Hybrid MR/PET scanner

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A medical scanner capable of earlier diagnosis of some of the most fatal diseases could be available in hospitals in the next three years.

The technology is being developed under the €7.3m (£6.5m) HyperImage consortium led by Philips Healthcare, aimed at providing a hybrid Positron Emission Tomography (PET)/Magnetic Resonance (MR) scanner for the faster diagnosis of cancer and cardiovascular diseases.

According to the researchers, the two technologies will be able to do this by combining the benefits of soft-tissue contrast and physiological processes, achieved by MR scanners, with the high-definition molecular imaging provided by PET.

Prof Tobias Schaefter of the Division of Imaging Sciences at King's College London is leading the UK's contribution to the project. He believes a breakthrough in developing a new gamma-ray detector for use inside the scanner could make the technology widely available in the near future.

'We have worked for a long time on developing this kind of hybrid system, but with the old technology we were never able to achieve the required sensitivity,' he explained. 'Recently, we met the most important milestone in the project. Under the lead of Philips, we have now developed a scanner that can detect gamma rays for the PET technology inside the MR system and this was not possible before.'

The development centres around a detector that is compatible with the strong static and dynamic magnetic fields that would be present in a hybrid PET/MR scanner. The team has also achieved progress in MRI-based static and dynamic PET attenuation correction, allowing both technologies to be used simultaneously while accounting for the scattering of high-energy gamma rays by the PET system.

'Doctors are already combining the data from these two technologies,' said Schaefter. 'This takes a long time because you do the scans separately and they can be weeks apart. By then, the position of the patient will have changed and the results are not as accurate.'

By collecting MR and PET information in one imaging session, it is hoped physicians will be able to work more efficiently and make faster decisions. Schaefter also expects the technology to have a significant impact on providing an early indication of whether certain treatments, such as chemotherapy or radiation therapy, are effective.

'What we have to prove in the next half year is that we can move from the theory to doing accurate PET images inside an MRI scanner,' said Schaefter. 'We have developed a pre-clinical prototype and are aiming to begin trials in the middle of next year for in-vivo imaging.'