Article

Label-Free Optical Transmission Tomography for Direct Mycological Examination and Monitoring of Intracellular Dynamics

Eliott Teston [1], Marc Sautour [2,3], Léa Boulnois [4], Nicolas Augey [5], Abdellah Dighab [5], Christophe Guillet [5], Dea Garcia-Hermoso [6], Fanny Lanternier [6,7], Marie-Elisabeth Bougnoux [7], Frédéric Dalle [2,3], Louise Basmaciyan [2,3], Mathieu Blot [1,8], Pierre-Emmanuel Charles [1,9], Jean-Pierre Quenot [1,9], Bianca Podac [4], Catherine Neuwirth [10,11], Claude Boccara [12], Martine Boccara [13], Olivier Thouvenin [12] and Thomas Maldiney [1,14,*]

[1] Lipness Team, Translational Research Center in Molecular Medicine– INSERM Joint Research Unit (CTM-UMR1231), University of Burgundy, 21000 Dijon , France
[2] Department of Parasitology/Mycology, Dijon Bourgogne University Hospital, 21000 Dijon, France
[3] Unité mixte de recherche Procédés Alimentaires et Microbiologiques (UMR PAM) A 02.102,   Bourgogne Franche-Comté University, AgroSup Dijon, Dijon, France
[4] Medical Biology Laboratory, William Morey General Hospital, 71100 Chalon-sur-Saône, France
[5] LISPEN, Arts et Metiers Institute of Technology, 71100 Chalon-sur-Saône, France
[6] Translational Mycology Research Group, Mycology Department, National Reference Center for Invasive Mycoses and Antifungals, Institut Pasteur, Paris Cité University, 75015 Paris, France
[7] Necker-Enfants Malades Hospital, Assistance Publique-Hôpitaux de Paris, 75015 Paris, France
[8] Infectious Diseases Department, Dijon Bourgogne University Hospital, 21000 Dijon, France
[9] Department of Intensive Care Medicine, Dijon Bourgogne University Hospital, 21000 Dijon, France
[10] Department of Bacteriology, University Hospital of Dijon, 21000 Dijon, France
[11] UMR/CNRS 6248 Chrono-Environnement, Bougogne Franche-Comté University, 25000 Besançon, France
[12] Institut Langevin, Ecole Supérieure de Physique et Chimie Industrielle de la ville de Paris, Université PSL, CNRS, 75005 Paris, France
[13] Institut de Systématique, Evolution, Biodiversité– (ISYEB-UMR7205), Ecole Normale Supérieure, PSL Research University, 75005 Paris, France
[14] Department of Intensive Care Medicine, William Morey General Hospital, 71100 Chalon-sur-Saône, France
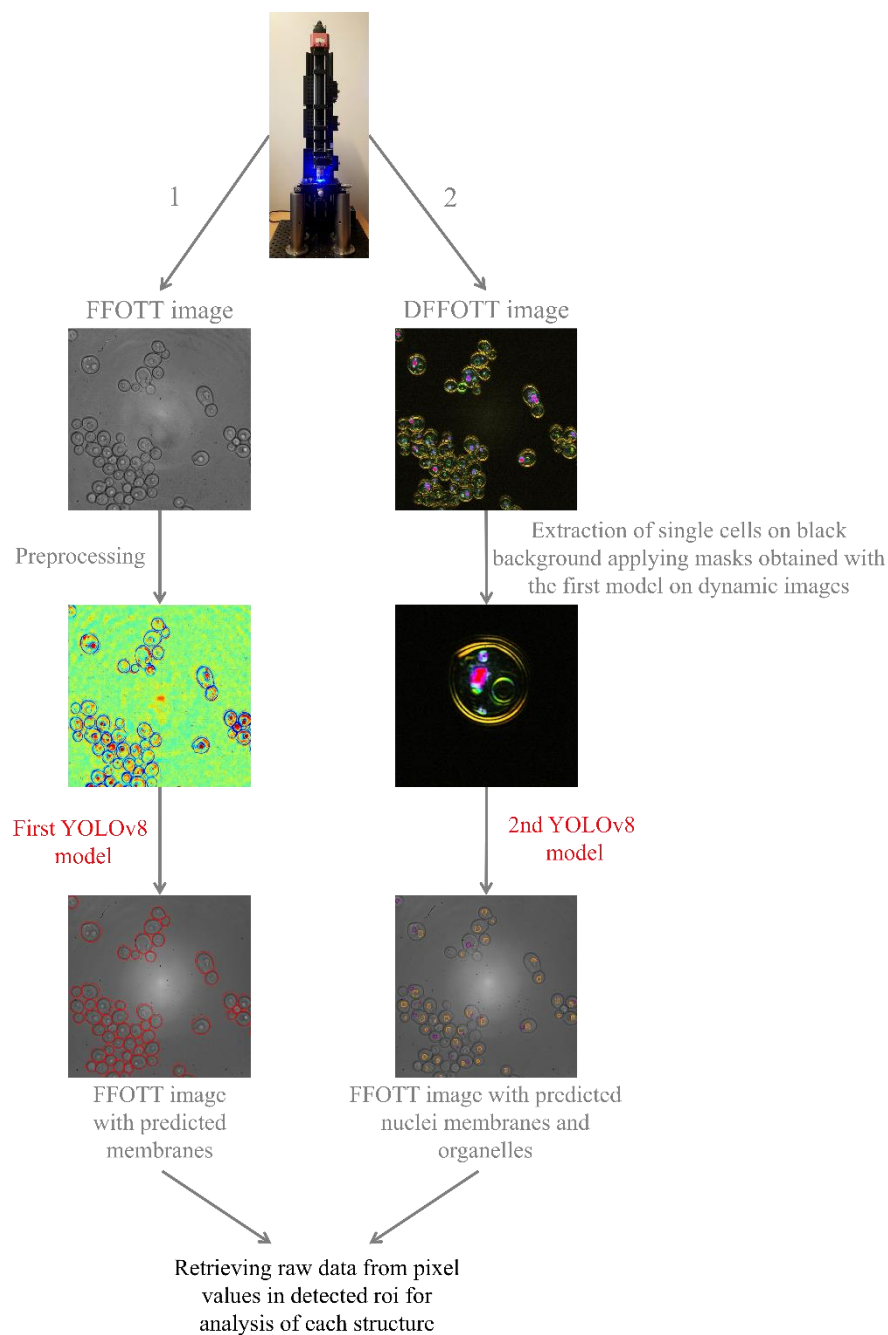
Supplementary Materials:

Figure S1: Schematic representation of a two-step neural network convolutional model for Candida albicans quantitative analysis.
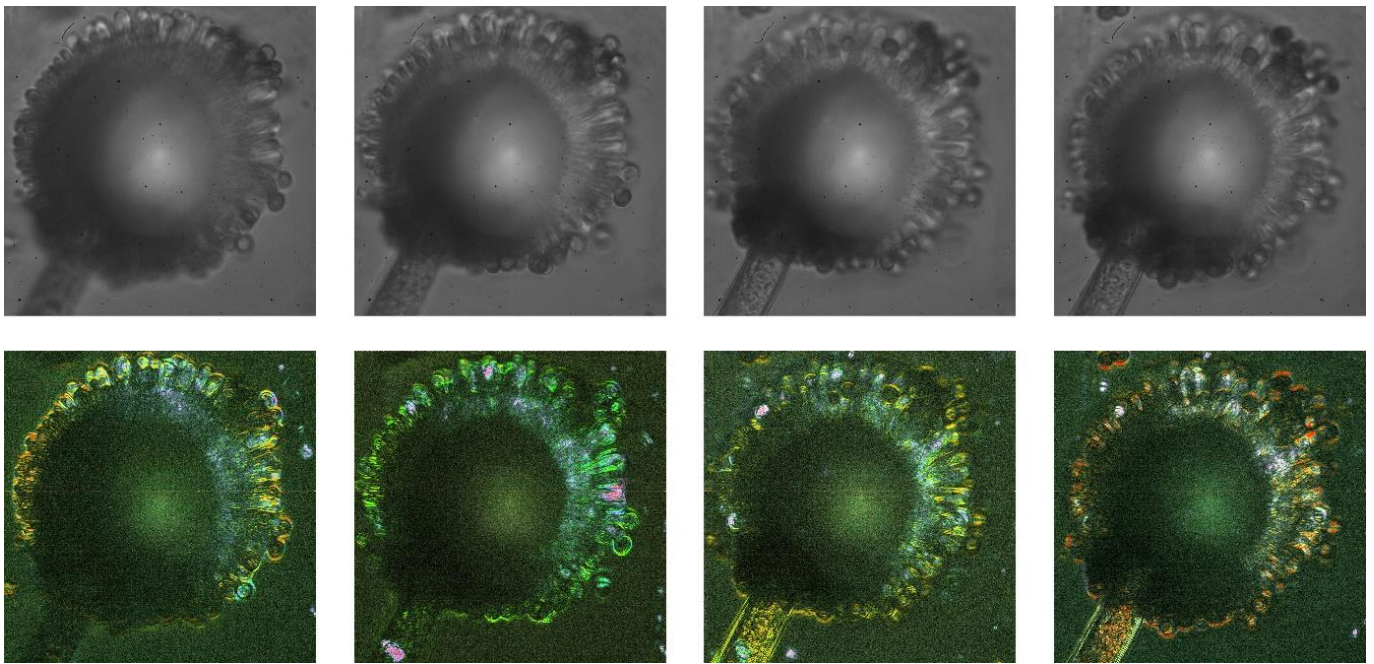
Figure S2: Typical images of an Aspergillus niger conidiophore realized at different depths showing no dynamic signal inside the vesicle and some bright pink signal inside few phialides or conidia.
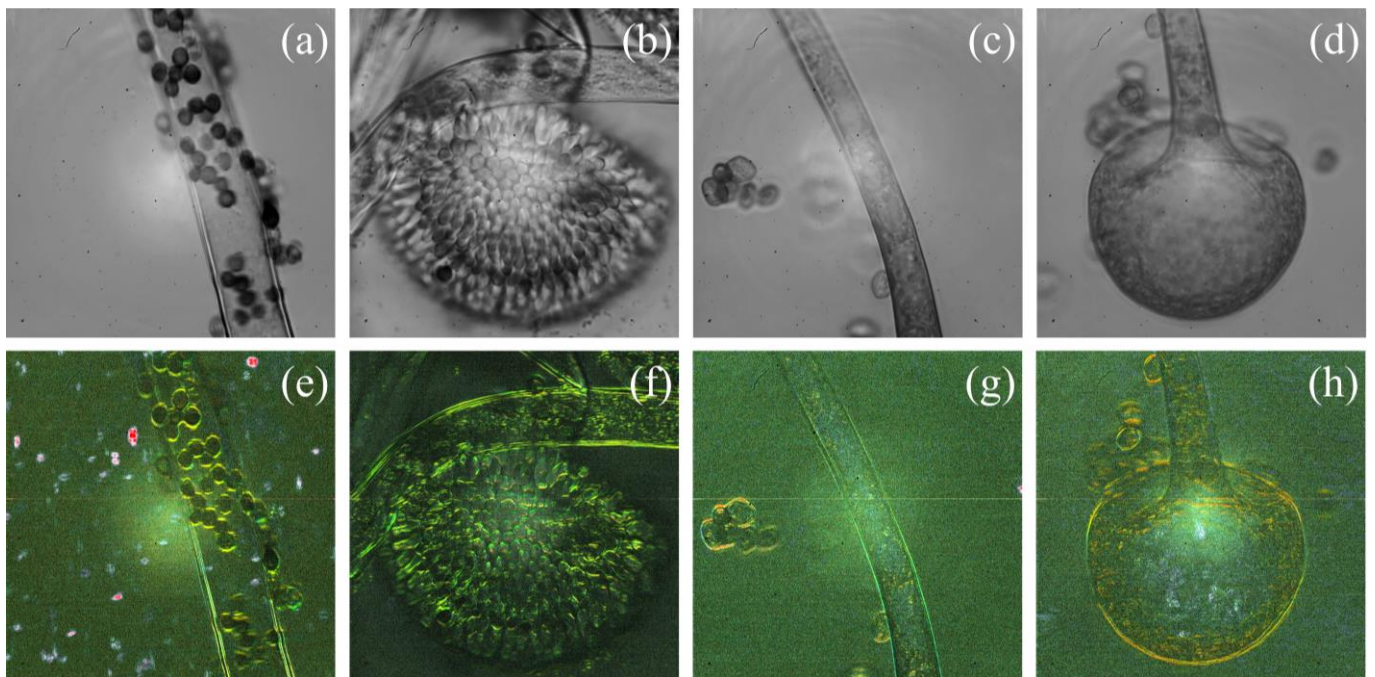

Figure S 3. D-FF-OTT of Aspergillus niger (a, b, e and f) and Rhizopus arrhizus (c, d, g and h) pretreated with lactophenol blue where hyphae, stipes and conidiophores have a green dynamic signal, close to the background noise.