ISSN: 0976-3031

Available Online at http://www.recentscientific.com

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 9, Issue, 7(D), pp. 27956-27959, July, 2018

International Journal of Recent Scientific Research

DOI: 10.24327/IJRSR

Research Article

THE FORAY OF THE FUNGUS

Raghavendra Rao M.V[1]., Sireesha Bala[1]., Sripada Pallavi.T[2]., KrishnaSowmya.M[3]., Mahendra Kumar[4]., ReshmaFateh[1]., Abraham Nayakanti[1]., Ramanaiah.C.J[5] and Sateesh.Babu.A[1]

[1]Avalon University School of Medicine, Curacao, Central America
[2]Apollo Institute of Medical Science and Research Institute, Jubilee Hills, Hyderabad, Telangana,
[3]Burjil Hospital, Abu Dhabhi, United Arab Emirates
[4]Indian Institute of Science Education and Research, Bhopal
[5]Amina Hospital, Sharjah, UAE

DOI: http://dx.doi.org/10.24327/ijrsr.2018.0907.2365

ARTICLE INFO

Article History:
Received 15th April, 2018
Received in revised form 7th May, 2018
Accepted 13th June, 2018
Published online 28th July, 2018

Key Words:

Mycetismus, Candidiasis, cephalosporins, Otomycosis, dermatophytes, recombinant DNA technology

ABSTRACT

Fungi are the diverse group of saprophytic and parasitic eukaryotic organisms. Now placed in kingdom Mycota. Fungi produce and secrete a variety of metabolic products. They are toxic to animals and humans. Fungi cause poisoning and infections. Pneumocystis is the cause of lethal pneumonia of immunocompromised patients. Previously, considered this as a parasite but now included in fungi. Aspergillosis in immunocompromised patients, leukemia patients and bone marrow transplant patients produce serious complications and finally death. Candida albicans produce diaper rash, oral thrush, vulvoveginitis. Histoplasma produce progressive pulmonary disease similar to pulmonary T.B. Blastomycosis produce skin lesions. In AIDS patients cryptococcosis, the second most common fungal infection (After candidiasis) is potentially most serious. Fungus is sophisticated than virus and bacteria They have cell walls, but lower than plant and animal(1). During this period several fungi such as Actinomyces, Candida albicans, Crytococcus neoformans, were isolated, cultured, identified and described(2).

INTRODUCTION

Ingestion of toxic species due to erroneous identification resulted in acute discomfort, severe illness or even death (5) Mostly oral candidacies is observed in new born, aged and debilitated patients.(6) Infection by C. albicans is found in mouth and intestinal tract of a large number of humans (7) The other species of candidiasis are C. parapsilopsis, C. tropicalis, C. stellotoidea etc (8). The deep oral candidiasis may be painful, Oral lesions also produced(9). Oral candidiasis is a disease mainly of a new born and of debilitated or aged patients and in persons treated for weeks or months with broad spectrum antibacterial antibiotics.(10). Candida endocarditis is characterized by fever, heart murmur, congestive heart failure and anemia. These cases are found in drug addicts.(11) C. albicans causes most frequently the meningeal candidiasis.(12)In sputum both budding cells and pseudomycelia can be seen.(13).It produces spherical clusters of blastospores or yeasts on media. (14).However, the infants or children acquire A. Israeli from other infected persons (15) A. fumigates is generally an occupational disease.(16). A. fumigates is also found during early stages of decomposition of vegetables. On trimmed portion of trees in city streets, the wood chips are over grown by A. fumigates (17) A. fumigates being a saprophyte luxuriantly grows on decaying organic materials, decaying organic materials. Through inhalation into the lungs of human and get established inside the lung tissues It causes pulmonary aspergillosis (18) Myocardial aspergillosis can be fatal. (19) Otomycosis is caused by several fungal species but more specifically by A. niger. A. fumigates grows rapidly and forms white cottony colony which later on turns like velvet. After production of spores, it becomes dark green and powdery.(20) However, neurotoxin and other toxins are also isolated which possibly are involved in hemorrhagic lesions produced in birds and animals (21). In addition, the polysaccharides of A. fumigates have been found antigenic. Immune serum of

Corresponding author:* **Raghavendra Rao M.V
Avalon University School of Medicine, Curacao, Central America

rabbit has prevented the effect of toxins in experimental animals (22) Otomycosis of ear which is characterized by inflammation, scaling, pruritis and pain. (23) Otomycosis is characterized by inflammation of the ear. (24) A clinical diagnosis should be confirmed by microscopic observation of the mycelial plug and scales in order to be sure for treatment through anti fungal or antibacterial drugs (25) One should avoid swimming until the infection is fully cured (26) Huang and Harris (1963) have reported that P. commune caused disseminated pulmonary and cerebral penicillin in a patient with acute leukemia and gastrointestinal candidiasis (27)

History

It is presumed that humans started collecting mushrooms as food in prehistoric times. Mushrooms were first written about in the works of Euripides (480-406 B.C.). The Greek philosopher Theosophist of Eresos (371-288 B.C.) was perhaps the first to try to systematically classify plants; mushrooms were considered to be plants missing certain organs. It was later Pliny the Elder (23-79 A.D.), who wrote about truffles in his encyclopedia *Naturalis historia*. Historically, mycology was a branch of botany because, although fungi are evolutionary more closely related to animals than to plants, this was not recognized until a few decades ago. Pioneer *mycologists* included Elias Magus Fries, Christian Hen drick Person, Anton de Barry, and Lewis David von Schweinitz. The word *mycology* comes from the Greek meaning "fungus" Logos means study. The start of the modern age of mycology begins with Pier Antonio Michel's 1737 publication of *Nova plant arum genera.* Published in Florence, this seminal work laid the foundations for the systematic classification of grasses, mosses and fungi.

Significant Gap in Research

The use of fungi for unlocking the full potentials of the bio economy relies on such progress. The fungal kingdom can be an inspiration for even more.(28)Skin tests for fungal diagnosis cannot distinguish between past and present infection. Positive test indicates exposure to the antigen. Conversion of negative skin test to positive indicates good prognosis. Reversion of a positive test to negative reflects poor prognosis and indicates allergy. Mainly used in sero epidemeology.

Major Advances and Discoveries

Candida albicans remains the most important fungal pathogen and is frequently associated with oral.(31) Some fungal species especially those that cause systemic mycoses, and dimorphic, being usually yeast-like in one environment mold like in another.The sub cutaneous micoses are not transmissible from human to human under ordinary conditions. The wide range of clinical manifestations of histoplasmosis makes it a peculiarly complex disease, often resembling tuberculosis(34) Coccidioides immitis is endemic in South Western United States, California, Texas, Mexico Arid soil in and around rodent burrows is a common reservoir for hyphae and arthoconidia. Infection results from inhalation of orthoconidia. Non immune individuals visiting endemic area can develop this infection after overwhelming inhalation exposure

Where the Research go next?

Fungal infections represent approximately fifteen percent of all nosocomial infections in intensive care units in United States with Candida species being the most commonly occurring fungal pathogen. In AIDS patients, cryptococcosis, is the second most common fungal infection after candidiasis, is potentially more serious. Because the mechanism of action of anti fungal drugs, such as amphotericin, involves interfering with ergosterol synthesis or function, these drugs are useless or ergosterol-lacking fungi. Candida albicans produce systemic or superficial infection. It produce oral or esophageal thrush in immuno compromised (neonates, steroids, drugs, Diabetes, AIDS), vulvo vaginitis (diabetics, use of anti bio tics),diaper rash, endocarditis in intra venous drug users, disseminated candidiasis (to any organ), Tropical azole for vaginal, Fluconazole for oral Fluconazole and Amphoteticin B for systemic. Aspergellus produce lung cavities especially after TB infection. It also produce allergic bronchi pulmonary aspergillosis (ABPA) with asthma. Some species of aspergellosis produce afflotoxins.

Current Debate

The incidence of opportunistic mycoses has significantly increased, owing to a growing population of susceptible individuals. Risk factors for opportunistic Aspergillosis, systemic candidiasis, Zygomycosis) include AIDS, diabetes, lymphomas, broad spectrum antibiotic therapy and immuno suppressive therapy (eg Corticosteroids, Radiation therapy and cytotoxic drugs. infections represents 15 % of all Hospital acquired infections in intensive care units in the US. Out of them Candida species is the most common fungal pathogen. Because the mechanism of action of anti fungal drugs, such as amphotericin, involves interfering with ergosterol synthesis or function, these drugs are useless for ergosterol-lacking fungi. Anti fungal therapy has become established as standard practice in hematology and oncology units over the past decade and its use is increasing. A number of agents have been evaluated and intravenous amphotericin B has emerged as the drug of choice. Evidence of its benefit is limited and only clearly demonstrated in patients not receiving prior anti fungal prophylaxis.(32) Prof Cornily developed the first prophylaxis against fungal infection and successfully demonstrated the effectiveness of high-dose therapies for patients already infected. His guidelines for treating mu-cor mycosis, which are the first in the world, will serve as a foundation for additional standard treatments in India where infections caused by mu cor fungi are common. Prof Cornell's findings are also internationally highly relevant for cancer therapies; Immune systems of cancer patients are often compromised by treatment which increases the risk of fungal infection.(33)

References

1. Odds FC. The fungal kingdom: essentials of mycology. In: Kibbler CC, Mackenzie WR, Odds FC, editors. Principles and Practice of Clinical Mycology. John Wiley & Sons; Chicester, England: 1996.
2. Carvalho A, Pasqualotto AC, Pitzurra L, Romani L, Denning DW, Rodrigues F. Polymorphisms in toll-like receptor genes and susceptibility to pulmonary

aspergillosis. *J Infect Dis*. 2008;197:618-21. doi: 10.1086/526500.
3. Bochud P-Y, Chien JW, Marr KA, Leisenring WM, Upton A, Janer M, Rodrigues SD, Li S, Hansen JA, Zhao LP, Aderem A, Boeckh M. Toll-like receptor 4 polymorphisms and aspergillosis in stem-cell transplantation. *N Engl J Med*. 2008;359:1766-1777. doi: 10.1056/NEJMoa0802629.
4. Bow EJ, Loewen R, Cheang MS, Shore TB, Rubinger M, Schachter B. Cytotoxic therapy-induced D-xylose malabsorption and invasive infection during remission-induction therapy for acute myeloid leukemia in adults. *J Clin Oncol*. 1997;15:2254-2261.
5. Bodey GP, Buckley M, Sathe YS, Freireich EJ. Quantitative relationships between circulating leukocytes and infection in patients with acute leukemia. *Ann Intern Med*. 1966;64:328-340.
6. Palmer LB, Greenberg HE, Schiff M. Corticosteroid treatment as a risk factor for invasive aspergillosis in patients with lung disease. *Thorax*. 1991;46:15-20. doi: 10.1136/thx.46.1.15. 119
7. Hagen EA, Stern H, Porter D, *et al*. High rate of invasive fungal infections following nonmyeloablative allogeneic transplantation. *Clin Infect Dis*. 2003;36:9-15. doi: 10.1086/344906.
8. Peleg AY, Husain S, Kwak EJ, Siveira FP, Ndirangu M, Tran J, Shutt KA, Shapiro R, Abu-Elmagd K, McCurry KR, Marcos A, Paterson DL. Opportunistic infections in 547 organ transplant recipients receiving alemtuzumab, a humanized monoclonal CD-52 antibody. *Clin Infect Dis*. 2007;44:201-212. doi: 10.1086/510388.
9. Meersseman W, Lagrou K, Maertens J, Van Wijngaerden E. Invasive aspergillosis in the intensive care unit. *Clin Infect Dis*. 2007;45:205-216. doi: 10.1086/518852.
10. Blijlevens NMA, Donnelly JP, De Pauw BE. Impaired gut function as risk factor for invasive candidiasis in neutropenic patients. *Brit J Haematol*. 2002;117:259-264. doi: 10.1046/j.1365-2141.2002.03394.x.
11. Fridkin SK. The changing face of fungal infections in health care settings. *Clin Infect Dis*. 2005;41:1455-1460. doi: 10.1086/497138.
12. Fukuda T, Boeckh M, Carter RA, Sandmaier BM, Maris MB, Maloney DG, Martin PJ, Storb R, Marr KA. Risk and outcomes of invasive fungal infections in recipients of allogeneic hematopoietic stem cell transplants after nonmyeloablative conditioning. *Blood*. 2003;102:827-833. doi: 10.1182/blood2003-02-0456.
13. Wald A, Leisenring W, van Burik J-A, Bowden RA. Epidemiology of Aspergillus infections in a large cohort of patients undergoing bone marrow transplantation. *J Infect Dis*. 1997;175:1459-1466.
14. Pagano L, Valentini C, Caira M, Fianchi L. Zygomycosis: current approaches to the management of patients with haematological malignancies. *Brit J Haematol*. 2009;146:597-606. doi: 10.1111/j.1365-2141.2009.07738.x.
15. Nucci M, Anaissie E. Cutaneous infection by Fusarium species in healthy and immunocompromised hosts: Implications for diagnosis and management. *Clin Infect Dis*. 2002;35:909-920. doi: 10.1086/342328.
16. Marr KA, Carter RA, Crippa F, Wald A, Corey L. Epidemiology and outcome of mould infections in hematopoietic stem cell transplant recipients. *Clin Infect Dis*. 2002;34:909-917. doi: 10.1086/339202.
17. Husain S, Alexander BD, Munoz P, Avery RK, Houston S, Pruett T, Jacobs R, Dominguez EA, Tollemar JG, Baumgarten K, Yu CM, Wagener MM, Linden P, 120 Kusne S, Singh N. Opportunistic mycelial fungal infections in organ transplant recipients: emerging importance of non-Aspergillus mycelial fingi. *Clin Infect Dis*. 2003;37:221-229. doi: 10.1086/375822.
18. Viscoli C, Girmenia C, Marinus A, *et al*. Candidemia in cancer patients: a prospective, multicenter surveillance study by the Invasive Fungal Infection Group (IFIG) of the European Organization for Research and Treatment of Cancer (EORTC) *Clin Infect Dis*. 1999;28:1071-1079. doi: 10.1086/514731.
19. Paterson DL, Singh N. Invasive aspergillosis in transplant recipients. *Medicine*. 1999;78:123-138.
20. Pfaller MA, Diekema DJ. Epidemiology of invasive candidiasis: a persistent public health problem. *Clin Microbiol Reviews*. 2007;20:133-163. doi: 10.1128/CMR.00029-06.
21. Pfaller MA, Jones RN, Doern GV, *et al*. Bloodstream infections due to Candida species: SENTRY antimicribial surveillance program in North America and Latin America, 1997-1998. *Antimicrob Agents Chemother*. 2000;44:747-571.
22. Zaoutis TE, Argon J, Chu J, Berlin JA, Walsh TJ, Feudtner C. The epidemiology and attributable outcomes of candidemia in adults and children hospitalized in the United States: a propensity analysis. *Clin Infect Dis*. 2005;41:1232-1239. doi: 10.1086/496922.
23. Garey KW, Rege M, Pai MP, Mingo DE, Suda KJ, Turpin RS, Bearden DT. Time to initiation of fluconazole therapy impacts mortality in patients with candidemia: a multinstitutional study. *Clin Infect Dis*. 2006;43:25-31. doi: 10.1086/504810.
24. Greene RE, Schlamm HT, Oestmann J-W, Stark P, Durand C, Lortholary O, Wingard JR, Herbrecht R, Ribaud P, Patterson TF, Troke PF, Denning DW, Bennett JE, de Pauw BE, Rubin RH. Imaging findings in acute invasive pulmonary aspergillosis: clinical significance of the halo sign. *Clin Infect Dis*. 2007;44:373-379. doi: 10.1086/509917.
25. Lin S-J, Schranz J, Teutsch SM. Aspergillosis case-fatality rate: systematic review of the literature. *Clin Infect Dis*. 2001;32:358-366. doi: 10.1086/318483.
26. Cordonnier C, Ribaud P, Herbrecht R, Milpied N, Valteau-Couanet D, Morgan C, Wade A for Société Française de Greffe de Moelle et de Thérapie Cellulaire. Prognostic factors for death due to invasive aspergillosis after 121 hematopoietic stem cell transplantation: A 1-year retrospective study of consecutive patients at French transplantation centers. *Clin Infect Dis*. 2006;43:955-963. doi: 10.1086/500934
27. Nivoix Y, Velten M, Letscher-Bru V, Moghaddam A, Natarajan-Ame S, Fohrer C, Lioure B, Bilger K, Lutun P, Marcellin L, Launoy A, Freys G, Bergerat J-P, Herbrecht R. Factors associated with overall and

attributable mortality in invasive aspergillosis. *Clin Infect Dis.* 2008;47:1176-1184. doi: 10.1086/592255

28. The importance of fungi and mycology for addressing major global challenges, Lene LangeIMA Fungus. 2014 Dec; 5(2): 463-471, Published online 2014 Dec 12. doi: 10.5598/imafungus.2014.05.02.10OpenStax College,
29. Biology. October 22, 2013. Provided by: OpenStax CNX. Locateat: http://cnx.org/content/m44629/latest/?collection=col11448/latest. License: *CC BY: Attribution.*
30. "Medicinal mushrooms: their therapeutic properties and current medical usage with special emphasis on cancer treatments." John Smith, Neil. J. Rowan, and Richard Sullivan31. Current topics in medical mycology | on Research Gate, the scientific network for scientists. Available from: https://www.researchgate.net/journal/0177-4204_Current_topics_in_medical_mycology [accessed Jul 06 2018].Derek J Sullivan, David C Coleman
31. Empirical antifungal therapy in febrile neutropenic patients: current status
December 1997
Current topics in medical mycology 8(1-2):5-14,
CC Kibbler
32. Cologne mycology professor Oliver Cornely honored with 'Prof Pushpa Talwar Memorial Oration' January 17, 2014.Prof Cornely heads the Clinical Trials Center and the Translational Research Platform at the CECAD Excellence Cluster at the University of Cologne.
33. Lippincott's Illustrated reviews, Microbiology second Edition, Richard.A. Harvey, Pamela C.Champe, Bruce D.Fisher.

How to cite this article:

Raghavendra Rao M.V *et al.* 2018, The Foray of The Fungus. *Int J Recent Sci Res.* 9(7), pp. 27956-27959.
DOI: http://dx.doi.org/10.24327/ijrsr.2018.0907.2365

****