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Presenting author Hans Ulrich

Presenting author's email hans.felix.ulrich@leibniz-hki.de

Further authors (if any)

Antje Meyer
Derya Nur Cömert
Sophie Dietz
Thomas Orasch

Affiliation(s)

Leibniz-Institut für Naturstoff-Forschung und Infektionsbiologie Hans-Knöll-Institut

Country Germany

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Poster title

ATHANA – Antifungal therapeutic approaches through nanoparticle-based targeting of drugs

Poster abstract

Infectious diseases caused by fungi represent an often-underestimated problem. Especially invasive fungal infections, affecting in particular immunocompromised patients, are associated with unacceptable high mortality rates up to 95%. These infections are estimated with an annual incidence of 6.5 Mio, resulting in 3.8 Mio deaths. Limited treatment options in combination with an increasing number of resistant strains against the currently available drugs further highlights the importance of this topic and the necessity for new developments.

The ATHANA consortium developed a platform technology for the production and testing of drug-loaded nanoparticles that can recognize pathogen-specific structures thereby attacking pathogens in a targeted manner. Encapsulating the active pharmaceutical ingredient (API) within a 'nanocarrier' is a strategy employed to prevent premature degradation and facilitate controlled release at the targeted location. This approach increases efficiency and reduces systemic side effects.

The toolbox approach facilitates the flexible, systematic and accelerated production of therapeutic nanoparticles with different functionalities for gradual expansion to accommodate new applications. Furthermore, the use of nanoparticles would open the application of pharmacologic problematic substances, as the pharmacological properties in these formulations are dominated by the carrier system and not by the API itself.

The primary objective of the ATHANA project is the development of nanoparticles with the capacity to target specifically fungal cells. These nanoparticles are to be loaded with a drug candidate that has the potential to combat invasive pulmonary aspergillosis. In this regard, a frontrunner-nanoparticle targeting Aspergillus spp. and displaying increased efficiency compared to the pristine antifungal substance was developed as inhalative application to treat invasive aspergillosis.

Research topic Clinical development