



The Capital Region
of Denmark



The importance of detail

DTU Nanotech works on materials that are so miniscule that the components are not even visible under a microscope. A nanometre is just one millionth of a millimetre. This amazingly advanced technology is used among other things to improve the diagnosis and treatment of cancer patients.

It's all in the detail, as they say – and it certainly is at DTU Nanotech, the Department of Micro- and Nanotechnology of the Technical University of Denmark. The department received a Global Excellence Award in 2011 and conducts biotechnological research that can be used, for example for more targeted and specialised cancer diagnostics and treatment.

“One of our main areas of activity at DTU Nanotech is the development of nanometre-sized capsules that are implanted in the body, track down the diseased tissue and release the drug right where the cancer is rather than elsewhere,” explains Professor Thomas Andresen. He adds that the technology can be used correspondingly for diagnostic purposes. In this case, the nanocapsules do not release drugs, but a contrast substance into the cancerous tissue, which then shows up in a subsequent scan.

Accurate radiation of moving tissue

Nanotechnology holds great potential for the healthcare sector. At DTU Nanotech, researchers are working on the insertion of contrast substances into cancerous tissue tumours that can be used to guide the radiation therapy. This enables doctors to target the cancerous tissue with much greater precision and thus cause the least possible damage to surrounding healthy tissue.

Researchers have carried out successful trials in both small animals and on dogs with cancer and are ready to start a study in collaboration with Rigshospitalet involving lung cancer patients and patients with cancer of the oesophagus. Characteristic of these forms of cancer is that the tumour moves during radiation therapy. Thus the cancerous tissue has to be marked very precisely and the radiation therapy must be accurately steered.

“We have launched a spin-off company that deals with the clinical trials for this technology. And this is one of DTU Nanotech's objectives. We're interested in establishing spin-offs or licence agreements to ensure that our research ultimately flows into clinical practice, while at the same time helping to create growth by exploiting the commercial potential,” explains Thomas Andresen.

The required visibility

DTU's researchers are very active at an international level and across traditional technological boundaries in their endeavour to produce solutions tailored to specific problem areas. They participate in a multitude of EU projects and also work closely with leading international research groups outside Denmark.

“We have a number of joint projects with colleagues in Sweden and the US. Working with researchers abroad is both an inspiration and a necessity. To excel in your field – and maintain your position – you need to work in conjunction with other leading experts who may either be in another country or working in an adjacent research field,” Thomas Andresen points out.

“Furthermore, an international horizon is absolutely essential from the point of view of training and education. It's important for our senior researchers to work in an international network which offers our younger colleagues opportunities to work abroad, participate in exchanges etc. This opens up horizons, bolsters their research and ultimately enhances the value of the results,” Thomas Andresen concludes.

DTU Nanotech at a glance

DTU Nanotech has a staff of approximately 200, including 90 PhD students. The working environment at the department is very international, with about 40 percent non-Danish staff. The department is involved in roughly 100 research projects, many of them in the biomedical and life science sector. DTU Nanotech has a strong tradition of transferring research findings from the research environment to industry and with about 15 spin-off companies and numerous licensing agreements has helped to create several hundred jobs over the last 10-15 years. DTU Nanotech won a Global Excellence award in 2011.



Professor Thomas Lars Andresen, Department of Micro- and Nanotechnology, Technical University of Denmark (DTU)

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)

