# 🦁 Healthcare industry BW

New molecules promise improved diagnosis of pancreatic cancer

Being diagnosed with pancreatic cancer is often a death sentence. One reason for the high mortality rate of pancreatic cancer patients is that there is currently no reliable diagnosis of early stages and no cure once the disease has reached a late stage. In an EU-funded project, 23 research groups from six countries have developed new strategies for the improved diagnosis of pancreatic cancer. Researchers at the Ulm-based Hospital for Nuclear Medicine developed molecules that enable the earlier detection of pathogenic alterations in combination with special imaging methods.

The scientists based their research on the fact that tumour cells divide more frequently and in a different way from normal cells. "Our goal is to find molecules that react to the particularities of tumour cells, and accumulate specifically in the cancer tissue. The accumulation of tumour cells is made visible through the radioactive labelling of the molecules, which can then be detected using specific imaging methods," said Sven Norbert Reske, Medical Director of the Hospital for Nuclear Medicine, explaining the basic principle behind the method.

The molecules can contribute to differential diagnosis

	Pancreatitis	Pancreatic cancer
CT		
^{18}F-FLT PET		
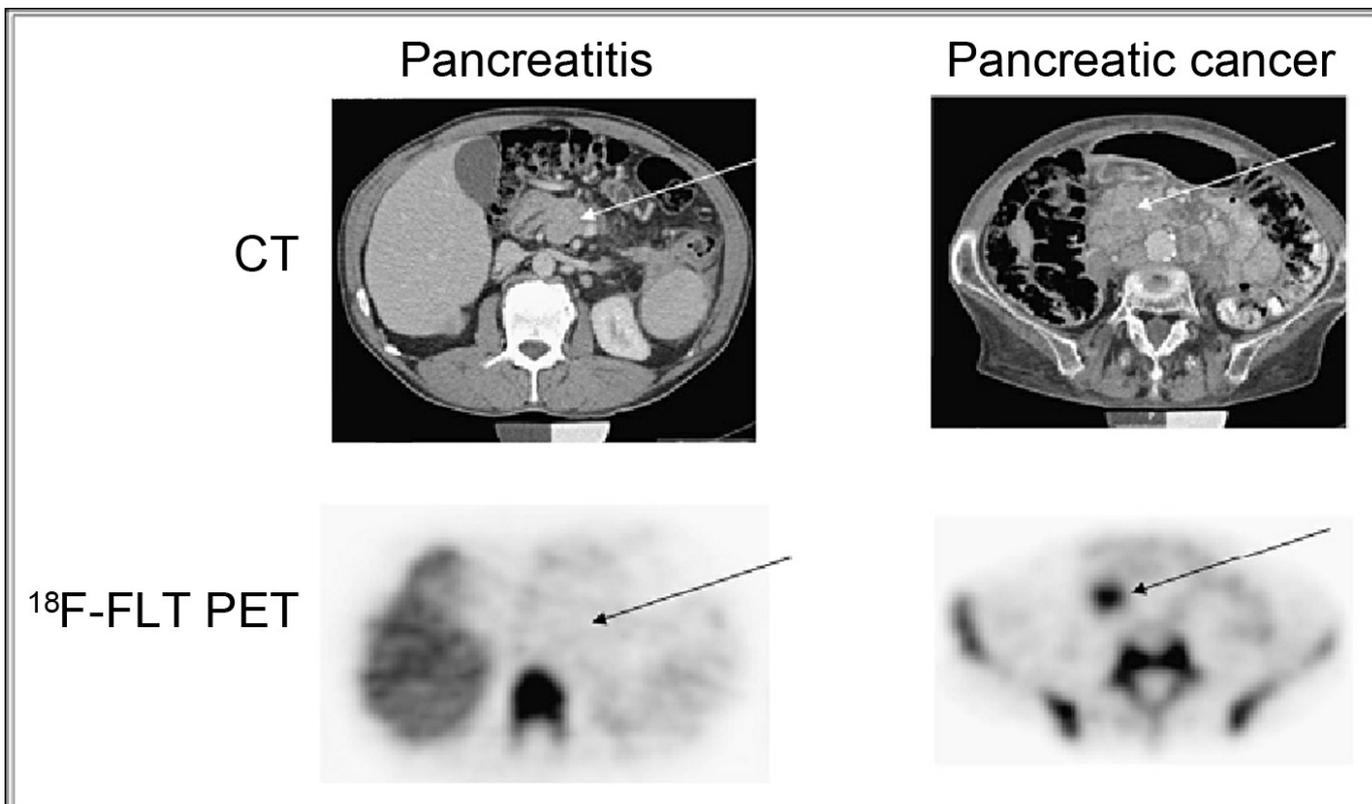
Comparison of computed tomography (CT) scans and positron-emission tomography (PET) scans used for the diagnosis of pancreatic cancer: in contrast to the CT scans, the PET images at the bottom clearly show whether a pancreatic disease (arrow) is an inflammation or cancer. In the case of inflammation, the PET image on the bottom left-hand side clearly reveals that radioactively labelled molecules (18F-FLT) do not accumulate; in contrast, the tumour tissue in the bottom right-hand photo becomes visible due to the increased accumulation of radioactively labelled molecules (black spot).
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Finding and producing such molecules is a very time-consuming process. This is because the radioactively labelled molecules must specifically bind to and be compatible with the tumour cells. A molecule developed by the group of Ulm researchers responds to an elevated number of transporter molecules on the surface of tumour cells. "Another molecule can be used to visualise the synthesis of a specific nucleic acid (RNA), which helps to transfer or translate genetic information in a special phase of cell division," said Reske.

The development of the molecules by the team of chemist Boris D. Zlatopolskiy led to publications in two expert journals: Journal of Nuclear Medicine (DOI: 10.2967/jnumed.109.065623) and Bioorganic & Medicinal Chemistry Letters (DOI: 10.1016/j.bmcl.2009.07.017). "Both molecules might one day help us to better diagnose pancreatic cancer and to differentiate between pancreatic cancer and benign inflammatory diseases. However, it will be quite some time before patients will be able to benefit from our discoveries. Numerous trials will have to be carried out to prove the efficiency and safety of the molecules," said Reske with an eye on the future.

Already known structurally related molecules were recently tested in a clinical trial involving 31 patients. The trial showed that the molecules were able to detect pancreatic cancer and differentiate it more easily from other pancreatic diseases. The trial was led by nuclear medicine expert Andreas Buck, who previously worked in the Ulm research group, and is now at the Technical University of Munich (DOI: 10.2967/jnumed.108.052027).

The interdisciplinary cooperation between medical doctors, biologist, chemists, physicists, pathologists and statisticians and the collaboration with industry is a particularlity of the EU-funded MolDiag-Paca project (Novel molecular diagnostic tools for the prevention and diagnosis of

pancreatic cancer; www.moldiagpaca.eu). The researchers from Ulm were funded with approximately 390,000 euros over a period of three years.