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Service of Mycology and Aerobiology
Scientific Institute of Public Health

Dr. Koen De Cremer, co-promotor

Service of Health and Environment
Scientific Institute of Public Health

PhD in Medical Sciences
2015-2016

INVITATION to the Public defence of

David TRIEST

To obtain the academic degree of '**DOCTOR IN MEDICAL SCIENCES**'

***Fusarium, clinical relevance and mass spectrometry
methods for identification, using strains of the Belgian fungal
culture collection BCCM/IHEM.***

Friday 18 December 2015

Auditorium **Kiekens** – **UZ Brussel**, 17:00
Laarbeeklaan 101 – 1090 Brussel

How to reach the Universitair Ziekenhuis Brussel:

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Vrije Universiteit Brussel

Summary of the dissertation

A correct identification of mold species causing human infections is of the utmost importance since treatment may differ depending on the infecting species. However, this is still a challenge in the current clinical practice, relying upon a morphological examination of a cultured isolate.

In the first part of this PhD the focus was on *Fusarium*, a mold genus causing a wide variety of opportunistic human infections. In order to study the clinically relevant species diversity, the more than 300 *Fusarium* strains in the Belgian fungal culture collection BCCM/IHEM, mostly isolated from patients, were re-identified by multilocus DNA marker sequencing and phylogeny. The remaining 289 validated strains, comprising 40 different species, were of great value: (i) Analysis of the strain information revealed a species, i.e. *Fusarium musae*, of which it was not yet known that it caused human infections. (ii) A new species, closely related to *Fusarium*, was described, i.e. *Pseudofusicolla biseptata*. (iii) *In vitro* antifungal susceptibility testing was performed on the *Fusarium* dataset showing the importance of a correct species (complex) identification. (iv) The *Fusarium* dataset was used to prove the feasibility of the MALDI-TOF mass spectrometry identification as opposed to the, often difficult, morphological identification.

In the second part of this PhD the focus was on the development of a new identification method for mold infections which is directly applicable on clinical samples and relies upon the detection of species- and genus-specific peptides using tandem mass spectrometry. Candidate peptides were selected according to a mass spectrometry based proteomics study. Accurate genus identification of *Fusarium* and species identification of *Aspergillus* BCCM/IHEM collection material was possible and the new method was optimized for the analysis of clinical samples.

Curriculum Vitae

Personalia: David TRIEST

Date of birth: 15/05/1988, Halle, Belgium

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Education: Master of Science in Biology: Genetics, Cell and Developmental Biology at the Vrije Universiteit Brussel (2006-2011)

Professional: - Researcher at the Vrije Universiteit Brussel (01/10/2011-30/11/2011)

- PhD student associated to the Vrije Universiteit Brussel, Doctoral School of Life Sciences and Medicine; Research funded by the Belgian Science Policy Office and conducted at the Service of Mycology and Aerobiology of the Scientific Institute of Public Health under the program of the Belgian fungal collection BCCM/IHEM (01/12/2011-29/02/2015)

Publications: - Garcia-Armisen T, Vercammen K, Passerat J, Triest D, Servais P and Cornelis P (2011) Antimicrobial resistance of heterotrophic bacteria in sewage-contaminated rivers. *Water Research* 45:788-796

- Triest D et al. (2015) Banana infecting fungus, *Fusarium musae*, is also an opportunistic human pathogen: are bananas potential carriers and source of fusariosis? *Mycologia* 107:46-53

- Triest D et al. (2015) Use of matrix-assisted laser desorption ionization-time of flight mass spectrometry for identification of molds of the *Fusarium* genus.

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