S6.3c
Adaptive dynamics in experimental populations of Aspergillus nidulans
Krithti Nandimath1,2, Ben Axter1, Josée van den Heuvel1, Eric Bastiaens1, Mirre Klater1, Marije Slabbjer1, Sijmen Schuurman1, affine J. M. Deuba1, Vidyavaran Mysrayidsh1, Bas J. Zoanen1, Daan K. Aanen1, JAGM de Vries1,2
1Laboratory of Genetics, Wageningen University, Wageningen, The Netherlands
2Centre for Human Genetics, Bangalore, India

S6.5 Fungal adaptation and evolution, September 22, 2022, 4:41 PM - 6:13 PM

A total of 12 replicate populations initiated with a laboratory strain of the ascomycete fungus Aspergillus nidulans evolved on synthetic minimal glucose agar medium for 1 year, using weekly transfers of 3% of the pooled aerial spores to fresh medium. This Aspergillus short-term evolution experiment (AEXE) was designed to understand how filamentous fungi adapt to growth on limited carbon in a spatially structured environment. We observed no systematic improvement in the fitness components normal and unfair in the competitive fitness relations to the ancestor. Instead, we observed the expected evolution of at least two morphotypes, with a fully-like (FL) or an ascospore-like (AL) colony morphology, leading to non-transitive fitness interactions among isolates in two selected populations. The genetic analysis of clones from all 12 populations at an early (week 10) and the final time point (week 52), show a clear role of natural selection during AEXE. We also observed a shared genetic basis and different timing of adaptation of AL and FL types. In addition, in most populations, both morphotypes do not form monomorphic groups, but they frequently disappear and re-evolve from ancestral forms of both types. Reduction in aerial spore yield, the most evident parallel phenotypic change found in all our evolved populations, is not due to the direct selection of genes involved in aerial reproduction. Instead, we argue that reduced spore yield is a pleiotropic effect of adaptive changes in metabolism.

S6.3d
Candida albicans commensalism in the oral mucosa is favored by limited virulence and metabolic adaptation
Salome Leibund Guti-Landmann
University of Zurich, Switzerland, Zurich, Switzerland

S6.5 Fungal adaptation and evolution, September 22, 2022, 4:41 PM - 6:13 PM

Objective: As part of the human microbiota, the fungus Candida albicans colonizes the oral cavity and other mucosal surfaces. Commensalism is tightly controlled by complex fungal-host interactions that preclude fungal dominance but also fungal overgrowth and invasion that would result in disease. As such, defects in antibacterial T cell immunity render individuals susceptible to oral thrush due to unregulated intermicrobiome. The factors that promote commensalism and innate persistence of C. albicans in a fully immunocompetent host remain less clear. In this study, we aimed at identifying determinants of C. albicans commensalism in the oral cavity.

Methods: We used an experimental model of C. albicans oral colonization in mice, profiled the transcriptome of the fungus in the mucosal tissue, and conducted functional studies with the prototypic commensal isolate 101 in host-free and host-involving conditions.

Results: C. albicans commensalism is associated with a characteristic metabolic profile tailored to the nutrient-poor conditions in the stratum corneum of the epithelium where the fungus resides. Metabolic adaptation of the commensal isolate 101 was also reflected in enhanced nutrient acquisition when grown on oral mucous substrates. Protein complementation of the oral mucosa by C. albicans also correlated in vivo with the capacity of the fungus to induce epithelial cell damage and to elicit an inflammatory response. These immune evasion properties of isolate 101 are explained by a strong attenuation of numerous virulence genes, including those linked to filamentation. The repression of the hyphal program by deletion or conditional repression of the transcriptional repressor NRG1 abolished the commensal behavior of isolate 101.

Conclusions: This study establishes a central role of NRG1 in the commensal lifestyle of C. albicans in the oral niches of the host.

S6.6c
Primary cutaneous implantation coccidioidomycosis
Alejandro Borrufaz, Javier Araiza, Martin Arce
Hospital General De Mexico, Mexico, Mexico

S6.6a One health approach for endemic mycoses in the Americas, September 22, 2022, 4:41 PM - 6:13 PM

Objective: To present a series of cases of primary cutaneous coccidioidomycosis, to highlight this mycosis that can start as cutaneous implantation, after trauma, and to emphasize the classification criteria.

Methods: A series of cases of primary cutaneous coccidioidomycosis will be presented, all of them confirmed by mycological studies, both examinations, stains, and cultures, as well as their molecular identification, also confirmed by histopathology.

Results: A series of 22 cases of primary cutaneous coccidioidomycosis is presented, 16 (72.7%) are in men, 6 (27.3%) in women. With an average age of 35.2 years, the longest case in a 14-year-old child and the highest of 72 years. All from rural and endemic areas. A total of 11 (50%) with childhood and the rest due to various injuries. The etiological agent was isolated in all of them: Coccidioides posadai in 14 (72.7%). C. immitis in 3 and one by Coccidioides sp. 20 cases were managed with itraconazole, with an average of 8 months and two cases with a cycle of amphotericin B and subsequent itraconazole. Clinical and mycological cure was obtained in all.

Discussion: Primary cutaneous coccidioidomycosis is considered an implantation mycosis, similar to other endemic ones, it occurs between 2% - 10% of cases. It begins after trauma that inoculates the fungus, such as a primary chance. To confirm that it is a primary form, Wilson's criteria must be met: the presence of skin trauma, regional lymphadenopathy, no evidence of pulmonary involvement, preexistent intramural reaction, and low antibody test. It may present auto-inoculation and in immunosuppressed patients, it can spread.

Conclusion: The primary cutaneous form of coccidioidomycosis is rare, usually seen in patients living in endemic areas, and usually present in patients with rural occupations. It has a variety of clinical forms, being contused with minor diseases. Its diagnosis is simple, being the biopsy the most used, and it must be confirmed by mycological tests. It has a good prognosis and its main management is with itraconazole.