



Pneumocystis in the lung: Revealing the shift from fungal colonisation to disease

Project Coordinator



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Project Description

Pneumocystis is a genus of fungal organisms that dwells in the lungs of mammals. For a long time, *Pneumocystis* was thought to be a unique species. However, with the help of recent discoveries and new molecular analyzing techniques, this view has changed radically and multiple species in the genus have now been identified in different mammals. *Pneumocystis* normally poses no risk for human beings: about 8 to 20% of healthy people carry *Pneumocystis* species without experiencing the pulmonary disease Pneumocystis pneumonia (PcP). However, a weak immune system will increase the likelihood of illness dramatically, as *Pneumocystis* can cause PcP in such cases. Furthermore, some studies have shown that healthy hosts act as a dynamic reservoir of *Pneumocystis* species, supporting the distribution of pathogenic organisms.

Three academic groups from three different countries have now come together under the umbrella of the *ERA-NET Pathogenomics* to focus on the biological changes undergone by *Pneumocystis* organisms that allow them to spread extensively in the lungs and develop pathogenic potential. The research will especially target the species *Pneumocystis jirovecii*, which is often detected in human beings with pulmonary diseases. The overall goal is to compare its characteristics with other related species that are non-pathogenic for humans. Thanks to the sequencing of another important *Pneumocystis* species genome (*Pneumocystis carinii*), now nearing completion, the researchers are expecting to be granted a closer look at the specific disease-related factors in the colonisation process of these fungi during chronic pulmonary diseases and their relevance to the promotion of immune and inflammatory responses. With the help of these insights on a proteomic level, the scientists also want to help generate efficient *in vitro* and *in vivo* models which would enable continuous monitoring of either *Pneumocystis* colonisation or concrete infection mechanisms caused by *Pneumocystis* species.

