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A novel approach for diagnostic imaging of invasive fungal infections

Arkady Mustaev

The State University of New Jersey, USA

Invasive fungal infections (IFI) are a major threat to human health. In particular, medical advances in the management of cancer patients and hematopoietic stem cell and organ transplantation, in addition to immunocompromising diseases such as AIDS, have increased the population at risk for IFI. Successful treatment of fungal infections relies on unequivocal diagnosis and rapid response. In the case of mould infections due to *Aspergillus* species, diagnosis represents a significant challenge resulting in a mortality rate of around 85% for patients in Europe and the USA. For IFI detection we suggest the approach based on using high-affinity and high specificity labeled antifungal drugs as diagnostic molecules. As a result the fungal cells become labeled and therefore can be detected. The exceptional diagnostic ability of our compounds relies of their high binding constants to targets, that are only present on fungi and are not present in the host. In our preliminary studies we successfully validated this approach by imaging fungal infections *in vitro* and *in vivo* in a murine model of candidiasis using fluorescently labeled drugs emitting in near-infrared spectral range, in which body tissues are transparent for excitation and emission light. The power of this approach is not limited to fungal infections, but in fact represents a broader platform useful for detection of other classes of human microbial pathogens.

Biography

Arkady Mustaev graduated from Novosibirsk State University (Russia). He received his PhD degree from Novosibirsk Institute of Bioorganic Chemistry. His Postdoctoral training was at Irkutsk Limnological Institute, Moscow Institute of Molecular Genetics, Columbia University, and Public Health Research Institute of New York City. Presently he is Assistant Professor at PHRI Center, NJMS at Rutgers, the State University of New Jersey. He has published over 90 papers in reputed journals. The main research areas are: Catalytic mechanisms of transcription, bacterial and cancer drug development, *in vivo* detection of human microbial pathogens, bioorganic chemistry and chemistry of natural compounds.

mustaear@njms.rutgers.edu