Immuno PET/MR imaging allows specific detection of Aspergillus fumigatus lung infection in vivo - DTU Orbit (03/12/2018)

Immuno PET/MR imaging allows specific detection of **Aspergillus fumigatus lung infection in vivo**

Invasive pulmonary aspergillosis (IPA) is a life-threatening lung disease caused by the fungus **Aspergillus fumigatus**, and is a leading cause of invasive fungal infection-related mortality and morbidity in patients with hematological malignancies and bone marrow transplants. We developed and tested a novel probe for noninvasive detection of *A. fumigatus* lung infection based on antibody-guided positron emission tomography and magnetic resonance (immunoPET/MR) imaging. Administration of a $[^{64}\text{Cu}]$DOTA-labeled *A. fumigatus*-specific monoclonal antibody (mAb), JF5, to neutrophil-depleted *A. fumigatus*-infected mice allowed specific localization of lung infection when combined with PET. Optical imaging with a fluorochrome-labeled version of the mAb showed colocalization with invasive hyphae. The mAb-based newly developed PET tracer $[^{64}\text{Cu}]$DOTA-JF5 distinguished IPA from bacterial lung infections and, in contrast to $[^{18}\text{F}]$FDG-PET, discriminated IPA from a general increase in metabolic activity associated with lung inflammation. To our knowledge, this is the first time that antibody-guided in vivo imaging has been used for non-invasive diagnosis of a fungal lung disease (IPA) of humans, an approach with enormous potential for diagnosis of infectious diseases and with potential for clinical translation.

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