MOLECULAR CHARACTERIZATION AND ANTIFUNGAL SUSCEPTIBILITY OF ASPERGILLUS COLLECTED IN INDOOR SETTINGS

Daniela Simões¹,², Liliana Aranha Caetano³,⁴*, Cristina Veríssimo¹, Carla Viegas³,⁵, Raquel Sabino¹

¹Infectious Diseases Department, National Institute of Health Dr. Ricardo Jorge, Lisbon, Portugal; ²Animal Biology Department, Faculty of Sciences of the University of Lisbon, Lisbon, Portugal; ³H&TRC- Health & Technology Research Center, ESTeSL-Escola Superior de Tecnologia da Saúde, Instituto Politécnico de Lisboa; ⁴Research Institute for Medicines (iMed.ULisboa), Faculty of Pharmacy, University of Lisbon, Lisbon, Portugal; ⁵Centro de Investigação em Saúde Pública, Escola Nacional de Saúde Pública, Universidade NOVA de Lisboa

*Presenting author: liliana.caetano@estesl.ipl.pt

Introduction: The exposure to Aspergillus conidia is an increased risk factor for the development of respiratory symptoms, such as asthma, in occupational and non-occupational settings. Aspergillus identification should be based on molecular methods as there are species with similar morphology but distinct at the molecular level (cryptic species), with variable antifungal susceptibility profiles. The aim of this study was to perform the molecular identification of Aspergillus species collected from different occupational and non-occupational settings. Due to the emergence of azole-resistance in A. fumigatus, the susceptibility of the collected Fumigati isolates was determined.

Methods: Sixty Aspergillus spp. isolates were studied. The isolates were collected from 28 samples of non-occupational settings (houses) and 32 from occupational environments (veterinary clinic, faculty environment, waste industry, dairy farms, bakery and taxis). All the isolates were plated onto malt extract agar with chloramphenicol and incubated at 27°C, during 5 days. These isolates were identified on the basis of macro and micromorphology and also by sequencing the calmodulin gene. All the Aspergillus of the Fumigati section were screened (for azole resistance detection) using media supplemented with itraconazole, voriconazole and posaconazole.

Results: From the 60 isolates, 41 (68%) were identified as belonging to the Fumigati section, 15 (25%) to the Nigri section and 1 (2%) to the Versicolores, Terrei, Clavati and Nidulantes sections. In the majority of the settings, Aspergillus fumigatus sensu stricto was the most frequently isolated species (55%). However, in the waste industry the majority of the isolates (92%) belong to the Nigri section, 82% of them being Aspergillus tubingensis. None of the tested isolates belonging to Fumigati section presented resistance to the tested azoles.

Discussion: Environments contaminated with Aspergillus may be the cause or enhance respiratory problems in workers of specific settings. The most frequent species found in the studied environments was A. fumigatus sensu stricto, described as the major etiological fungal agent of respiratory infections/allergies. In the waste industry setting, however, the most frequent species found was A. tubingensis, described as less susceptible to azoles. The knowledge of the Aspergillus epidemiology in specific indoor environments will allow a better risk characterization regarding Aspergillus burden.

Acknowledgments: The authors are grateful to Instituto Politécnico de Lisboa, Lisbon, Portugal for funding the Projects "Waste Workers’ Exposure to Bioburden in the Truck Cab during Waste Management” (IPL/2016/W2E-ESTeSL) and “Cyto-Vet –
Occupational exposure to antineoplastic drugs in veterinary settings” (IPL/2016/CYTO_VET_ESTeSL).