Researchers light up lungs to help diagnose disease

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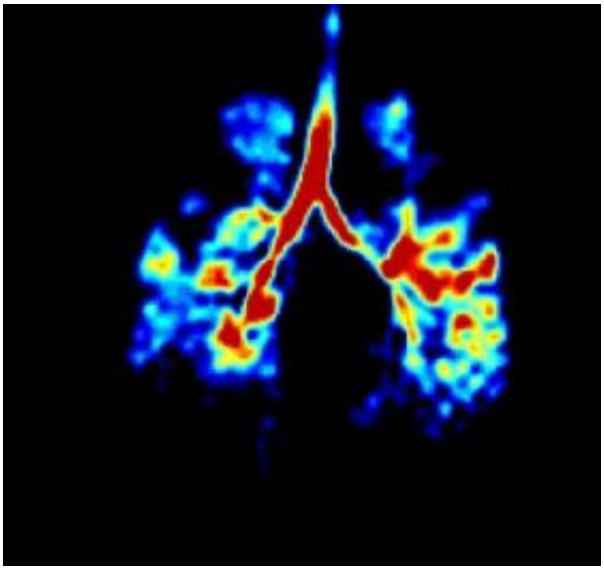

An image of a person's lung who has emphysema. Credit: The University of Sheffield

Researchers at the University of Sheffield have developed innovative technology which illuminates a person’s lungs and helps clinicians identify if they are functioning correctly. The new technology could result in earlier diagnosis of emphysema and smoking related damage, as well as other lung conditions and diseases.

Lung diseases are of growing concern to the health of the nation, with people suffering from conditions as mild as asthma or as severe as lung

cancer. By detecting lung damage early, doctors could help slow down or stop the conditions.

The technique developed at Sheffield involves a person inhaling small amounts of harmless hyperpolarised (HP) noble gases (Helium-3 and Xenon-129), which are then imaged inside an MRI scanner. The gases are hyperpolarised using high power lasers by a process called optical pumping. The high resolution images of the airspaces that are produced offer additional functional information that is currently not available with traditional X-rays and lung CT scans.

The first clinical studies using this novel method have been carried out at the University of Sheffield, with the University holding the only UK regulatory licence to administer hyperpolarised gases for lung imaging.

Images obtained of lungs so far are shedding new light on a variety of different lung conditions and diseases. Tests carried out on smokers, for example, have shown signs of early emphysema.

The technology has also been used to help detect the early stages of lung obstruction in children with Cystic Fibrosis, something which a traditional X-ray would miss. The technique also allows repeated investigations in children without the fear of radiation exposure.

The researchers are also now looking at using the technology to assess inhaled therapies for asthma patients and help plan radiotherapy treatment in patients with lung cancer.

Jim Wild, a physicist from the University's Academic Unit of Radiology and the lead academic involved in the project, said: "The images produced are providing clinicians with functional information of the lungs that has previously been unattainable. The high sensitivity of the technology means that it offers real hope for detecting lung damage

early.

“Being able to detect lung conditions and disease at an early stage could radically affect the lifespan and quality of life of patients. For children with cystic fibrosis it means that, with the right treatment, they could live longer. Patients who have successfully stopped smoking can also see how they can halt or slow down the damage being done to their lungs.”

Source: University of Sheffield