Considering these findings, we recommend that laboratories review their current methodologies to ensure that the IIF screening dilution used for the detection of GPCA has optimal sensitivity and specificity for their methodology and microscope.

Conflicts of interest and sources of funding: The authors state that there are no conflicts of interest to disclose.

Louise Wienholt^{1,2}, Emma Dawson¹, Loriza Khan¹, Tiffany Hughes³, Frederick Lee^{2,4}

¹The Royal College of Pathologists of Australasia Quality Assurance Programs (RCPAQAP), St Leonards, Sydney, Australia; ²Sydney Medical School, University of Sydney, Sydney, Australia; ³Clinical Immunology and Allergy Department, The Royal Adelaide Hospital, Adelaide, Australia; ⁴Department of Clinical Immunology and Allergy, Royal Prince Alfred Hospital, Sydney, Australia

Contact: Dr Louise Wienholt.

E-mail: louise.wienholt@rcpaqap.com.au

1. Toh BH, van Driel IR, Gleeson PA. Pernicious anemia. *N Engl J Med* 1997; 337: 1441–8.
2. Davidson RJ, Atrah HI, Sewell HF. Longitudinal study of circulating gastric antibodies in pernicious anaemia. *J Clin Pathol* 1989; 42: 1092–5.
3. Carmel R. Reassessment of the relative prevalences of antibodies to gastric parietal cell and to intrinsic factor in patients with pernicious anaemia: influence of patient age and race. *Clin Exp Immunol* 1992; 89: 74–7.
4. Taylor KB, Roitt IM, Doniach D, et al. Autoimmune phenomena in pernicious anaemia: gastric antibodies. *Br Med J* 1962; 2: 1347.
5. Irvine WJ, Davies SH, Teitelbaum S, et al. The clinical and pathological significance of gastric parietal cell antibody. *Ann N Y Acad Sci* 1965; 124: 657–91.
6. Sun A, Wang YP, Lin HP, et al. Do all the patients with gastric parietal cell antibodies have pernicious anemia? *Oral Dis* 2013; 19: 381–6.

DOI: <https://doi.org/10.1016/j.pathol.2020.04.014>

***Candida duobushaemulonii* sepsis and *Candida auris* co-isolation following hospitalisation in Vietnam**

Sir,

Candida auris is an emerging pathogen linked with health-care associated outbreaks.¹ *Candida duobushaemulonii* is closely related to *C. auris* and belongs to the *C. haemulonii* complex. It often exhibits elevated minimum inhibitory concentrations (MICs) to azoles and amphotericin B.^{2,3} An unexpected number of invasive *C. duobushaemulonii* isolates reported in Panama in 2016–2017 raised concern regarding emergence of *C. duobushaemulonii* as a cause of highly transmissible multidrug resistant infection.² We report a patient with two antifungal resistant *Candida* species: *C. duobushaemulonii* bloodstream infection and *C. auris* colonisation after transfer from a hospital in southern Vietnam.

In June 2019, an 85-year-old man was transferred to Melbourne, Australia from Vietnam. He had been

hospitalised 2 months prior while visiting Vietnam with altered conscious state and hyponatraemia in the setting of an *Escherichia coli* urinary tract infection. His medical history included non-insulin dependent diabetes and IgA nephropathy with a baseline creatinine of 200 µmol/L. His stay in Vietnam required prolonged intensive care unit admission complicated by cardiac arrest after acute coronary syndrome, anuric renal failure, gastrointestinal haemorrhage, and carbapenem resistant *Klebsiella pneumoniae* pneumonia and bloodstream infection. His antimicrobial use included colistin, meropenem, vancomycin and caspofungin.

On arrival to Melbourne, there was no evidence of ongoing infection and his antimicrobials were ceased. All central venous access devices were replaced. A groin and axilla swab, catheter urine and endotracheal aspirate were taken for *C. auris* screening. He was placed in contact isolation.

The *C. auris* screening specimens were cultured on Brilliance Candida Agar (Oxoid, UK). After 72 h incubation pink colonies were isolated and identified as *C. auris* by matrix-assisted laser desorption/ionisation time-of-flight mass spectrometry (MALDI-TOF MS) with a score of >2.0 (MALDI Biotyper version 3.1, database MBT 7854 MSP library RUO; Bruker Daltonik, Germany). Identity was confirmed by sequencing of the internal transcribed spacer region (ITS2) with primers in the conserved flanking 5.8S and 28S region, with 99.2% match at 100% coverage to *C. auris* with NCBI accession number MF817727.1 (type strain DSM21092). *Candida duobushaemulonii* was not isolated. Antifungal susceptibility testing with Sensititre YeastOne plate (TREK Diagnostic Systems, UK) demonstrated high MICs to fluconazole (MIC 128 µg/mL) and amphotericin (MIC 2 µg/mL), and a low MIC to micafungin (0.12 µg/mL). These may be tentatively interpreted as resistance to fluconazole and amphotericin and susceptibility to micafungin based on CDC interpretive criteria.⁴

On day 9 after transfer, he developed a fever with increasing vasopressor requirements. After discussion with his family, treatment was withdrawn due to poor neurological recovery.

A yeast was isolated on day 3 of incubation from a blood culture taken from the central venous catheter (BACTEC 9240 system; Becton Dickinson, USA). It was identified as *C. duobushaemulonii* by MALDI-TOF MS (Bruker Daltonik) with a confidence score of >2.0. The identity was confirmed by sequencing of the ITS2 region which matched 100% at 100% coverage with NCBI accession number NR_130694.1 (type strain CBS7789). It was subsequently cultured on Brilliance Candida Agar and yielded beige colonies. Susceptibility testing with Sensititre YeastOne demonstrated a fluconazole MIC of 64 µg/mL, micafungin MIC 0.06 µg/mL and amphotericin B MIC 0.5 µg/mL. The isolate was sent to another clinical laboratory and tested on Vitek MS MALDI (bioMérieux, France) and Vitek2 Yeast ID card which yielded identification of *C. duobushaemulonii* with a confidence value of 99.9% and 97% probability, respectively. Colony colour on CHROMagar Candida medium (Becton Dickinson) was cream with a pale pink hue in the primary inoculum (Fig. 1).

Candida duobushaemulonii has previously been reported to be an uncommon cause of invasive infection in India, East

Fig. 1 *Candida duobushaemulonii* after 48 h incubation on CHROMagar Candida medium.

Asia and the Americas.^{5–7} Surveillance for *C. auris* in Panama in 2016–2017 identified 17 of 36 submitted isolates as *C. duobushaemulonii*.² Ten of these isolates were blood-stream isolates and half were from a single institution. A study from the US Centers for Disease Control (CDC) described 50 clinical *C. duobushaemulonii* isolates from Panama, Guatemala, US and Venezuela.⁸ Whole-genome sequencing demonstrated a cluster of clonally related isolates within a hospital in Panama which had reported a suspected outbreak.⁸

Like *C. auris*, phenotypic identification systems can misidentify *C. duobushaemulonii* as closely related species such as *C. haemulonii*.² In recent years, updates to MALDI-TOF MS databases and VITEK2 Yeast ID systems have improved the ability to differentiate *C. auris* and closely related species and was able to accurately differentiate *C. duobushaemulonii* from *C. auris* in our case.³ However, even updated phenotypic identification systems such as Vitek2 Yeast ID can misidentify *C. auris* as *C. haemulonii* or *C. duobushaemulonii*.⁹ MALDI-TOF MS systems with updated databases are able to accurately identify isolates to species level.³

Antifungal susceptibility for *C. duobushaemulonii* has demonstrated elevated MICs to fluconazole and amphotericin. Like *C. auris*, there are no clinical breakpoints for *C. duobushaemulonii*.^{2,3} MICs to the echinocandins remain low and they are suggested as first line therapy for cases of invasive *C. duobushaemulonii*.

In summary, patients may carry more than one resistant *Candida* species. We describe a case with *C. duobushaemulonii* bloodstream infection and *C. auris* colonisation, in a patient who had been hospitalised in Vietnam where there have not been any previous documented cases. *Candida duobushaemulonii* demonstrates elevated MICs to multiple antifungals and ongoing surveillance is required should it emerge as another cause of potentially transmissible multidrug resistant infection.

Acknowledgement: We thank Katherine Bond and the Victorian Infectious Diseases Reference Laboratory Bacteriology department for molecular testing of both *Candida* isolates. We thank Kyra Chua and Elisabeth Grabsch from Austin Hospital Microbiology for additional phenotypic laboratory testing.

Conflicts of interest and sources of funding: The authors state that there are no conflicts of interest to disclose.

Ouli Xie^{1,2}, Richard Streitberg¹, Carly Hughes^{1,2}, Rhonda Stuart², Maryza Graham^{1,2,3}

¹Microbiology Department, Monash Health, Clayton, Vic, Australia; ²Department of Infectious Diseases, Monash Health, Clayton, Vic, Australia; ³Faculty of Medicine Nursing and Health Sciences, Monash University, Clayton, Vic, Australia

Contact Dr Ouli Xie

E-mail: ouluxie87@gmail.com

1. Eyre DW, Sheppard AE, Madder H, *et al.* A *Candida auris* outbreak and its control in an intensive care setting. *N Engl J Med* 2018; 379: 1322–31.
2. Ramos R, Caceres DH, Perez M, *et al.* Emerging multidrug-resistant *Candida duobushaemulonii* infections in Panama hospitals: importance of laboratory surveillance and accurate identification. *J Clin Microbiol* 2018; 56: e00371-18.
3. Cendejas-Bueno E, Kolečka A, Alastruey-Izquierdo A, *et al.* Reclassification of the *Candida haemulonii* complex as *Candida haemulonii* (*C. haemulonii* group I), *C. duobushaemulonii* sp. nov. (*C. haemulonii* group II), and *C. haemulonii* var. *vulnera* var. nov.: three multiresistant human pathogenic yeasts. *J Clin Microbiol* 2012; 50: 3641–51.
4. Centers for Disease Control and Prevention. *C. auris* Antifungal Susceptibility Testing and Interpretation. Cited 13 Apr 2020. <https://www.cdc.gov/fungal/candida-auris/c-auris-antifungal.html>
5. Hou X, Xiao M, Chen SC, *et al.* Identification and antifungal susceptibility profiles of *Candida haemulonii* species complex clinical isolates from a multicenter study in China. *J Clin Microbiol* 2016; 54: 2676–80.
6. Kumar A, Prakash A, Singh A, *et al.* *Candida haemulonii* species complex: an emerging species in India and its genetic diversity assessed with multilocus sequence and amplified fragment-length polymorphism analyses. *Emerg Microbes Infect* 2016; 5: e49.
7. Boatto HF, Cavalcanti SD, Del Negro GM, *et al.* *Candida duobushaemulonii*: an emerging rare pathogenic yeast isolated from recurrent vulvovaginal candidiasis in Brazil. *Mem Inst Oswaldo Cruz* 2016; 111: 407–10.
8. Gade L, Caceres DH, Chow NA, *et al.* Understanding the emergence of multidrug resistant *Candida*: using whole-genome sequencing to determine the population structure of *Candida haemulonii* and *Candida duobushaemulonii*. ASM Microbe, June 7–11, 2018, Atlanta, American Society of Microbiology; CIV LB3
9. Ambaraghassi G, Dufresne PJ, Dufresne SF, *et al.* Identification of *Candida auris* by use of the updated Vitek 2 Yeast Identification System, Version 8.01: a multilaboratory evaluation study. *J Clin Microbiol* 2019; 57: e00884-19.

DOI: <https://doi.org/10.1016/j.pathol.2020.05.003>

Daratumumab-induced pancytopenia: collateral damage from the silver bullet

Sir,

A 78-year-old man with relapsed, refractory IgG kappa plasma cell myeloma was commenced on daratumumab