A Potential Explanation of a Positive Serum β-Glucan Assay in Mucormycosis

To the Editor—I read with interest the nice study by Angebault et al [1] that gives a "real world" picture of the suboptimal performance of the serum β-glucan assay. Unexpectedly, the authors found that serum β-glucan test was positive in 3 of the 6 cases of mucormycosis in their series with no apparent cause of false-positive test results (eg, prior administration of intravenous immunoglobulin, recent surgery, etc). This was an unanticipated finding because prior biochemical studies detected unusually low amounts of glucans in the cell wall of *Rhizopus* [2]. In addition to the possibility of an undetected mixed infection with another glucan-producing fungus (for example, concomitant growth of *Aspergillus* or *Fusarium* species was found in 46% of high-risk patents with mucormycosis in one of our earlier series [3]), I would like to offer another explanation: the cell wall of some Mucorales does contain glucan at a concentration above the threshold of detection by the β-glucan assay. We have previously shown that induction of interleukin-23 producing dendritic cells by *Rhizopus oryzae* was dectin-1 dependent and was mediated by β-glucan [4], a finding that corroborates with a study that identified β-glucan synthetase, the enzyme responsible for synthesis of β-glucan, in *R oryzae* [5]. It is unclear whether these experimental observations extend to other *R oryzae* strains, other *Rhizopus* species, or other Mucorales. Because 3 of the 6 cases reported by Angebault et al [1] were caused by *Rhizopus* species, it would be of interest to see whether there was a Mucorales-specific positivity (and its magnitude) in the small number of mucormycosis cases with a positive serum β-glucan assay in their work.

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References

1. Angebault C, Lanternier F, Dalle F, et al. Prospective evaluation of serum β-glucan testing in patients with probable or proven fungal diseases. Open Forum Infect Dis **2016**; 3:ofw128.
2. Mélida H, Sain D, Stajich JE, Bulone V. Deciphering the uniqueness of Mucoromycotina cell walls by combining biochemical and phylogenomic approaches. Environ Microbiol **2015**; 17:1649–62.
3. Kontoyiannis DP, Wessel VC, Bodey GP, Rolston KV. Zygomycosis in the 1990s in a tertiary-care cancer center. Clin Infect Dis **2000**; 30:851–6.
4. Chamilos G, Ganguly D, Lande R, et al. Generation of IL-23 producing dendritic cells (DCs) by airborne fungi regulates fungal pathogenicity via the induction of T(H)-17 responses. PLoS One **2010**; 5:e12955.
5. Ibrahim AS, Bowman JC, Avanessian V, et al. Caspofungin inhibits *Rhizopus oryzae* 1,3-beta-D-glucan synthase, lowers burden in brain measured by quantitative PCR, and improves survival at a low but not a high dose during murine disseminated zygomycosis. Antimicrob Agents Chemother **2005**; 49:721–7.

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