THESIS TOPIC

<table>
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<tr>
<th>Subject N° (to be completed by the ED):</th>
<th>FUNDING:</th>
<th></th>
<th>Funding origin: Programme Capes-Cofecub franco-brésilien</th>
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<td>Thesis title:</td>
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<td>DIAGNOSIS AND EPIDEMIOLOGY OF ASPERGILLUS IN PERNAMBUCO AND CHARACTERIZATION OF CLINICAL AND ENVIRONMENTAL ISOLATES BY PROTEOMIC AND GENOMIC APPROACHES</td>
<td>3 keys: Aspergillus, Aspergilloses, Antifungal resistance</td>
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<td>Unit / team:</td>
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<td>EA 1155 - IICMed Cibles et Médicaments des Infections et du Cancer (France) &amp; Laboratoire d’essais biologiques pour la recherche sur les médicaments, Département des Antibiotiques, Université Fédérale de Pernambuco, Recife, Brésil</td>
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<tr>
<td>Supervisor’s name:</td>
<td>Prof. Patrice Le Pape</td>
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<tr>
<td>Phone number:</td>
<td>0240084072</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Email address:</td>
<td><a href="mailto:patrice.le-pape@univ-nantes.fr">patrice.le-pape@univ-nantes.fr</a></td>
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Socio-economic and scientific context (approximately 10 lines):
The study is justified, since it represents a need to improve mycological diagnosis, with the possibility of a better therapeutic choice and consequently a more effective treatment for aspergillosis in Brazil.

The diagnosis of aspergillosis will allow the isolation of Aspergillus fumigatus strains from human patients in Pernambuco State, Brazil, in addition to areas of agricultural relevance, and will enable differentiation genomic and proteomic of resistant species.

Given to above, we believed that protein spectra obtained by MALDI-TOF MS can be readily used to characterize isolates drug-resistant against antifungals commonly used in therapy. This will shorten the time at the beginning of the treatment and improve the prognosis, besides to bring benefit to critically ill patients, mainly admitted in cancer sectors, that are widely present in the Brazilian Health System.

Working hypothesis and aims (approximately 8 lines):
To characterize the determinant and conditioning factors about aspergillosis, to relate them to the risk factors and clinical manifestations of the disease, besides describing the sensitivity or resistance profile of the isolates obtained from patients and from agricultural areas from the Pernambuco State, Brazil, against antifungals, which will facilitate the elaboration of therapeutic guidelines by Hospital Infection Control Services. Additionally, to propose a new methodology for rapid detection of resistance by MALDI-TOF MS that will be useful to initiate therapy more early.

Main milestones of the thesis (approximately 12 lines):
To diagnose and describe the epidemiology of aspergillosis in the Northeast of Brazil, besides the characterization of antifungal resistance by proteomic and genomic analyses of the clinical and environmental Aspergillus isolates.

To determine the aspergilloses incidence, prevalent of Aspergillus species and risk factors in the Health Units studied.

To perform in vitro antifungal susceptibility testing of Aspergillus sp. against itraconazole and voriconazole by CLSI and to propose a new method of detection of fungal resistance by MALDI-TOF MS.

To provide support for Infection Control Services, identification and resolution of potential Aspergillosis cases.

Scientific and technical skills required by the candidate (2 lines):
Capability in the management of laboratory equipments is perfectly in line with the work required during the thesis. The student must present sufficient knowledge of the english or french language required and scientific level for the development of planned activities.

3 publications from the team related to the topic (last 5 years):
Morio, F.; Dannaoui, E.; Chouaki, T.; Cateau, E.; Malard, O.; Bonfils, P.; Page, C.; Dufour, X.; Cottrel, C.; Erwan, T.; Lavergne, RA.; Le Pape, P. PCR-based detection of A. fumigatus and absence of azole resistance due to TR34/L98H in a french multicenter cohort of 137 patients with fungal rhinosinusitis. Mycoses. 2018, 61, 30-34


National and international collaborations:

Unité d'infectiologie, Université nationale de Bogota (Colombie)
Centre de référence en mycologie médicale Université de Rarbrourd, Pays bas
Centre médical en infectiologie université de Stanford (USA)
Centre of Biological Engineering, University of Minho, Braga, Portugal (Prof Nelson Lima)