

# Keynote Forum



2<sup>nd</sup> Annual Congress on  
**MICROBIOLOGY AND MICROBIOLOGISTS**  
&  
6<sup>th</sup> International Conference on  
**MYCOLOGY AND FUNGAL INFECTIONS**

October 07-08, 2019 | Madrid, Spain



**Yue Wang**

Institute of Molecular and Cell Biology, Singapore

## Beta-lactam antibiotics, the human microbiome and the risk of invasive *Candida albicans* infection

*Candida albicans* is an opportunistic fungal pathogen in humans. While it normally colonizes the gut and skin as a commensal yeast in healthy people, it is also a common cause of life-threatening invasive infection in immunocompromised patients, leading to ~400,000 deaths every year worldwide. What causes *C. albicans* to transform from a harmless resident in our body to a deadly pathogen? The use of broad-spectrum antibiotics is one of the well-recognized risk factors for invasive *C. albicans* infection, although the underlying mechanism remains unclear.  $\beta$ -lactams, the most commonly used class of broad-spectrum antibiotics, act by inhibiting peptidoglycan (PGN) polymerization in bacteria, leading to the accumulation and release of PGN subunits upon bacterial cell lysis. In a previous endeavor to identify the molecules in the human blood that promote *C. albicans* infection, we detected bacterial PGN subunits and demonstrated that some subunits were extremely potent inducers of *C. albicans* hyphal morphogenesis, the invasive form of the fungus. This discovery inspired us to propose and test a potential mechanism by which  $\beta$ -lactam antibiotics could increase the risk of invasive candidiasis. We hypothesized that  $\beta$ -lactams promote *C. albicans* infection by forcing trillions of bacterial cells in the human microbiota to suddenly release a massive amount of PGN subunits which in turn drive *C. albicans* to undergo the yeast-to-hyphal transition. We have obtained compelling *in vitro* and *in vivo* evidence that supports our hypothesis, which could lead to new strategies for the prevention and management of invasive *C. albicans* infection.

### Biography

Yue Wang has his expertise in fungal pathogens with a focus on *Candida albicans*. His main interest lies in the identification and characterization of both host and fungal factors that determine the pathogenicity of *Candida albicans*. His main discoveries include the hypha-specific gene HGC1 that controls hyphal morphogenesis and a range of Hgc1/Cdc28 substrates that play various roles in polarity control, vesicle transport and virulence. He also discovered that bacterial peptidoglycan subunits in the blood are potent inducers of *C. albicans* hyphal growth.

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## Kenji Sasaki

Midtown Medicare Clinic, Japan

### **Candida-associated gastric ulcer until yesterday, today and from tomorrow**

*Candida*-associated gastric ulcer occurs not only in debilitated but healthy individuals. Though had been reported to demonstrate nothing but nonspecific endoscopic features, it occasionally exhibits a typical finding the author designated a candidarium. The natural history of the disease had not been clarified and the recurrence had not been described: the fungus had been reported to become undetectable once the ulcers were healed. However, the author demonstrated that the ulcer not only occurs but also recurs in a different site with a different shape in a non-diabetic, *Helicobacter pylori*-negative patient, who has not been given non-steroidal anti-inflammatory drugs, antibiotics, antineoplastic agents, or systemic corticosteroids, advocating that, contrary to the prevailing opinion, *Candida* (*C.*) is no innocuous bystander but an etiologic perpetrator: intragastric inoculation of *C. albicans* causes epithelial necrosis through activation of IL-23/IL-17 pathway in mice. In the oropharyngeal field, the fungus has recently been shown to secrete a cytolytic pore-forming toxin (PFT), candidalysin, into a pocket in the epithelium after penetrating into it to activate mitogen-activated protein kinase (MAPK)/MAPK phosphatase 1 (MKP1)/c-Fos pathway, triggering release of damage as well as immune cytokines. While candidalysin, exerting an effect even on the adjacent cells, directly injures the tissue with damage cytokines, immune counterparts activate polymorphonuclear leukocytes to eventually terminate inflammation. Though the epithelial response to the fungus is different from organ to organ, it invades into and induces necrotic cellular damage to the intestinal mucosa through the toxin to translocate: the action of candidalysin is proven not only on the stratified squamous mucosa but on the single layer of the columnar epithelium. Since, by analogy with intestinal candidiasis, it is never difficult to speculate that the PFT inflicts such damage to the gastric mucosa, a theoretically strong possibility has come up that *Candida*-associated gastric ulcer is actually *Candida*-induced ulcer.

#### **Biography**

Kenji Sasaki received his MD in 1973 and PhD in 1977 from Tohoku University. He is a JGES Board Certified Fellow and Preceptor, JSGE Board Certified Gastroenterologist, JSIM Board Certified Member and CRIM Editorial Board Member. He has given presentations at international congresses and published papers on gastroenterology in international journals. Acclaimed by Prof Tamawski at DDW 2012, he published his article "*Candida*-associated gastric ulcer relapsing in a different position in a different appearance." in World J Gastroenterol 2012 Aug 28; 18 (32): 4450-4453, which was featured in the section of Infection and Immunity of World Biomedical Frontiers in September, 2013 and recommended by an associate research scientist on PubAdvanced in December, 2013. Invited to participate in a special issue, he published a review article "*Candida*-associated gastric ulcer until yesterday, today, and from tomorrow --- In quest of the etiology" in SciZt Gynecol Reprod Med 2017; 1(1): 1002.

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## Wafaa K Taia

Alexandria University, Egypt

### Study of the airborne fungal spores in Rosetta, Egypt

In this study, fungal spores in the atmosphere of Rosetta, Egypt were studied for one year (August 2015 to July 2016) using a Hirst type volumetric pollen trap. An annual spore index equals to 8023 was recorded during the studied period. The maximum records were in August 2015, May and July 2016. *Alternaria*, *Cladosporium*, *Tilletia*, *Stemphylium*, *Chaetomium*, *Aspergillus*/*Penicillium*-type, *Drechslera*-type, *Mycosphaerella* and *Epicoccum* represent the main spore producers organized in relation to their abundance. A total of nine fungal spore genera with minimum 10-day mean equal to or greater than 0.1 spores/m<sup>3</sup> of air are involved to construct an approximate spore calendar. This aero palynological study was compared with others elsewhere in the world. Correlation analysis between spore counts and different meteorological parameters (temperature, rainfall and relative humidity) as well as number of allergic patients were studied. It was obvious that most of the recorded fungal spores have allergenic properties.

#### Biography

Wafaa K Taia, graduated from Alexandria university, Egypt and got her Ph.D. from Reading university, England. Her major field is Botany, Angiosperm taxonomy, Eco taxonomy and biodiversity. Her main interest is plant taxonomy, allergy, and the effect of environment on the plants. She attained a lot of conferences inside and outside Egypt and has many publications in the above-mentioned items. She is teaching plant taxonomy, Speciation, Angiosperm phylogeny, Palynology, Flora, General Botany and post graduate courses in Alexandria University, Faculty of Science. She had valuable work on the effect of habitats, environmental conditions and sea elevation on the plants. She did many works on allergy, air pollution and causes of environmental disorders. She attained lot off M.Sc. and Ph.D. Juries in Egypt, Saudi Arabia and Spain (MALAGA), as an examiner of the thesis. She has reviewed many scientific papers in her field of interest She published book entitled 'Biodiversity and plant taxonomy: Definition, History and Classification. Lambert Academic Publishing (2017).

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