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B4: Cause - Effect Relationships in Confrontation Assays with C. glabrata and Human Neutrophils using Bayesian Networks

S. Dietrich, C.M. Svensson, S. Timme, T. Lehnert, M.T. Figge

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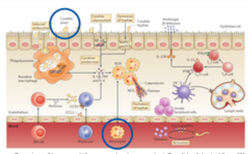
Stefanie Dietrich[1,2], Carl-Magnus Svensson[1], Sandra Timme[1,2], Teresa Lehnert[1], Marc Thilo Figge[1,2]

[1] Applied Systems Biology, Leibniz Institute for Natural Product Research and Infection Biology, Hans Knöll Institute, Jena, Germany
[2] Faculty of Biological Science, Friedrich Schiller University, Jena, Germany

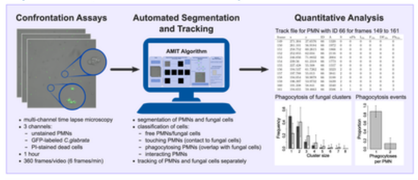
Introduction

Invasive fungal infections are emerging as a significant health risk for humans. The innate immune system is the first line of defence against invading microorganisms and involves the recruitment of phagocytes like polymorphonuclear neutrophils (PMNs), which engulf and kill pathogens, to the site of infection.
To gain a quantitative understanding of the interplay between phagocytes and fungal pathogens, live-cell imaging was applied to monitor the dynamic process of phagocytosis in time and space. We used our previously developed frame work AMIT (algorithm for migration and interaction tracking [1,2]) for the automated high-throughput analysis of multi-channel time-lapse microscopy videos of phagocyte-pathogen confrontation assays. Thereby, we are able to quantify phagocytosis, touching and interaction events between cells. We now aim to find cause - effect relationships between events using Bayesian networks to gain deeper insights into the chronology and dependence of events.



Overview of immune defence mechanisms against *Candida*. Adapted from [3]

Experiments/Data and Video Analysis



Bayesian Network

References

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[3] Netea, MG, Joosten LA, van der Meer JW, Kullberg BJ, van der Veerdonk FL, *Nature Reviews Immunology* (2015)

Contact: stefanie.dietrich@leibniz-hki.de

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