

Automated Image Analysis to Study the Early Effects of Antifungal Compounds on Growth and Differentiation of the Pathogenic Yeast *Candida albicans*.

Kris Ver Donck, Karin Thevissen³,
Gerrit Dispersyn², Isabelle François³, Marcel Borgers²,
Bruno Cammue³ & Johan Geysen

MAIA SCIENTIFIC and Barrier Therapeutics²,
Cipalstraat 3, B2440 Geel, Belgium;
Centre of Microbial and Plant Genetics, KU Leuven³
Kasteelpark Arenberg 20, B3001 Heverlee, Belgium.



In their interaction with host tissues, pathogenic fungi, such as *Candida albicans*, display subtle changes in morphogenesis. Yeast, the unicellular form that displays budding, can evolve into filamentous form comprising hyphae and pseudohyphae. Antifungal compounds affect both the yeast form as well as the filamentous form.

Using *C. albicans* cultures as a test case for temperature-induced differentiation into filamentous forms, images were captured on a camera equipped microscope. The eaZYX® software was used to develop image segmentation scripts that allowed object identification of yeasts, to identify newly formed as well as mature buds and to identify filamentous forms. Processed images are given of each of the microscopic images.

Special attention was paid to eliminate false positive objects from the image analysis result, such as dust particles, air bubbles and flocculent materials originating from the culture broth. Also unwanted forms, such as large yeast cells (blastospores or opaque cells) and gaseous bubbles, were not included.

Using these image capture and analysis tools, we are currently analyzing at which time point after hyphal inductions a first significant effect of antifungal treatment can be observed. Indicative pilot experiments show that image-based analysis will allow to measure compound effects as early as few hours following induction and treatment.