Microbial metagenomics of chronic lung disease: Big Data mining to improve knowledge, diagnostics and patient care

Initiative: zukunft.niedersachsen (nur ausgewählte Ausschreibungen)

Ausschreibung: Big Data in den Lebenswissenschaften der Zukunft

Bewilligung: 27.05.2019

Laufzeit:

The Human Microbiome Project characterized the human microbiome of 18 body sites of healthy subjects by metagenome sequencing, but did not include the lungs as target body sites. This project would like to close this gap of knowledge. The airway metagenome of DNA viruses, bacteria, yeasts and fungi will be studied in health, acute respiratory tract infection and chronic lung disease. The metagenome data sets will be mined to extract diagnostic microbial signatures of health and acute airway infection in persons with no history of lung disease and of 'pulmonary exacerbation' and 'clinically balanced state' in individuals with asthma, chronic obstructive pulmonary disease, cystic fibrosis and bronchiectasis.The project aims to develop standards for airway microbiome analysis and to advance the implementation of microbiomic data into clinical practice of microbial diagnostics. The scientists would like to demonstrate that airway metagenome analysis can generate more clinically relevant information about the patient's microbiome at lower costs and in a shorter time than the common culture-based diagnostics. The procedures of metagenome analysis should be optimized to a 30 hours turn-around time from sampling of the patient's respiratory secretion to the delivery of the report to the ordering physician. If this pilot study will be successful, it will function as a model how next generation sequencing, bioinformatics and machine learning can transform clinical microbiology and the diagnostics of airway infectious disease.

Projektbeteiligte

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