

Cystic Fibrosis Research News

Title:

Lavage lipidomics signatures in children with cystic fibrosis and protracted bacterial bronchitis

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What was your research question?

Pulmonary surfactant is composed of lipids and proteins. It is secreted into the alveolar spaces of the lungs responsible for surface tension reduction. We were interested, whether the composition of lipids recovered by lung-wash in children with cystic fibrosis differs from children with a bacterial infection (protracted bacterial bronchitis) and healthy controls.

Why is this important?

Surfactant allows appropriate gas exchange and patent small airways. It may be deranged by several diseases processes, in particular inflammatory airway diseases. Published results of the lipid composition of airspace samples in patients with CF have been contradictory and lack of disease controls, which may help to elucidate, whether observed differences are characteristic for the inflammatory response or specific for the disease.

What did you do?

We analyzed the cellular components and concentration of lipids (phospholipids, sphingolipids, cholesteryl esters and free cholesterol) as well as lipid classes and subclasses in the airspace fluid recovered by lung wash.



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What did you find?

Whereas the total concentration of all lipids and the fraction of phospholipids were similar between all analyzed groups, we found alterations in the composition of cholesteryl esters, free cholesterol, sphingolipids and phospholipid species. A major finding was that patients diagnosed with CF had an increased proportion of free cholesterol and specific phospholipid (like PE, PE P, LPC). Such changes are consistent with the accumulation of cell membrane-derived lipids. However, we did not find such changes in wash fluid of children diagnosed with protracted bacterial bronchitis.

What does this mean and reasons for caution?

We suspect that the changes in CF are caused by the prolonged chronic inflammation in contrast to a relatively short standing process of a protracted bacterial bronchitis. This study underscores the susceptibility of the lipid composition to influences from airspace inflammatory processes. Analyses of the lipid composition may help to differentiate the type and extent of inflammatory processes.

What's next?

Assessment of the lipid composition of the airspaces may help to identify and quantify deranged inflammatory processes.

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