Effect of Staphylococcus aureus supernatant on airway epithelium function in infants with cystic fibrosis

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Staphylococcus aureus colonizes very early the airways in CF patients. For a better understanding of the physiopathological mechanisms which are involved in the first stages of CF lung disease development, we analyse the airway epithelium from young asymptomatic CF infants.

The aim of the present work was to study the effect of Staphylococcus aureus toxins on airway epithelium functionality.

Airway epithelial cells collected from nasal brushings were analyzed for ciliary beating frequency measurement, for assessment of chloride and potassium efflux and for measurement of gap junction functionality.

In 13 CF infants diagnosed by neonatal screening and in 8 non-CF infants, nasal brushing was performed within 6 months after birth and incubated or not with S. aureus supernatant. Chloride efflux was significantly (p < 0.04) decreased in CF patients compared with non-CF patients. We also observed that S. aureus supernatant significantly decreased ciliary beating frequency (p < 0.02), chloride efflux (p < 0.01), voltage-dependent potassium efflux (p < 0.02) and gap junction functionality (p < 0.03) in non-CF and CF infants.

The present data demonstrate that, prior to any lung disease development in CF infants, toxins produced by S. aureus may alter the functionality of the airway epithelium and may favour the decline of pulmonary function in CF.

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