

A new scan for lung diseases

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People with chronic lung disease and asthma could soon be offered better treatment thanks to a new type of Magnetic Resonance Imaging (MRI) scan being pioneered at The University of Nottingham.

A purpose-built MRI research unit has been established to study a range of respiratory diseases. The unit is based at the Queens Medical Centre and will allow doctors to virtually 'see inside' the lungs of patients using a new, specifically-adapted [MRI scanner](#).

The team of scientists and clinicians are working on a new technique using a specially-treated harmless gas which the patient is given to inhale. Unlike air, this gas shows up clearly on an MRI scan, giving an exquisitely-detailed picture of the lungs, their damaged and healthy areas. The new method also shows the gas being absorbed into the bloodstream. This will give doctors a clear idea of how well or badly the different parts of the lungs are transferring life-sustaining oxygen. The scans could also be used to guide treatment or to guide surgeons performing lung reduction operations.

The diseases to be studied using the new type of scan include asthma, lung fibrosis and [Chronic Obstructive Pulmonary Disease](#) (COPD). These diseases are a major health burden: for example COPD is among the top five causes of death and disability in the UK with around a million sufferers. It is caused by inhalation of poisonous gases or particles, most commonly in smoking, although some working environments, e.g. coalmining, are also known triggers. COPD accounts for more time off work than any other illness and places a huge burden

on the health service.

At present X-rays or CT scans are used to investigate lung diseases. But X-rays and CTs only show the structure of the lung and don't reveal any detail on how well the lungs are functioning. They also involve a small exposure to radiation which can limit repeat scanning.

The MRI imaging technique to be used in the trials will use a gas called Xenon 129. The Xenon is 'hyperpolarized' using lasers which make the gas particles detectable in the MR scanner. Whilst this approach has been tried previously using Helium 3, this gas is difficult to obtain and hence is unsuitable for routine clinical work. Xenon 129 is easy to obtain and thus has the potential to be used widely in the clinic.

The team of scientists and clinicians at the University has won around £3 million from a range of sources to fund the building of the tailor-made facility at the Queen's Medical Centre. It will also pay for clinical trials of the technique and to develop better hyperpolarisation equipment to supply the gas needed. A new member of staff, physicist Professor Thomas Meersman, has been appointed from Colorado State University to help lead the hyperpolarization research.

The project is being led by Professor Ian Hall in the medical school and Professor Peter Morris, Director of the Sir Peter Mansfield MRI Centre. Professor Hall said: "This research has huge implications for the treatment and monitoring of lung disease. We are very excited to be able to combine our world-renowned MRI knowledge with the clinical expertise at the Queen's Medical Centre in Nottingham to try and develop hyperpolarized xenon MRI as the diagnostic and therapeutic monitoring tool of choice for lung-related diseases in the future."

Source: University of Nottingham ([news](#) : [web](#))

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