
Using Light To Examine Lungs Of Premature Babies



Research from [Lund University](#) in Sweden suggests that in the future, tests to see how much premature air babies' lungs contain as their lungs are not sufficiently developed could be done using laser light, which at present can only be done using X-rays. The researchers suggest that this method could also be employed to measure oxygen among severely ill adult patients.

"Multiple X-ray examinations involve a certain increase in the risk of developing cancer, not least in small children. Decreasing the number of X-ray examinations would be a major advantage", said Emilie Krite Svanberg, an anaesthesiologist and researcher, who defended her doctoral [thesis](#) on the use of light to measure oxygen in a human body this March.

The basic principle of the method described by Svanberg is to send light of a certain wavelength into the body, and then measure how much of the light can be retrieved. Based on this, it is possible to calculate the oxygen supply.

Technology that measures oxygen bound in the blood already exists. Free oxygen that exists in cavities such as lungs is much more difficult to measure. Here, the submitted light must be at exactly the right wavelength – achieving a wavelength of 760 nanometres is not enough; the light beam must be precisely 760.445 nm.

The Lund University researchers are the first to successfully perform these types of measurements and trials with healthy newborn babies have shown that the method works. The research group, with roots in both the Faculty of Medicine and the Faculty of Engineering, has, along with private companies, received a large EU grant to continue developing the method.

"Today, the method requires one person to hold a measuring instrument against the baby's chest, while another sits by the computer, registering the results. Our goal is to simplify this technology", explained Svanberg.

"We hope that the measurements will be possible to perform automatically, by using small transmitters attached to the baby's chest. This would enable measuring the lung function continuously, in a way that is completely safe and that doesn't bother the child".

These measurements could help determine whether or not a premature baby needs treatment in order to improve their breathing. If intensive interventions are necessary, such as inflating collapsed parts of the lungs, light measurements could also be used to minimise the risk of injury from the treatment.

Another part of Svanberg's doctoral thesis is about refined oxygen measurements to monitor severely ill adult patients. In critical conditions, such as circulatory failure (medical shock), the body focuses mainly on maintaining blood supply to the brain and the heart. The blood flow to less vital parts of the body, such as arms and legs, decreases, which can be measured through a newer method that uses short laser pulses.

"In cases of circulatory failure, time is crucial. The faster healthcare staff realise the oncoming crisis, the better the chances of the patient to survive", said Svanberg, hoping that by measuring the oxygen supply, in for instance the forearm, it will be possible to detect signs of medical deterioration at an early stage and thereby save lives.

The technology is not yet available in hospitals, but could soon be introduced. Another advantage is that the technology is so simple that it could be used not only within intensive care, but also in emergency wards and other healthcare clinics.

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