Disclosures. **All authors:** No reported disclosures.

1729. Profiling Human Neutrophil Functional Responses From Solid-Organ and Stem Cell Transplant Recipients to *Candida albicans*

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Background. Solid-organ (SOT) and stem cell transplant (SCT) recipients are at increased risk of invasive fungal disease despite normal neutrophil counts in peripheral blood. However, the neutrophils function against fungi has not been completely defined. In this study, we measure human neutrophil anti-*candida* activity in SOT and SCT recipients.

Methods. SOT and SCT patients were identified and consented from September 2018 until April 2019. Healthy control patients (HC) were identified at primary care clinics. EDTA-anticoagulated peripheral blood was obtained from healthy and transplant patients 2–4 months post-transplant. Neutrophils were isolated by negative selection. *C. albicans* was incubated for 2 hours with and without human neutrophils at multiplicity of infection (MOI) of 10, 5 and 1. Following neutrophil cell lysis, percent remaining live *Candida* was measured using a viability dye. In addition, growth inhibition of *C. albicans* by neutrophil swarming to *C. albicans* spotted onto glass slide arrays was also assessed by live cell imaging.

Results. 22 SOT (15 kidneys, 7 livers), 20 SCT (allograft) and 22 HC were enrolled. Neutrophils from SCT and SOT had lower *C. albicans* killing percentages compared with HC at MOI 10 (HC: 47%, SOT: 29%, SCT 24% $P = 0.0041$); MOI 5 (HC: 72%, SOT: 35%, SCT 38% $P < 0.0001$) and MOI 1 (HC: 91%, SOT: 48%, SCT: 45% $P < 0.0001$). Neutrophil swarming and fungal control of *C. albicans* spots was significantly inhibited by neutrophils from SCT when compared with SOT and controls ($P < 0.0001$). Analysis of medications, including tyrosine kinase inhibitor (TKI) use, did not demonstrate significant differences of a specific drug class when patient groups are compared (SCT vs. SOT).

Conclusion. Our study indicates that despite normal circulating numbers, neutrophils from SOT and SCT recipients are dysfunctional and show profoundly impaired anti-Candida activity. There were no medications or laboratory values that predicted functional neutrophil outcome. These data strongly support the use of functional neutrophil profiling to risk stratify those individuals at higher risk for invasive fungal infections.

Disclosures. **All authors:** No reported disclosures.

1730. Invasive Fusarium Species in Mayo Clinic Patients with Hematologic Malignancies

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Background. The epidemiology of fungal infections in hematologic malignancies has changed in the past decade. Triazole prophylaxis has decreased Candida spp infections while infections due to other molds such as *Aspergillus* and *Fusarium* species have increased. Fusariosis has very poor prognosis, and after aspergillosis, is the most common invasive fungal infection in this patient population. We sought to describe fusariosis in patients with hematologic malignancy at the Mayo Clinic.

Methods. We performed a retrospective review of patients with culture-positive *Fusarium* infection from January 2003 to October 2016 at the Mayo Clinic, Rochester, MN. The records of patients were reviewed for demographics, diagnosis, treatment, and outcomes including mortality. Patients without a diagnosis of hematologic malignancy were excluded. Patients were classified with proven or probable Fusariosis based on the Revised Definitions of Invasive Fungal Disease from the EORTC/MSG Consensus Group.

Results. We identified 14 patients with hematologic malignancies (age range 17–76 years; median 60 years) with a confirmed culture diagnosis of Fusarium infection classified as proven (9 patients) or probable (5 patients). Two cases were isolated pulmonary infections, 3 extra-pulmonary, and 9 disseminated cases. Two patients had previously undergone stem cell transplantation. Eight patients (57%) were receiving antifungal prophylaxis at the time of diagnosis: 2 on voriconazole, 1 on posaconazole, 1 on fluconazole, 3 on echinocandins, and 1 on Amphotericin B. Nine patients (64%) were neutropenic at the time of diagnosis. Amphotericin was the initial treatment in 7 (50%) patients, with voriconazole added for 4 patients for combination therapy the first week. Voriconazole monotherapy was given initially in 5 patients. Seven patients (50%) were deceased at 6 weeks after culture positivity, with an additional 2 patients deceased by 12 weeks.

Conclusion. *Fusarium* infection outcomes in patients with hematologic malignancies are poor. Neutropenia was common in those diagnosed, and infections were more likely to be disseminated, with high mortality rates. Amphotericin was commonly used as initial treatment, with many physicians recommending combination therapy with two agents, commonly voriconazole.

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1731. Immune Dysregulation in Mucormycosis

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Background. Mucormycosis is a fatal fungal infection with unique predisposition to infect diabetics. Dysregulated adaptive immunity contributes to the pathogenesis in all fungal diseases, but activated Th17 cells have laid a new dimension to chronic inflammatory response which was previously attributed to uncontrolled Th1 response. We attempted to study the Th17 and T regulatory (Treg) immune response in diabetic patients with mucormycosis and compared the data with a healthy control and a T2DM case without fungal infection. In addition we could follow-up one patient post 6-month treatment and performed immunological studies.

Methods. 2 mL of blood samples were collected in EDTA vial from two patients who were suffering from diabetes with mucormycosis for immunological investigations. Samples were also taken from age-matched T2DM patient without fungal infection and a healthy volunteer as controls for T-cell parameters. Repeat blood sample was taken to study immune parameters in one patient who was followed up after 6 months. The expression of various T-cell markers was analyzed by immunostaining with the antibodies against CD3, CD4, CD25, CD161, IL-23R [Becton Dickinson (BD) PharMingen]. Fluorescence profiles were analyzed using Flow Jo software (BD Biosciences). The results are expressed as a percentage of positive cells.

Results. The percentages of CD4+ cells were low in both patients when compared with and healthy control but it is much higher in diabetes case when compared with others. CD161+ cell population was higher in both patients when compared with healthy control and diabetic patient without fungal infection. The percentage of IL23R+ cells was significantly high in patient before treatment when compared with, healthy control and diabetics. and decline after treatment. The percentage positivity of CD25+ cells was highest in healthy control when compared with others. The profile of CD25+ cells was comparatively similar in patient before treatment and diabetics but we found a higher percentage, in patients after treatment.

Conclusion. The findings in this study imminently indicate the mechanism of immune dysregulation involving Th17 and Treg pathways in mucormycosis and provide evidence that restoration of Th17/Treg may be considered as a therapeutic option for long-term benefit in diabetics.

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1732. A Canine Target Species Challenge Model to Evaluate Efficacy of a Coccidioidomycosis Vaccine

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Background. The preferred efficacy design for licensing a vaccine for animal use (United States Department of Agriculture (USDA)) is a prospective, placebo-controlled, randomized, and double-blinded vaccination-challenge trial. In such studies, each subject receives the same exposure to the virulent pathogen by active challenge. To test a cps1, live avirulent canine coccidioidomycosis vaccine, an inhalation disease model was developed in beagle dogs.

Methods. 6-month old male beagle dogs were housed according to PHS standards. All procedures, approved by the Institutional Animal Care and Use Committee for Colorado State University, were performed at ABSL3. Dogs were infected by nebulization with low, medium or high counts of arthroconidia of *Coccidioides posadasii*, strain Silveira, delivered via endotracheal tube under injectable anesthesia. Thoracic radiographs, CBC, and serum chemistries and body weights were obtained at 2- or 3-week intervals and dogs were euthanized 8 weeks p.i., or earlier if necessary. Approximately 1 gram lung specimens from each lobe were cultured for fungal burden. Fixed tissues were examined histologically. Serum was tested for antibodies.

Results. Ten of 11 dogs were successfully infected; 5 required early removal at 33 to 48-days p.i. Elevated globulin, decreased albumin, decreased A/G ratio, monocytosis and weight loss were present in all infected dogs. Radiographic and histopathological lesions were very extensive at the high challenge doses. Medium doses had the most consistent scoring and clinical findings, including some early removal, without overwhelming disease, while the low dose produced the least consistent quantifiable features. All dogs developed antibodies.

Conclusion. Nebulized aerosol delivery of spores reproducibly produced significant coccidioidomycosis in 10 of 11 dogs. Overall, the challenge model demonstrated consistent characteristic findings sufficient to assess vaccine efficacy in dogs during an 8-week period post challenge without producing a potentially overwhelming infection. The aerosol nebulization of arthroconidia in beagle dogs should provide a vaccination-challenge experimental design in line with Chapter 9 Code of Federal Regulations, parts 102.5 and 104.5.

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