Press release PExA AB
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New Lancet journal study shows virus-specific antibodies can be measured deep in the lungs without bronchoscopy

A new scientific study by researchers at Karolinska Institutet, Danderyd Hospital and Uppsala University demonstrates that samples collected non-invasively using PExA can be used to measure virus-specific antibodies from the small airways. Published in eBioMedicine, one of the leading international scientific journals in biomedicine and part of The Lancet Discovery Science, the study opens new opportunities in vaccine research, immunology and drug development, paving the way for broader applications of PExA's instruments and technology.

For the first time, researchers led by Professor Charlotte Thålin at Karolinska Institutet have demonstrated that antibodies targeting specific viruses can be analyzed in samples collected non-invasively from the small airways, deep within the lungs. PExA's technology enables these samples to be collected without bronchoscopy or other invasive procedures and subsequently examined using advanced analytical methods.

For pharmaceutical companies and researchers, this opens the possibility of investigating whether future vaccines generate the desired immune responses deep within the lungs, rather than only in the blood or upper airways. This could be particularly valuable in developing new vaccines against respiratory infections such as influenza, COVID-19 and RSV.

Ultimately, the aim is to investigate not only whether the body responds to a vaccine, but also whether the appropriate immune response develops where protection is needed.

New Opportunities in Vaccine Development

The researchers analyzed samples from 28 individuals. Using PExA, samples were collected from the small airways and subsequently analyzed using sensitive immunological methods. This enabled the researchers to measure IgA and IgG antibodies targeting three important respiratory viruses: influenza, SARS-CoV-2 and RSV.

The results demonstrate that these antibodies can be measured with high precision in the collected samples. The study also reveals differences in antibody profiles between the blood, nose and lower airways, highlighting the importance of being able to investigate immune responses directly in the lungs.

- *Being able to analyze antigen-specific antibodies in samples from the lower airways without invasive sampling gives us new opportunities to study the immune system in the lungs. This is particularly interesting for the development of future mucosal vaccines, where we need to understand how immunity differs between different parts of the respiratory tract,* says Charlotte Thålin, Professor at Karolinska Institutet and affiliated with Danderyd Hospital.

An important part of the research has been the use of sensitive analytical methods that make it possible to measure specific antibodies in the very small sample volumes collected using PExA's technology.

- *What makes these results particularly interesting is that we can use advanced analytical methods to measure virus-specific antibodies with high precision in the very small samples collected using PExA's technology. The combination of non-invasive sampling and sensitive analyses gives us new opportunities to investigate local immune responses that have previously been difficult to study,* says Mikael Åberg, Associate Professor at Uppsala University and SciLifeLab.

Opening the Door to a New Application Area in the Pharmaceutical Industry

The development of new vaccines against respiratory infections is a major international research field. One important objective is to develop vaccines that not only generate a systemic immune response but also strengthen local immunity in the respiratory tract.

When Charlotte Thålin was awarded a Wallenberg fellowship last year, she described the possibility of using PExA to investigate antibodies in the lower airways as a "game-changer" for the development of vaccines and antibody-based treatments.

The newly published study represents a concrete step forward, demonstrating that researchers can analyze virus-specific antibodies in samples collected non-invasively using PExA. The findings strengthen the potential for future applications of the technology to study local immune responses, compare vaccine candidates and monitor how the immune system responds over time.

This also opens opportunities in pharmacodynamics (PD), where researchers and pharmaceutical companies seek to investigate biological effects directly at the site where a treatment is intended to act.

- *Charlotte Thålin and her colleagues have presented very exciting results that could have a significant impact on future vaccine research and drug development. We already collaborate with pharmaceutical companies in other areas of lung disease, and we now see how these findings could open the door to an entirely new application area. The ability to collect samples non-invasively from the small airways could become highly valuable for both vaccine researchers and pharmaceutical companies*, says Tomas Gustafsson, CEO of PExA.

Scientific Publication

Aguilera K. et al. *Non-invasive quantification of lower airway antigen-specific antibodies using exhaled breath particles – an observational proof-of-concept study*. eBioMedicine, 2026;133:106538.

https://doi.org/10.1016/j.ebiom.2026.106538

Read more in the press release from:

Karolinska Institutet – Lung antibodies can be measured in exhaled breath

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About PExA AB:

PExA AB *(corporate registration number 556956-9246) has developed PExA 2.1, a patented research instrument enabling non-invasive small airway liquid biopsy. The technology allows researchers to collect biological samples from the small airways of the lungs, providing molecular insights directly from the site of action and supporting biomarker discovery, pharmacokinetic and pharmacodynamic (PK/PD) studies, immunology research and future diagnostic applications.*

PExA's technology is used by leading research groups internationally and has contributed to more than 60 peer-reviewed scientific publications. Recent research comparing PExA with bronchoalveolar lavage (BAL) has demonstrated substantial overlap in detected proteins, further strengthening the scientific evidence supporting the technology. PExA has also established Small Airway Atlas™, a growing molecular database designed to support research and biomarker discovery.

PExA aims to expand the use of its technology in pharmaceutical development and research into respiratory diseases, including lung cancer, chronic obstructive pulmonary disease (COPD) and idiopathic pulmonary fibrosis (IPF), while pursuing long-term opportunities in clinical diagnostics.

PExA's B share is listed on Spotlight Stock Market.

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