tablished multiples abscesses in cerebrum, cerebellum, choroid, vitreous humor, spinal cord, and meninges, where two (8.1%) of 25 CSF cultures were positive and 25 (100%) of simultaneous CSF samples for (1→3)-β-D-glucan were positive with a range of 755 to 7750 pg/mL ($p<0.001$). Levels of (1,3)-β-D-glucan in CSF were significantly greater than those of simultaneously obtained serum samples in treated animals (n=94) and UC ($p<0.05$), suggesting CNS compartmentalization of this polymeric biomarker. Clearance of *C. albicans* from blood cultures was not predictive of eradication of organisms from CNS; whereas, reduction of CSF (1→3)-β-D-glucan levels was predictive of therapeutic response. A significant decrease of (1→3)-β-D-glucan concentration of CSF started at 0.5 mg/kg/day in comparison to that of UC ($p<0.001$). Fungemia persisted in all untreated controls. Positive blood cultures converted to negative with MICA and DAmB within one day after treatment, while CNS tissues remained positive for *C. albicans*. By comparison, CSF (1→3)-β-D-glucan levels correlated directly in a dose-dependent pattern with therapeutic response and residual fungal burden of *C. albicans* in cerebral tissue (r=0.842).
Conclusions: (1→3)-β-D-Glucan in CSF is a surrogate marker for detection and therapeutic response of hematogenous candida meningoencephalitis.

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Species-Dependent Differences in Virulence of Medically Important Zygomycetes in Neutropenic Hosts are Related to Sporangiospore Germination, Hyphal Metabolism, and Circulating Molecular Biomarker Levels

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Background: Zygomycetes are emerging fungal pathogens that cause life-threatening pneumonia in cancer patients, especially during prolonged neutropenia and corticosteroid therapy. Little is known about the relation between different species of Zygomycetes and their pathogenesis in pulmonary zygomycosis.
Objectives: To study the relative virulence of *Rhizopus oryzae* (RO), *Rhizopus microsporus* (RM), *Mucor circinelloides* (MC), *Mucor indicus* and *Cunninghamella bertholletiae* (CB) in experimental pulmonary zygomycosis and the possible correlation with germination rate, metabolic activity, and circulating zygomycete-specific DNA by qPCR.
Methods: Interspecies virulence was studied in experimental primary pulmonary zygomycosis in persistently neutropenic rabbits by a panel of validated outcome variables. Sporangiospore germination kinetics were measured over 4 h. Hyphal metabolic activity was determined by XTT assays. Plasma levels of zygomycete-specific DNA, as a surrogate biomarker for angioinvasion, were measured by qPCR of two regions within the 28S rRNA gene.
Results: There were significant inoculum-dependent differences in residual pulmonary fungal burden (CFU/g) among CB-, RM-, and RO-infected rabbits (10^2-10^4 CFU/g, $p<0.05$), and significant differences in organism-mediated pulmonary injury as measured by lung weights in RM-, and RO-infected rabbits ($p<0.05$). CB caused the highest lung weights, most extensive pulmonary infarcts, and lowest survival of 0% (0/18), in comparison to 16% (3/18, $p<0.01$) of RM-, 81% (21/26) of RO- and 83% (15/18) of M-infections ($p<0.001$). Differences in virulence correlated with different germination kinetics at 4 h: CB (67-85%) > RM (14-56%) > RO (4-30%) > MC and MI (0%). These data correlated with greater in vitro metabolic activity by XTT assay of CB at 6 h (OD450=1.22) in comparison to that of RM, RO, MC and MI (0.37-0.84). Mean peak plasma zygomycete-specific DNA concentration (log GE/ml) followed a similar pattern: CB > RM > RO > MC.
Conclusions: Medically important species of Zygomycetes differ significantly in the outcome of pulmonary zygomycosis. *Cunninghamella bertholletiae* and *Rhizopus microsporus* were significantly more virulent than *Rhizopus oryzae* and *Mucor* species. Virulence parameters of zygomycosis in vivo correlate with species-dependent differences in germination kinetics, hyphal metabolic activity, and circulating levels of zygomycete-specific DNA.

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Characteristics of Transplant Recipients who Developed Influenza in 2007-08 despite Influenza Vaccination

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Background: Influenza vaccination is less immunogenic in transplant recipients than healthy people. Influenza A (H1N1) and B circulating viruses during the 2007-2008 epidemic were different from those contained in this season's vaccine.
Objective: To describe clinical and immunological characteristics of 15 transplant recipients who developed influenza despite influenza vaccination (group A), and compare them to 6 transplant recipients who developed influenza in the absence of influenza vaccination (group B), 13 transplant recipients who did not develop influenza (group C), and 8 healthy people who developed influenza (group D.)
Methods: Case ascertainment through microbiology and electronic medical records.
Results: Types of transplant: liver 3, heart 7, kidney 3, lung 8, HSCT 8, kidney + pancreas 3, liver + kidney 1, liver + pancreas 1. 20 had influenza A, and 10 had influenza B (1 transplant recipient has both simultaneously.) Influenza occurred 1757 days (mean [range 0-3850]) after transplant in group A, compared to 801 days (range 20-3082) in group B. Influenza occurred 116 days (mean [range 83-151] after vaccination in group A. There were no statistically significant differences in the incidence of fever, cough, rhinorrhea, sore throat, malaise, shortness of breath, exposure to contacts with similar symptoms, or presence of infiltrates on CXR among groups A, B and D. Groups A and B were treated with oseltamivir significantly more frequently than Group D, [p=0.002]. Patients in group A were hospitalized more frequently than group D [p=0.0002]. There were no statistically significant differences in the incidence of pneumonia, ICU admission, mechanical ventilation, or death among groups A, B and D. There were no statistically significant differences between groups A, B and C in the incidence of IgG < 600 mg/dL, immune function assay < 200 ng/mL, rejection (in SOT recipients) or GVHD (in HSCT recipients) in the preceding 30 days. Patients in group A were significantly more likely to have concomitant infections than group D [p=0.049], but not group B.
Conclusions: Influenza vaccination did not alter clinical presentation of influenza in transplant recipients, or impact the incidence of complications. Transplant recipients who developed influenza despite influenza vaccination were not more immunosuppressed than those who were vaccinated and did not develop influenza, and were more likely to have concomitant infections than healthy people.