In order to highlight and acknowledge these environments, in 2010 – 2013 the Global Excellence – in Health award has been presented to a total of 22 hospital and university environments.

Denmark is in fourth place among the OECD countries regarding scientific publications per inhabitant and similarly in third place regarding citations. Accordingly health research in the Capital Region ranks among the best in Europe. In close collaboration with the University of Copenhagen, The Technological University of Denmark, the Capital Region of Denmark represents frontline health science and clinical research, together with research of high quality in other areas with relevans for development of future healthcare. Health research is carried out for approx. EUR 185,000,000 annually at the university hospitals in the region (including internal as well as external funds).

Sources: OECD Territorial Reviews: Copenhagen, Denmark (OECD, 2009); Research Barometer 2012 (Danish Agency for Science, Technology and Innovation, 2012)

