Webinaire national
Candida auris

Réseau piloté par
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Réseau de Prévention des Infections et de l'Antibiorésistance
Santé publique France

L'épidémiologie et le diagnostic mycologique

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Université Paris Cité

INSTITUT PASTEUR

Candida auris = *Candidozyma auris*

Persoonia 52, 2024: 22–43
www.ingentaconnect.com/content/nhn/pimj

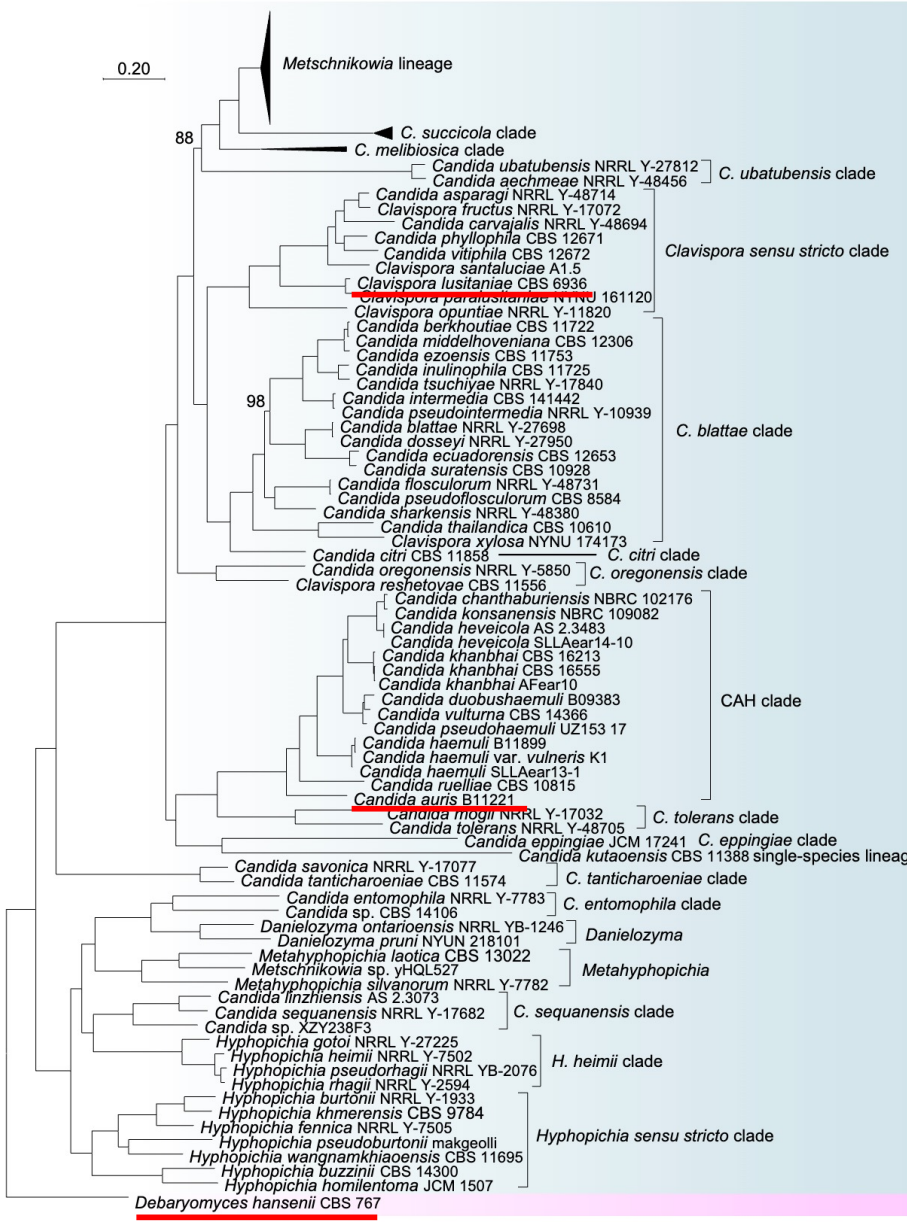
RESEARCH ARTICLE

ISSN (Online) 1878-9080
https://doi.org/10.3767/persoonia.2024.52.02

Phylogenomic analysis of the *Candida auris-Candida haemuli* clade and related taxa in the *Metschnikowiaceae,* and proposal of thirteen new genera, fifty-five new combinations and nine new species

F. Liu[1], Z.-D. Hu[1], X.-M. Zhao[1], W.-N. Zhao[1], Z.-X. Feng[1], A. Yurkov[2], S. Alwasel[3], T. Boekhout[3,4], K. Bensch[5], F.-L. Hui[6], F.-Y. Bai[7], Q.-M. Wang[1,8,9,*]

Clade séparé = nouveau genre
 # Candida glabrata et nakaseomyces glabratus

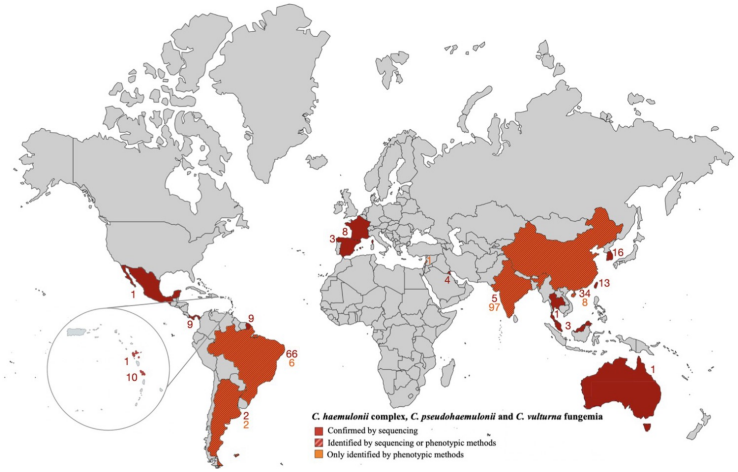


Candida haemulonii complex

RESEARCH ARTICLE

Candida haemulonii complex, an emerging threat from tropical regions?

Ugo Françoise[1¤a], Marie Desnos-Ollivier[2], Yohann Le Govic[1¤b], Karine Sitbon[2], Ruddy Valentino[3], Sandrine Peugny[4], Taieb Chouaki[5], Edith Mazars[6], André Paugam[7], Muriel Nicolas[8], Nicole Desbois-Nogard[1☯], Olivier Lortholary[2,9,10☯*], French Mycoses Study Group[¶]



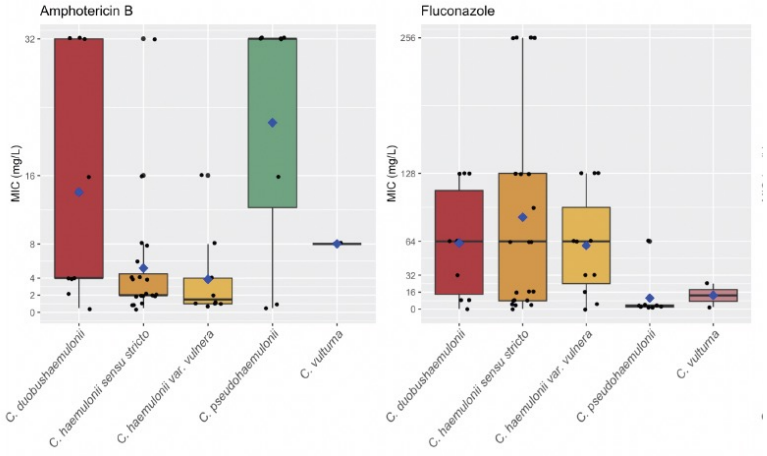


Fig 3. World mapping of cases of fungemia due to *C. haemulonii* complex, *C. pseudohaemulonii* or *C. vulturna*. According to our case series (obtained from the YEASTS program 2002–2021 and the RESSIF Network 2012–2021) and the literature review (Medline, 1962–2022). References are with the S3 Fig. Map created from fla-shop.com (https://www.fla-shop.com/svg/, CC BY 4.0 license) modified with inkscape software.

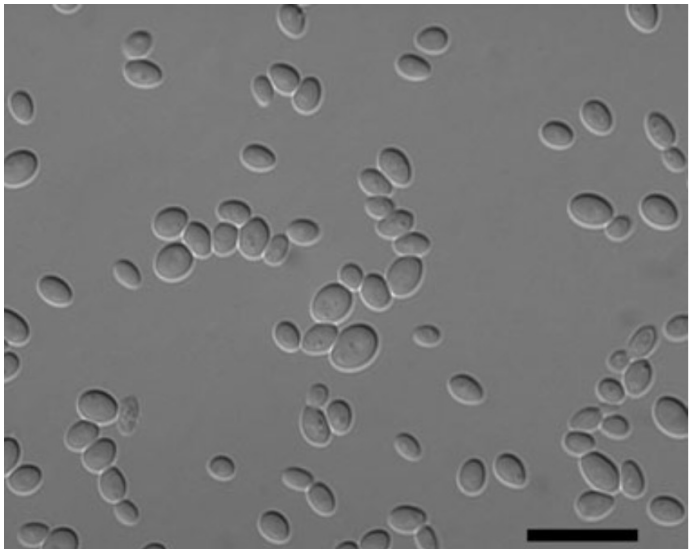
Candida auris sp. nov., a novel ascomycetous yeast isolated from the external ear canal of an inpatient in a Japanese hospital

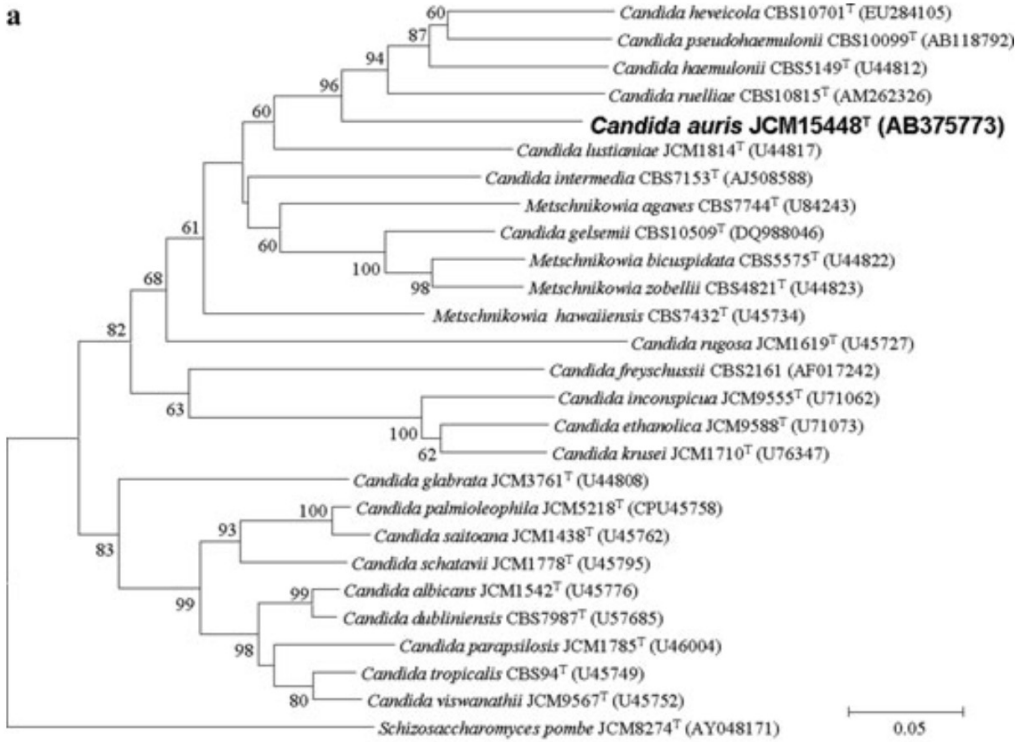
Microbiol Immunol 2009; **53**: 41–44
doi:10.1111/j.1348-0421.2008.00083.x

Kazuo Satoh[1,2], Koichi Makimura[1,3], Yayoi Hasumi[1], Yayoi Nishiyama[1], Katsuhisa Uchida[1] and Hideyo Yamaguchi[1]

[1]Teikyo University Institute of Medical Mycology, 359 Otsuka, Hachioji, Tokyo 192-0395, [2]Japan Health Sciences Foundation, 13-4 Nihonbashi-Kodenmacho, Chuo-ku, Tokyo 103-0001 and [3]Genome Research Center, Graduate School of Medicine and Faculty of Medicine, Teikyo University, Otsuka 359, Hachioji, Tokyo 192-0395, Japan

Conduit auditif externe d'une femme de 70 ans à Tokyo en 2007 CBS10913





Case report

Earliest case of *Candida auris* infection imported in 2007 in Europe from India prior to the 2009 description in Japan

Marie Desnos-Ollivier[a,*], Arnaud Fekkar[b], Stéphane Bretagne[a,c]

Homme rapatrié de réanimation en Inde (New delhi) avec un abcès hépatique en 2007

Hepatic drainage on June 28th yielded purulent liquid without bacteria but with an unidentified *Candida* sent to the NRCMA. Blood cultures were negative. Standardized EUCAST broth microdilution method for susceptibility testing of yeast revealed high minimum inhibitory concentrations (MIC) of fluconazole (≥64 mg/L) with lower values for voriconazole (0.5 mg/L), posaconazole (0.125 mg/L), amphotericin B (0.5 mg/L), caspofungin (0.06 mg/L) and micafungin (0.5 mg/L) [2]. Caspofungin was stopped on July 7th The patient was given posaconazole 400 mg twice a day. The patient died 50 days after intensive cares.

Candida auris Clinical Isolates from South Korea: Identification, Antifungal Susceptibility, and Genotyping

April 2019 Volume 57 Issue 4 e01624-18 Journal of Clinical Microbiology

Yong Jun Kwon,[a] Jong Hee Shin,[a] Seung A Byun,[a] Min Ji Choi,[a] Eun Jeong Won,[a] Dain Lee,[a] Seung Yeob Lee,[a] Sejong Chun,[a] Jun Hyung Lee,[a] Hyun Jung Choi,[a] Seung Jung Kee,[a] Soo Hyun Kim,[a] Myung Geun Shin[a]

1996-2018
13 hôpitaux en Corée du Sud
Identification de 61 patients avec *C. auris*

				Erg11p[b]		MLST results for 4 alleles (ITS-*RPB1*-*RPB2*-D1/D2)[e]			PFGE type[c]	
Year	Source/ sample no.	Hospital (no. of isolates)	FR[d]	AAS	GenBank accession no. or similar isolate	Allele profile	GenBank accession no. or similar isolate	ST cluster	EK	REAG-N
1996	Blood/B1	A (1)	R	None	MK294623	a-a-a-a	MK294578-MK294608-MK294593-MK294563	2	K1	N1a
2006	Ear/E4	A (1)	S	None	MK308826	a-a-a-a	MK308751-MK308776-MK308801-MK308726	2	K1	N1a
	Ear/E5	A (1)	R	None	MK308828	a-a-a-a	MK308753-MK308778-MK308803-MK308728	2	K1	N1b
	Ear/E6	A (1)	R	None	MK308829	a-a-a-a	MK308754-MK308779-MK308804-MK308729	2	K1	N1c
	Ear/E7	A (1)	R	None	MK308830	a-a-a-a	MK308755-MK308780-MK308805-MK308730	2	K1	N1d
	Ear/E8	A (1)	R	None	MK308831	a-a-a-a	MK308756-MK308781-MK308806-MK308731	2	K1	N1c
	Ear	A (1)	S	None	MK308827	a-a-a-a	MK308752-MK308777-MK308802-MK308727	2	K1	N1e
	Ear	A (1)	R	None	MK308832	a-a-a-a	MK308757-MK308782-MK308807-MK308732	2	K1	N1f
	Ear	A (1)	R	None	MK308833	a-a-a-a	MK308758-MK308783-MK308808-MK308733	2	K1	N1g
2007	Ear	B (1)	S	None	MK308834	a-a-a-a	MK308759-MK308784-MK308809-MK308734	2	K1	N1h
	Ear	B (1)	S	None	MK308835	a-a-a-a	MK308760-MK308785-MK308810-MK308735	2	K1	N1c
	Ear	B (1)	S	None	MK308836	a-a-a-a	MK308761-MK308786-MK308811-MK308736	2	K1	N1i
	Ear	C (1)	S	None	MK308837	a-a-a-a	MK308762-MK308787-MK308812-MK308737	2	K1	N1c
	Ear	C (1)	S	None	MK308838	a-a-a-a	MK308763-MK308788-MK308813-MK308738	2	K1	N1d
	Ear	C (1)	R	None	MK308839	a-a-a-a	MK308764-MK308789-MK308814-MK308739	2	K1	N1j

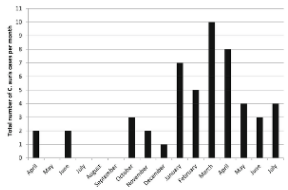
Retrospective description of the first *C. auris* cases in Paris (hepatic abscess) India

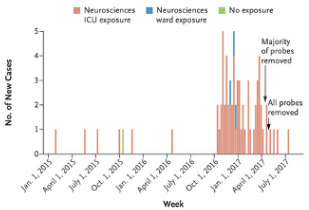
First *C. auris* described in La Réunion India

First *C. auris* described in Tours India Iran

Retrospective description of the First *C. auris* cases in Korea (Candidemia)

First description in a Japanese patient (External ear canal)





15 strains from South Korea (otitis)

12 cases from India (Fungemia)

Kenya (Fungemia)

USA (Fungemia)

South Africa (Fungemia)

Venezuela (Fungemia)

Koweit (Fungemia)

First outbreak in Europe London **50 cases**

Outbreak in Oxford **70 cases**

Clinical Alert to U.S. Healthcare Facilities - June 2016

This clinical alert has been updated. Please read the September 2017 *C. auris* Clinical Update with important information from investigations of U.S. cases of *C. auris* for clinicians, laboratorians, and public health officials.

1996 2007 2009 2011 2012 2013 2014 2015 2016 2018

Tracing the Evolutionary History and Global Expansion of *Candida auris* Using Population Genomic Analyses

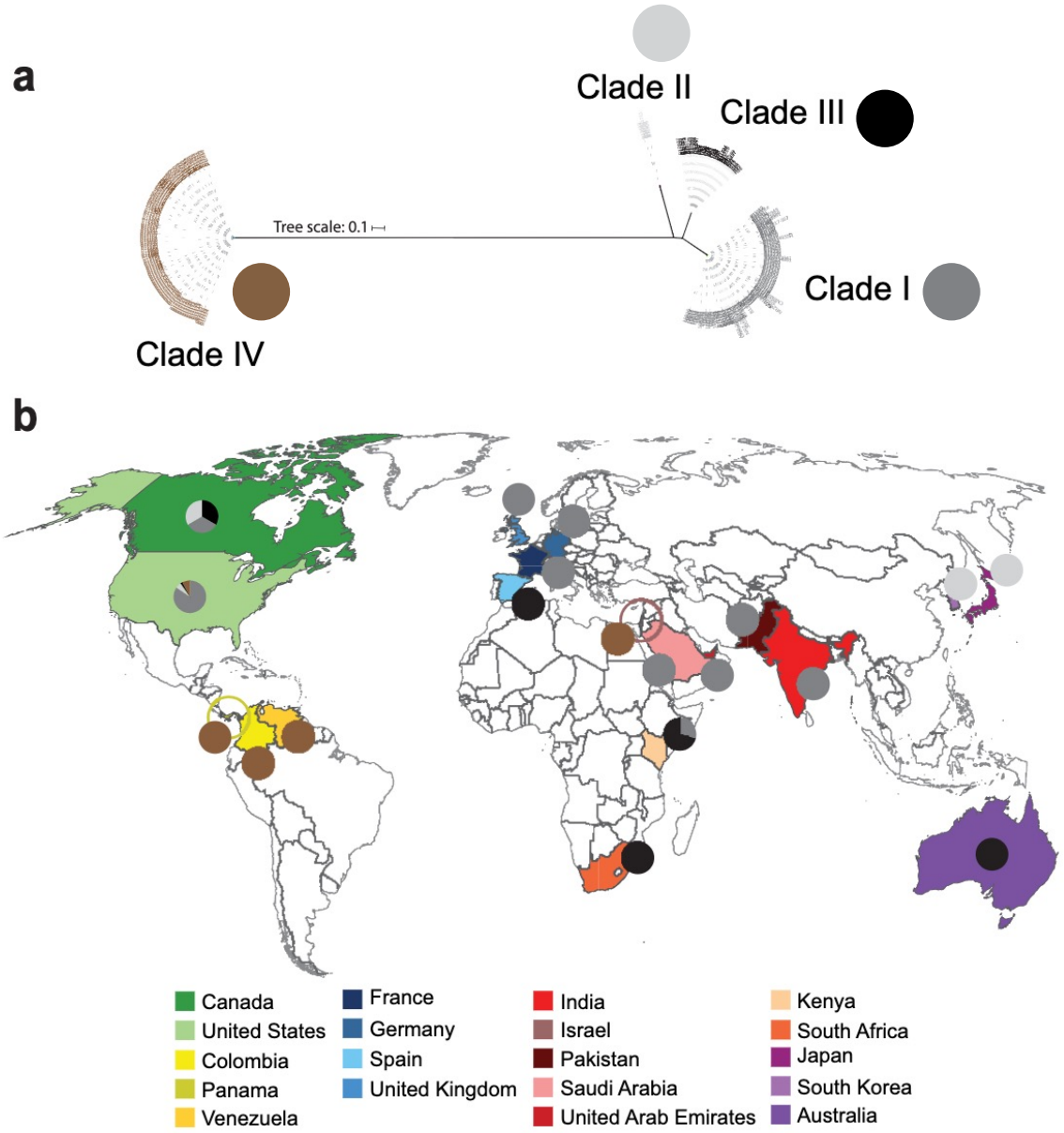
Nancy A. Chow,[a] José F. Muñoz,[b] Lalitha Gade,[a] Elizabeth L. Berkow,[a] Xiao Li,[b*] Rory M. Welsh,[a] Kaitlin Forsberg,[a] Shawn R. Lockhart,[a] Rodney Adam,[c] Alexandre Alanio,[d,e,f] Ana Alastruey-Izquierdo,[g] Sahar Althawadi,[h] Ana Belén Ronen Ben-Ami,[j,k] Amrita Bharat,[l] Belinda Calvo,[m] Marie Desnos-Ollivier,[d] Patricia Escandón,[n] Dianne Gardam,[o] Revathi Gunturu,[c] Christopher H. Heath,[o,p,q,r] Oliver Kurzai,[s,t] Ronny Martin,[s,t] Anastasia P. Litvintseva,[a] Christina A. Cuomo[b]

March/April 2020 Volume 11 Issue 2 e03364-19 mBio®

WGS
304 *C. auris* isolates
19 countries
Six continents
6 clades (V Iran + VI Singapour)

Origine de chaque clade = il y a 360 ans

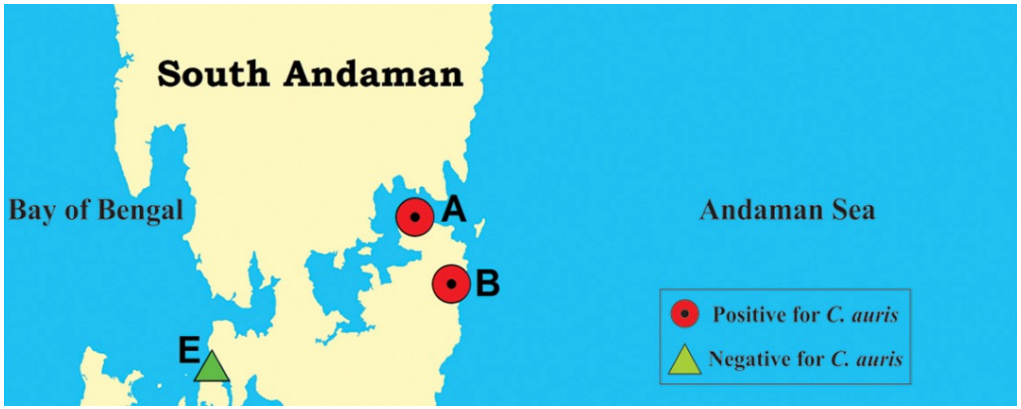
Origine des isolates épidémiques I, III et IV = 36 ans



Environmental Isolation of *Candida auris* from the Coastal Wetlands of Andaman Islands, India

Parth Arora,[a,b] Prerna Singh,[a] Yue Wang,[c] Anamika Yadav,[a] Kalpana Pawar,[a] Ashutosh Singh,[a] Gadi Padmavati,[b] Jianping Xu,[c] Anuradha Chowdhary[a]

March/April 2021 Volume 12 Issue 2 e03181-20 mBio®



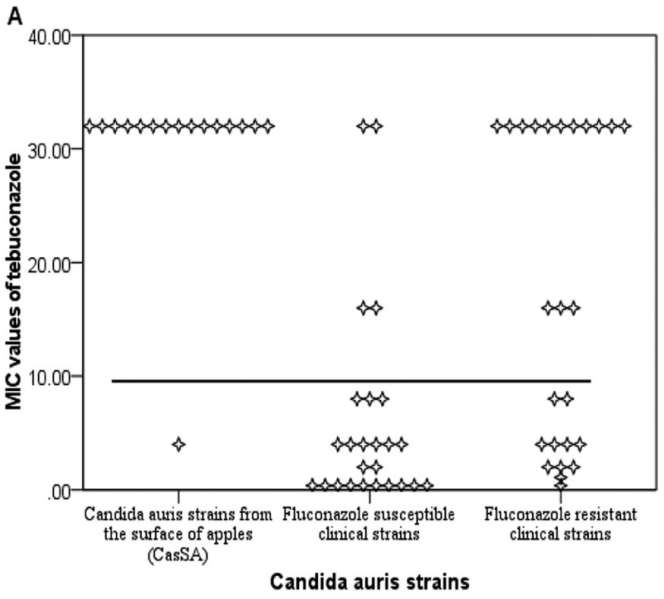
Sampling location	Sampling station	Yeast species isolated (no. of colonies isolated)	Station description
Location I (South Andaman Island)	A (Chatham salt marsh)	***Candida auris*** **(*n* = 2)**[a] *Trichosporon asahii* (*n* = 4) *Arthrographis kalrae*[c] (*n* = 2)	Intertidal habitat along the east coast of SAD, characterized by marshy sediment on the abundant seagrass bed with seabirds; negligible human activity.
	B (Corbyn's Cove)	***Candida auris*** **(*n* = 22)**[b] *Candida parapsilosis* (*n* = 2)	Upper middle intertidal zone, east coast of SAD, a tourist beach with fine sand sediment

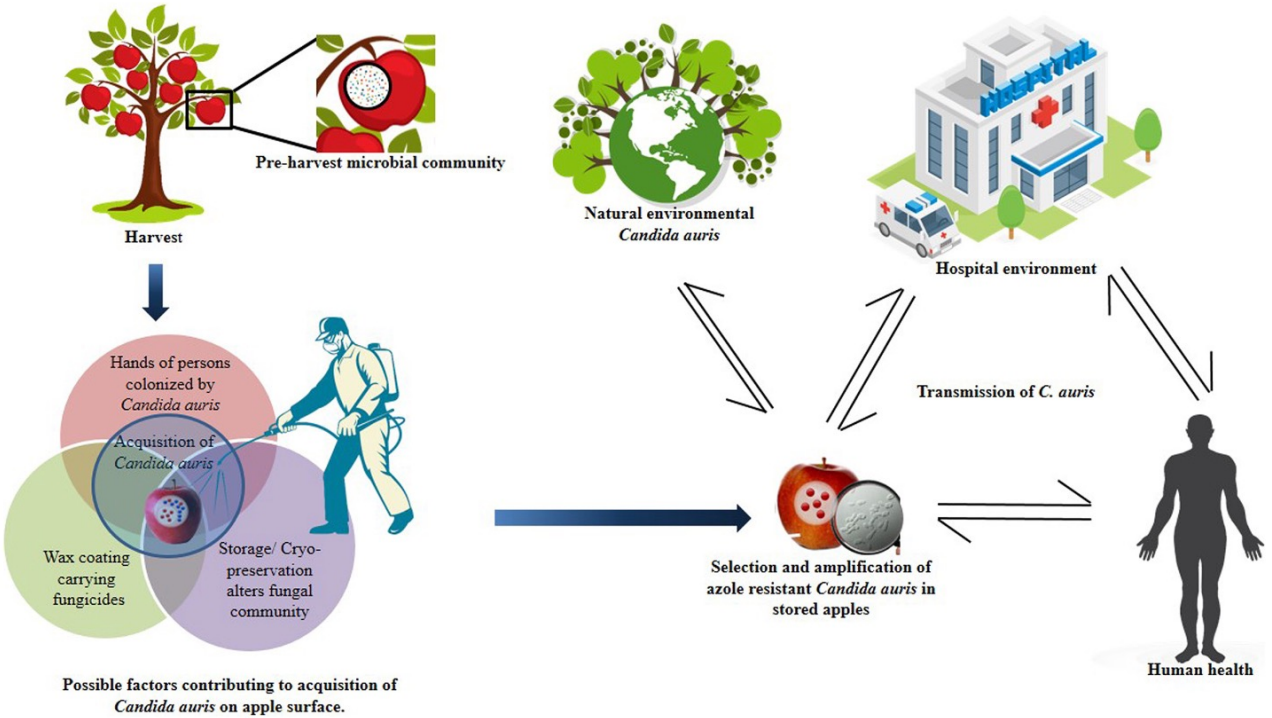
Site A : 1 colonie sensible à tous les antifongiques Clade I

Candida auris on Apples: Diversity and Clinical Significance

Anamika Yadav,[a,b] Kusum Jain,[a,b] Yue Wang,[c] Kalpana Pawar,[a] Hardeep Kaur,[b] Krishan Kumar Sharma,[d] Vandana Tripathy,[d] Ashutosh Singh,[a] Jianping Xu,[c] Anuradha Chowdhary[a]

India, New Delhi, vendeurs locaux
Mars 20 à Sept 21
84 fruits testés (écouvillons de surface) / 62 pommes
144 souches de 22 espèces de *Candida*
8 pommes positive à *C. auris*





Possible factors contributing to acquisition of *Candida auris* on apple surface.

Jpn. J. Infect. Dis., 75, 490-495, 2022

Original Article

Finding a Needle in a Haystack – In Silico Search for Environmental Traces of *Candida auris*

Laszlo Irinyi[1,2,3], Michael Roper[5], Richard Malik[6], and Wieland Meyer[1,2,3,4,7]*

Table 1. BioProjects in the Sequence Read Archive database of the National Center for Biotechnology Information containing partial ITS sequences of *Candida auris*

Run ID	BioProject ID	Study title	Isolation source	Host	Country	Number of *C. auris* reads	Total number of reads	ITS region
SRR6480849	PRJNA429422 (23)	ITS2 region of fungal species on amphibian skin swabs raw sequence reads	Skin	*Lissotriton vulgaris* (smooth newt)	United Kingdom	93	4,980	
SRR6480848						186	9,750	
SRR6480847						284	40,713	
SRR6480846						49	3,882	
SRR6480845						57	4,848	
SRR6480842						47	22,685	
SRR6480841						15	14,178	
SRR6480837						55	16,343	
SRR6480834						45	20,091	
SRR6480832				*Triturus cristatus* (great-crested newt)		2	9,319	
SRR6480828						460	16,298	
SRR6480819						53	10,474	
SRR6480823						65	5,749	
SRR6480822						235	31,526	
SRR6480821						395	16,267	ITS2
SRR10307162	PRJNA577804 (26)	Mycobiome analysis on the skin of dogs affected by otitis	Ear skin	*Canis lupus familiaris* (dog)	Spain	12	81,213	
DRR061259	PRJDB4852 (25)	MBR microbial community	Metagenome analysis from activated sludge and membrane biofilm		South Korea	1	46,252	
SRR10481409	PRJNA561929 (24)	Airborne dust fungal populations in Kuwait targeted loci	Airborne dust		Kuwait	16	155,807	
SRR10481408						6	9,150	
SRR12158838	PRJNA644000	Bacterial and fungal communities in root-knot nematode affected peanut field in Florida	Peanut field			21	44,060	

RESEARCH ARTICLE

Finding *Candida auris* in public metagenomic repositories

Jorge E. Mario-Vasquez[1], Ujwal R. Bagal[2], Elijah Lowe[3], Aleksandr Morgulis[4], John Phan[3], D. Joseph Sexton[1], Sergey Shiryev[4], Rytis Slatkevičius[5], Rory Welsh[1], Anastasia P. Litvintseva[1], Matthew Blumberg[5], Richa Agarwala[4], Nancy A. Chow[1]*

PLOS ONE

~300,000 shotgun metagenomic Sequence Read Archive NCBI

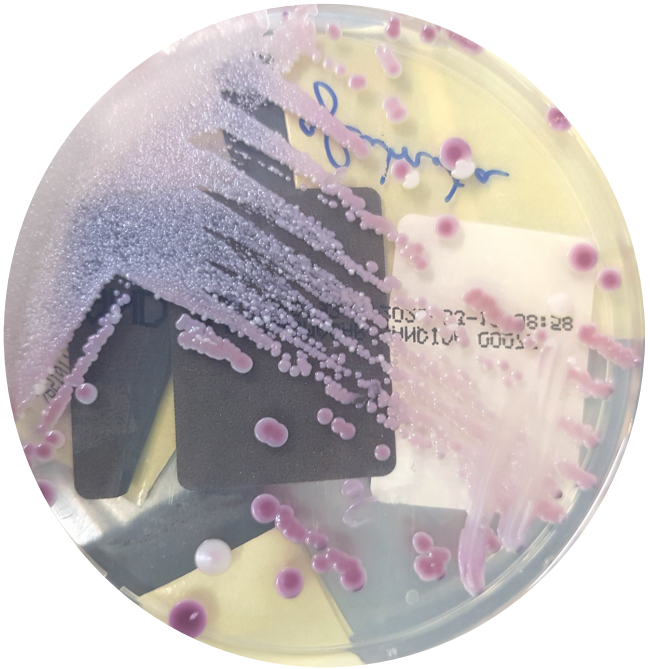
Table 4. Bioproject metadata for samples with WGS data at SRA with *C. auris* positive hits.

Run Record	Score	Release Year	Bioproject	SRA study	Title	Environment or isolation source
SRR8584355	100%	2019	PRJNA488992	SRP159446	Metagenomics of wastewater drains and river samples from Delhi, India	Wastewater drain
SRR8584356	100%					Urban river
SRR9016982	100%	2019	PRJNA657014	SRP277451	Sequencing data from point prevalence study associated with *C. auris* Raw sequence reads	Combined axilla and inguinal crease (groin) and anterior nares (Human skin metagenome)
SRR9016983	100%					
SRR9016984	100%					
SRR9016985	100%					
SRR10237756	>90%	2019	PRJNA475330	SRP161559	Metagenomic assembly of the iron-reducing, 1-methylnaphthalene-degrading enrichment culture (1MN)	Sulfur-oxidizing nitrate-reducing enrichment culture
SRR11734772	100%	2020	PRJNA631031	SRP260772	Study of microbial diversity of anterior nares swabs from patients colonized by the pathogen *Candida auris*	Human nasopharyngeal metagenome
SRR11734773	100%					
SRR11734774	100%					
SRR11734775	100%					
SRR11734776	100%					
SRR11734777	100%					
SRR11734778	100%					
SRR11734779	100%					
SRR11734780	100%					
SRR11734781	100%					
SRR11734783	100%					
SRR11734784	100%					
SRR11734785	100%					
SRR11734791	100%					
SRR11734782	>90%					
SRR10680803	>90%	2020	PRJNA557323	SRP237407	Human gut metagenomes from Hong Kong populations	Stool samples (Human gut metagenome)
SRR10680804						

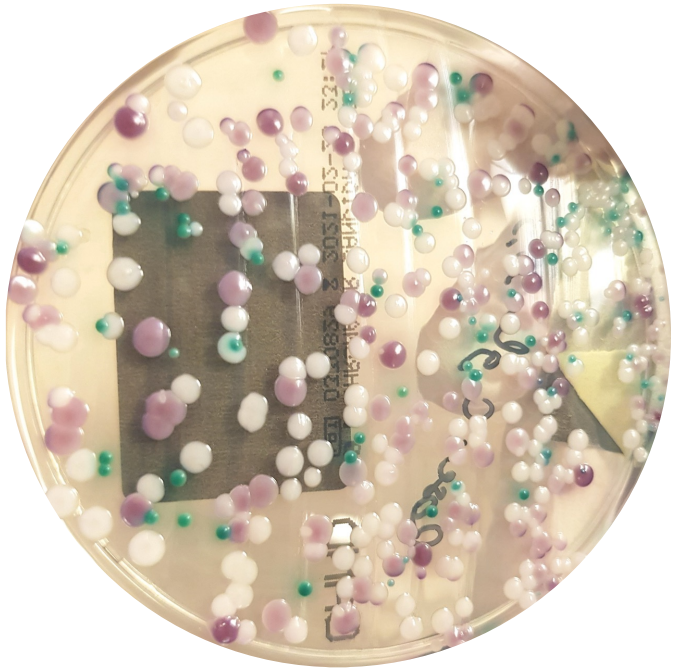
https://doi.org/10.1371/journal.pone.0291406.t004

https://www.gridrepublic.org/biosurveillance/

Aspect des cultures sur milieux chromogènes *Candida*



J+7 blood culture



J+5 skin swab culture

MALDI-TOF positif à J+7 (Bruker, Vitek-MS)

CHROMagar™ Candida Plus: A novel chromogenic agar that permits the rapid identification of *Candida auris*

Andrew M Borman*, Mark Fraser and Elizabeth M. Johnson

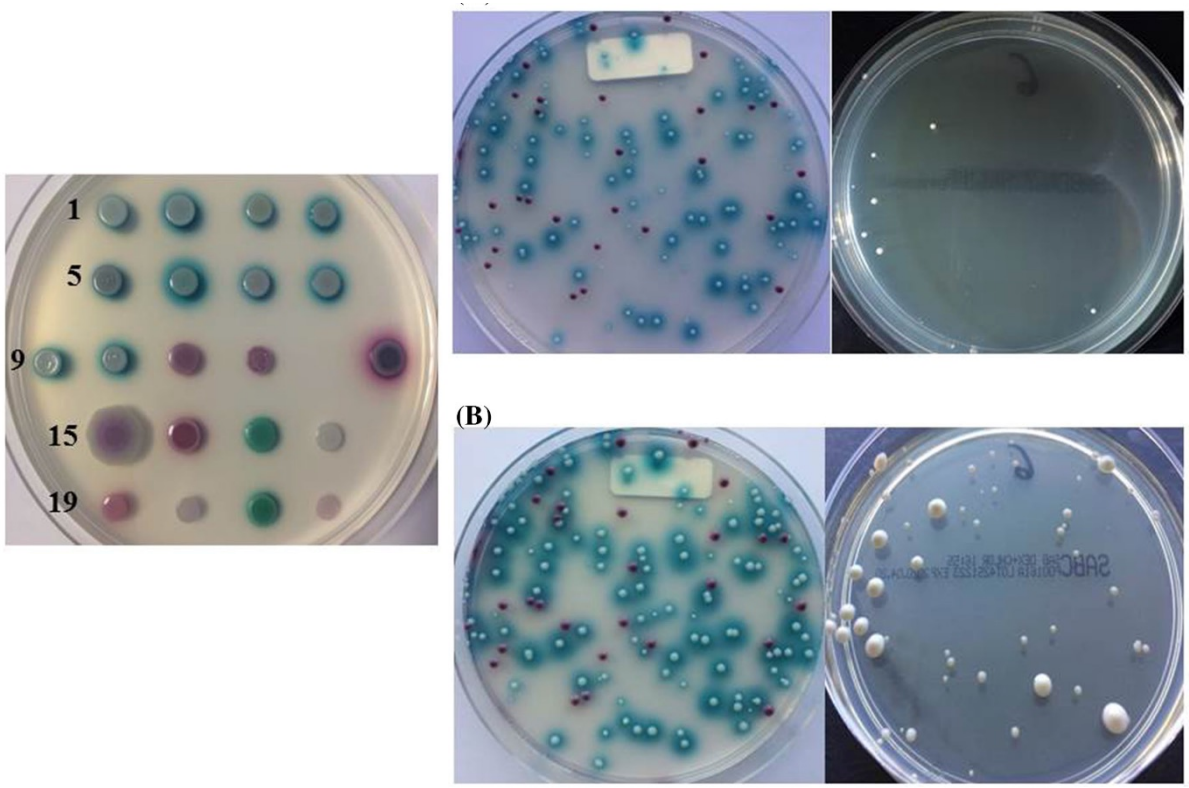
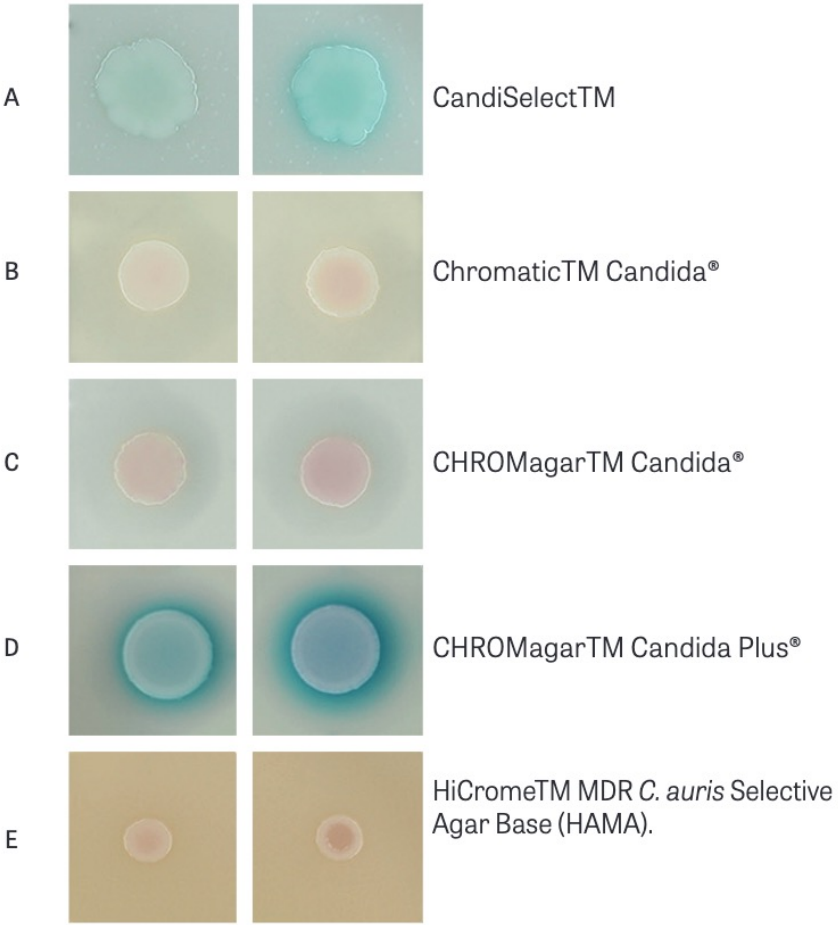


Figure 2 – Aspects des colonies de *Candida auris* sur différents milieux chromogènes.



Bigot J et al. Hygiènes 2024

Salt Sabouraud Enrishment Broth (2% glucose, 10% NaCl)

5 g pancreatic digest of casein (Remel, Lenexa, KS, USA), 5 g peptic digest of animal tissue (Neogen, Lansing, MI, USA), and **100 g sodium chloride (NaCl)** dissolved in a liter of deionized (DI) water with 20 g of either dextrose, dulcitol/galactitol, or mannitol (Difco, Franklin Lakes, NJ, USA) as the added carbon source

TABLE 2 Growth results for clinical samples positive for *C. auris* that were directly plated on CHROMagar Candida and processed through the enrichment broth procedure for isolation of *C. auris*

Specimen type	Positive by CHROMagar Candida (% positive)[a]	Positive by Salt SAB Dex broth (% positive)
Vaginal swab	1 (100)	1 (100)
Stool	1 (100)	1 (100)
Urine	2 (100)	2 (100)
Rectal swab	2 (100)	2 (100)
Environmental swab	2 (40)	5 (100)
Groin swab	6 (86)	7 (100)
Nasal swab	5 (63)	8 (100)
Axilla swab	7 (87)	8 (100)
Axilla/groin composite swab	30 (68)	43 (100)
Total specimens tested	56 (73)	77 (100)

[a]Percentage of specimens that were found positive by both methods.

40°C 250 rpm agitation

Welsh et al. 2019 JCM

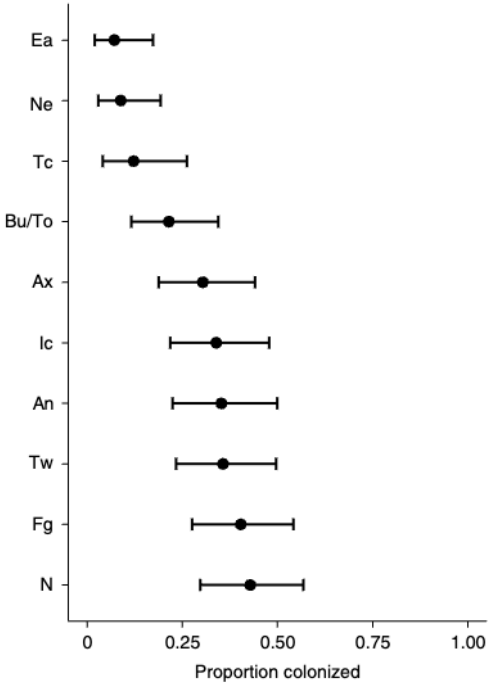
L’idéal de la culture à *C. auris*

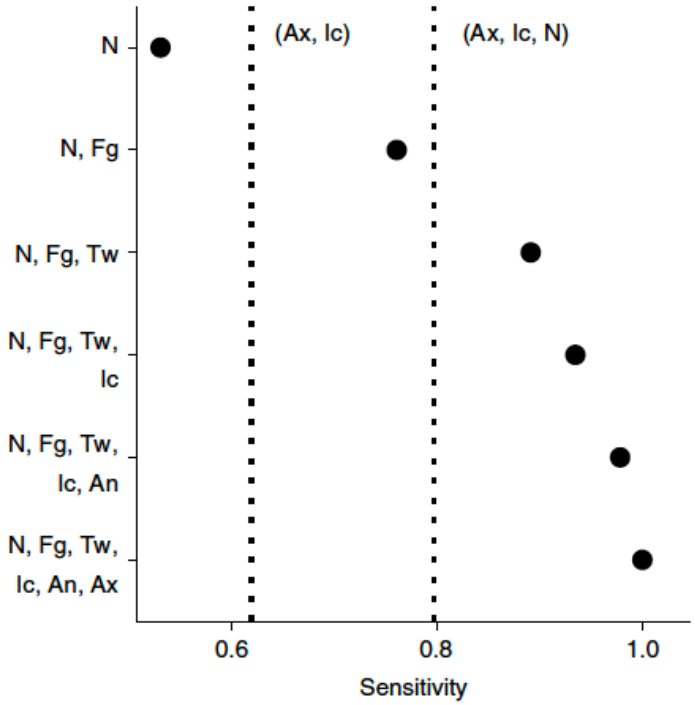
- 40°C (température sélective)
- 10% Salt Sabouraud/YNB Dulcitol broth (selectif)
- 10 jours d’incubation

Inefficient pour le dépistage

Welsh et al. JCM 2017 ; Proctor et al. Nature Med 2021

Quels prélèvements pour le dépistage?





An, perianal skin; Ax, axilla; Bu, buccal mucosa; Ea, external auditory canal; Fg, palm and/or fingertips; Ic, inguinal crease; N, anterior nares; Ne, neck; Tc, tracheostomy; To, tongue; Tw, toe web

Proctor et al. Nature Med 2021

nature medicine
ARTICLES
https://doi.org/10.1038/s41591-021-01383-w
Check for updates

Integrated genomic, epidemiologic investigation of *Candida auris* skin colonization in a skilled nursing facility

Diana M. Proctor[1], Thelma Dangana[2], D. Joseph Sexton[3], Christine Fukuda[2], Rachel D. Yelin[2], Mary Stanley[2], Pamela B. Bell[2], Sangeetha Baskaran[2], Clay Deming[1], Qiong Chen[1], Sean Conlan[1], Morgan Park[4], NISC Comparative Sequencing Program*, Rory M. Welsh[3], Snigdha Vallabhaneni[3,5], Tom Chiller[3], Kaitlin Forsberg[3], Stephanie R. Black[6], Massimo Pacilli[6], Heidi H. Kong[7], Michael Y. Lin[2], Michael E. Schoeny[8], Anastasia P. Litvintseva[3], Julia A. Segre[1,9] and Mary K. Hayden[2,9]

Nursing home
C. auris endemic
Clade IV
Chlorhexidine baths

qPCR disponibles

Rapid and Accurate Molecular Identification of the Emerging Multidrug-Resistant Pathogen *Candida auris*

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Development and Validation of a Real-Time PCR Assay for Rapid Detection of *Candida auris* from Surveillance Samples

L. Leach,[a] Y. Zhu,[a] S. Chaturvedi[a,b]

A TaqMan Probe-Based Real-Time PCR Assay for the Rapid Identification of the Emerging Multidrug-Resistant Pathogen *Candida auris* on the BD Max System

Amorce Lima,[a] Raymond Widen,[a] Grant Vestal,[a] Dominic Uy,[a] Suzane Silbert[a]

Article

Comparison of Two Commercially Available qPCR Kits for the Detection of *Candida auris*

Janko Sattler [1,2,†], Janina Noster [3,†], Anne Brunke [1,2], Georg Plum [1], Pia Wiegel [1], Oliver Kurzai [4,5], Jacques F. Meis [6,7] and Axel Hamprecht [1,2,3,*]

Tableau I – Kits commerciaux de PCR pour l'identification de *C. auris*, leur technique et performances.

Kit	Technique	Prélèvement	Performances	Référence
AurisID® (Olm Diagnostics, Newcastle Upon Tyne, Royaume-Uni)	Avec sondes et amorces (28S *ribosomal gene region*) Résultats en 45 minutes	À partir d'une colonie suspecte en culture et tous types de prélèvements	Limite de détection : 1 copie par réaction Faux positifs possibles	[21]
Fungiplex® RUO (Bruker, Billerica, MA, États-Unis)	Avec sondes et amorces (*mating locus alpha**) Résultats en 2 heures		Limite de détection : 9 copies par réaction Pas de faux positif	[21]
CanAur Monodose dtec–qPCR Test (Genetic PCR Solution, Orihuela, Espagne)	Résultats en 45 minutes		100% de Se et Sp Limite de détection : 1 copie par réaction	[22]
Candida auris kit BD Max™ System (BioGX, Birmingham, AL, États-Unis)	Avec sondes et amorces (ITS 1/2)		100% de Se et Sp	[23]

ITS : *internal transcribed spacer* ; RUO : *research use only* ; Se : sensibilité ; Sp : spécificité.

Note Centre National de Référence des Mycoses invasives & Antifongiques (CNRMA)/de la Société Française de Mycologie Médicale (SFMM)/Société Francaise d'Hygiène Hospitalière (SF2H)

En cas de colonisation ou d'infection à *Candida auris* dans un centre

- Déclaration par le mycologue de l'hôpital au CNRMA
- Envoi de la souche au CNRMA
- Déclaration simultanée par l'hygiéniste de l'hôpital par e-SIN à SPF

Indications de dépistage de *Candida auris* par culture d'écouvillons inguinal, axillaire et nasal sont préconisés pour tout patient:

- Hospitalisé dans les 12 mois précédents, notamment pour les patients rapatriés d'une réanimation d'un pays étranger.
- Dépistage à réitérer si réadmission dans les 12 mois suivant le retour.
- Antérieurement colonisé ou infecté par *C. auris*

Objet : Note du Centre National de Référence des Mycoses invasives & Antifongiques (CNRMA)/LA INuSuAl (Identification Numérique Surveillance Alerte)/ et de la Société Française de Mycologie Médicale (SFMM)/Société Francaise d'Hygiène Hospitalière (SF2H) sur l'épidémiologie et la surveillance des infections à *Candida auris* en France: Mise à jour du 17/04/2023

Utilisation de la qPCR

Si découverte fortuite ou contexte épidémique, pour dépister les cas contact, en plus de la culture, une approche de criblage par qPCR spécifique permet une identification rapide, qui devra être confirmée par culture.

- Doit motiver une recherche du C. auris en culture par échantillonnage extensif
- Détection d'ADN ≠ détection de levures vivantes (persistence longue d'ADN sur les surfaces en plus d'une persistence longue de la levure sur les surfaces) *Détection d'ADN possible sans culture positive*
- Sensibilité clinique non connue (mais patient culture positive = PCR positive sur presque tous les sites)
- Screening culture et PCR peuvent être négatifs chez un patient exposé développant secondairement une colonisation (J41-61)

Alanio et al. Microbiology Spectrum 2022

Utilisation de la qPCR

Interprétation d'une qPCR spécifique *C. auris* positive. Une PCR positive doit être confirmée par une culture. Un patient dont le prélèvement est positif en qPCR et négatif en culture doit être à nouveau prélevé sur d'autres sites pour culture et/ou PCR (urines, écouvillon rectal, bouche, paumes et plantes), afin de maximiser la possibilité d'une culture positive. Un volume suffisant doit être ensemencé (100 µL) après centrifugation du liquide d'écouvillon et la culture doit être conservée au minimum 10 jours à 35-40 °C (si possible 37°-40°) avant d'être considérée négative.

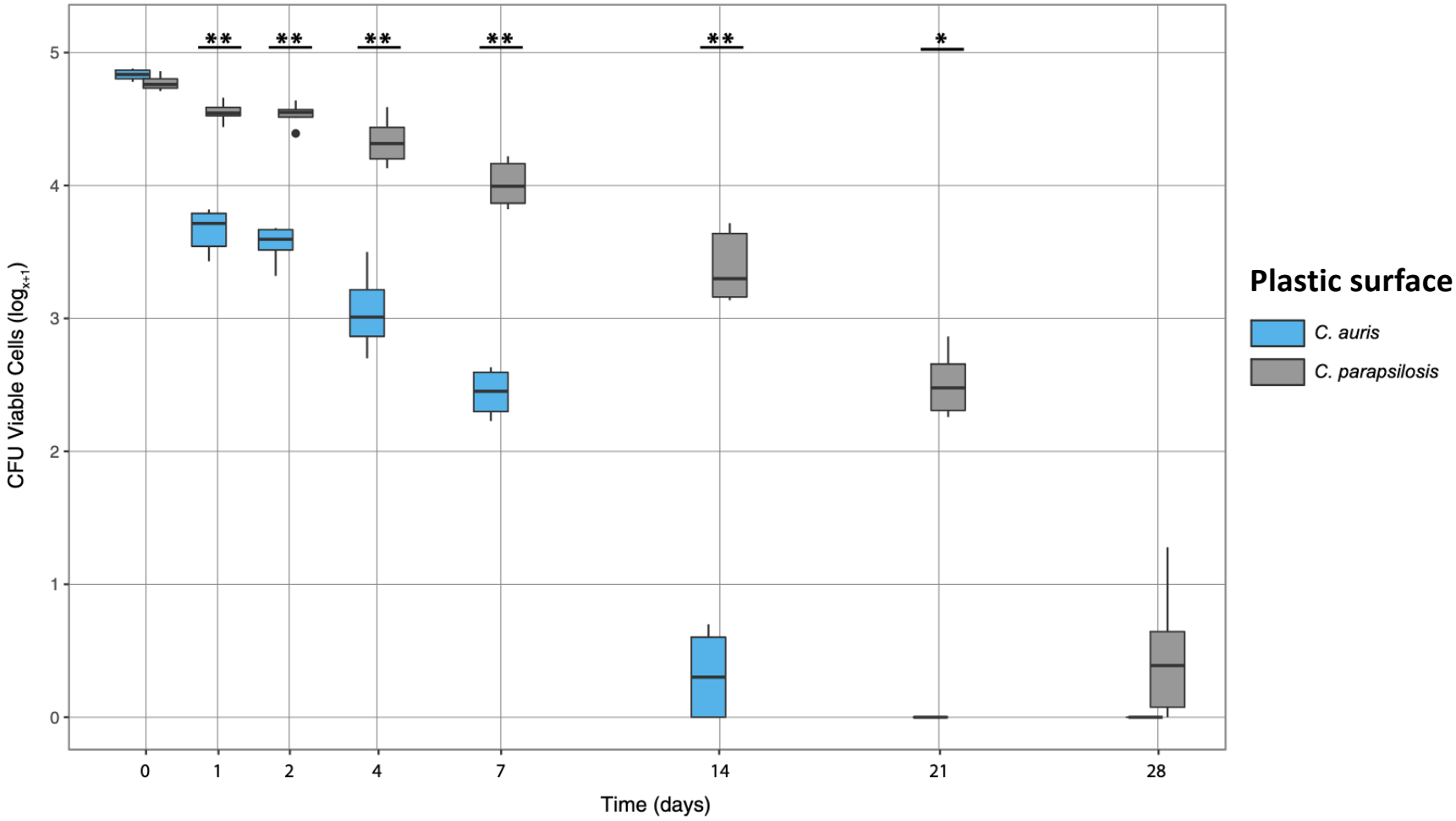
Si culture + : cas certain

Si PCR+/culture - : cas possible → **renouveler et élargir les sites de prélèvements**

. **si 1 seule PCR+ suivie d'au moins 4 PCR et cultures négatives** à une semaine d'intervalle : pas de portage

. **si au moins 2 PCR+ :** cas possible. Les mesures de contrôle de la diffusion sont alors à définir avec l'EOH et le service de mycologie/microbiologie.

Persistance dans l'environnement

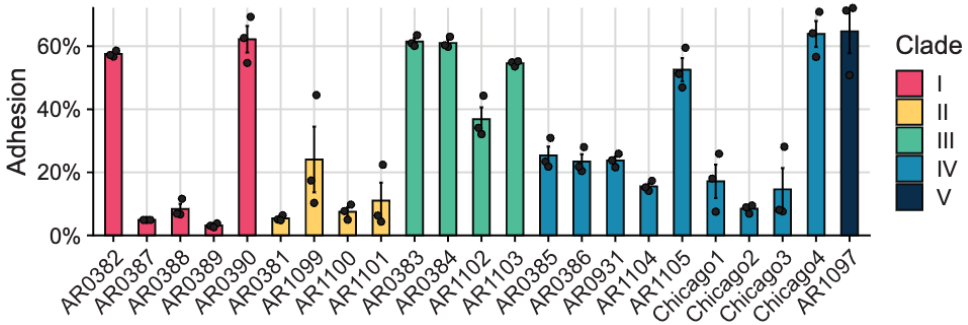


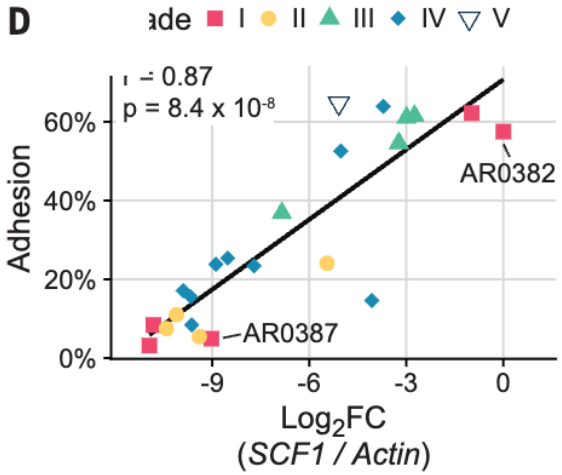
Welsh et al. 2019 JCM

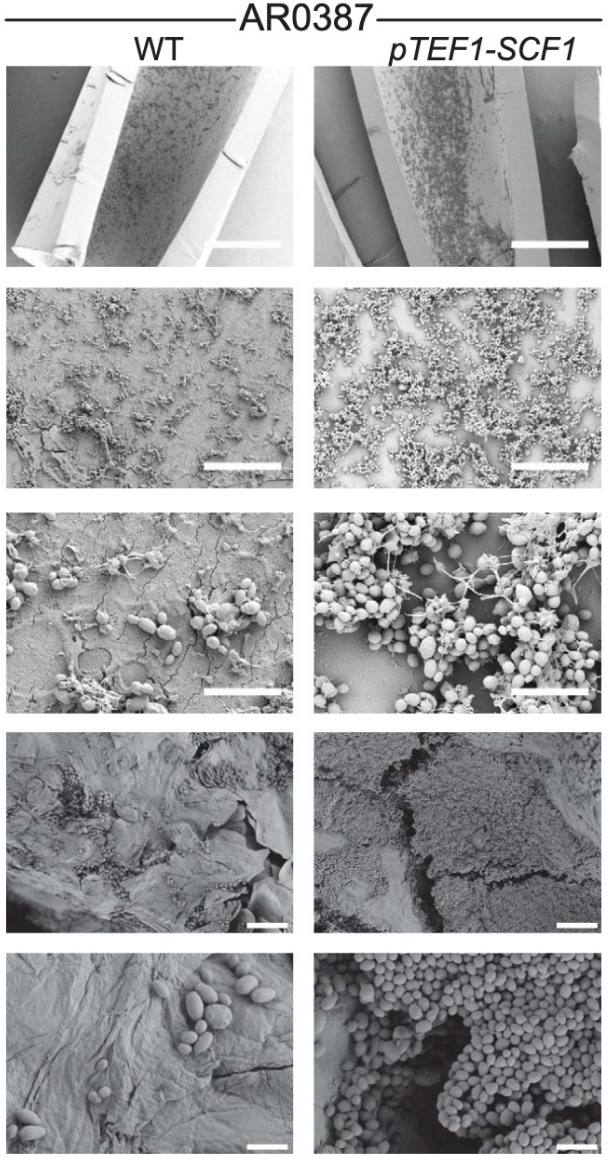
MYCOSES

A *Candida auris*–specific adhesin, Scf1, governs surface association, colonization, and virulence

Darian J. Santana[1,2], Juliet A. E. Anku[1,3,4], Guolei Zhao[1], Robert Zarnowski[5,6], Chad J. Johnson[5,6], Haley Hautau[7], Noelle D. Visser[1]†, Ashraf S. Ibrahim[7,8], David Andes[5,6], Jeniel E. Nett[5,6], Shakti Singh[7,8], Teresa R. O'Meara[1]*







Santana *et al.*, *Science* **381**, 1461–1467 (2023)

Sensibilité aux antifongiques

- Tentative Breakpoint technique CLSI (valable pour Etest) (https://www.cdc.gov/candida-auris/hcp/laboratories/antifungal-susceptibility-testing.html):
  - Fluconazole ≥32mg/L
  - Amphotéricin B ≥2mg/L
  - Caspofungin ≥2mg/L
  - Micafungin ≥4mg/L

Version 5.0, valid from 2024-12-02

Species	Drug	ECOFF (mg/L)	Clinical Breakpoints (mg/L)			
		WT ≤	S ≤	I	R >	ATU
C. albicans	Amphotericin B	1	1		1	
	Anidulafungin	0.016	0.016		0.016	
	Micafungin	0.03	0.03		0.03	
	Rezafungin	0.008	0.008		0.008	
	Fluconazole	0.5	2	4	4	
	Isavuconazole	ND	ND		ND	
	Itraconazole	0.03	0.06		0.06	
	Posaconazole	0.06	0.06		0.06	
	Voriconazole	0.03	0.06	0.125-0.25	0.25	
C. auris	Amphotericin B	2				
	Anidulafungin	0.25				
	Micafungin	0.25				
	Rezafungin	0.125				
	Fluconazole					
	Isavuconazole					
	Itraconazole					
	Posaconazole					
	Voriconazole					
	5-flucytosine	0.5				

https://www.eucast.org/fileadmin/src/media/PDFs/EUCAST_files/AFST/Clinical_breakpoints/BP_ECOFF_v5.0.pdf

Diapositive Marie Desnos-Ollivier

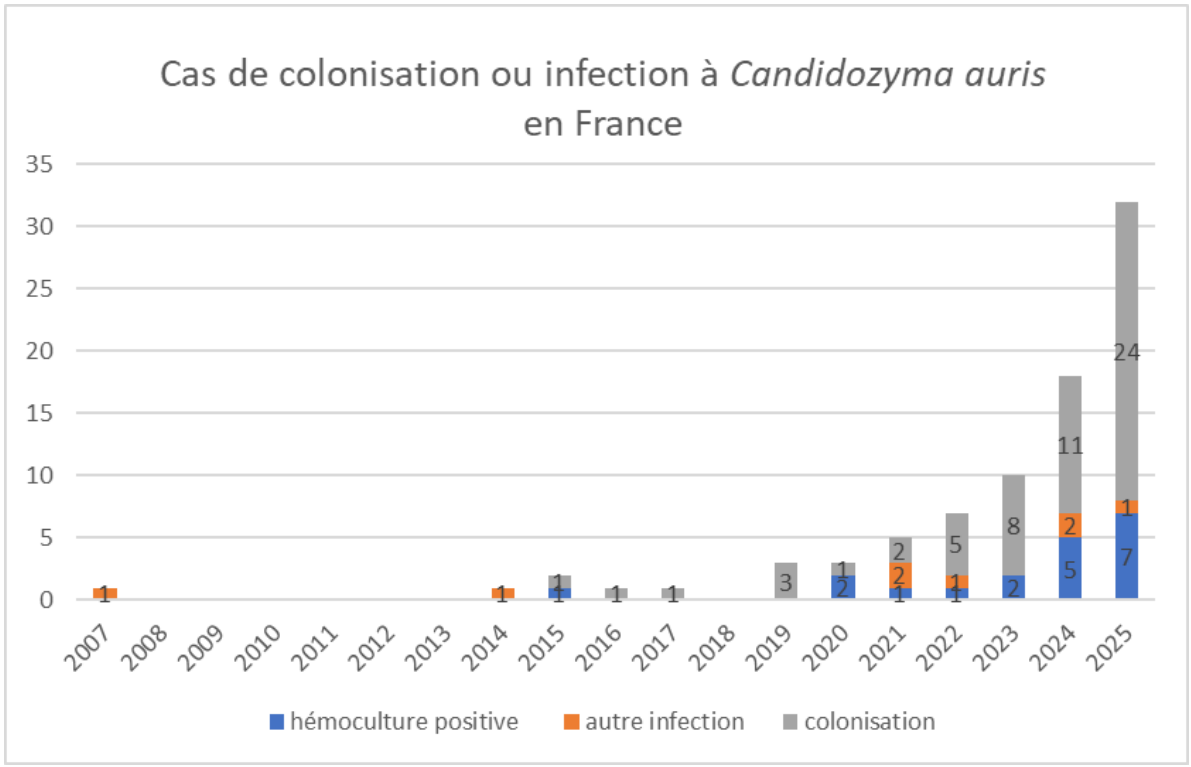
Sensibilité *in vitro* des souches de *C. auris* reçues au CNRMA (EUCAST)

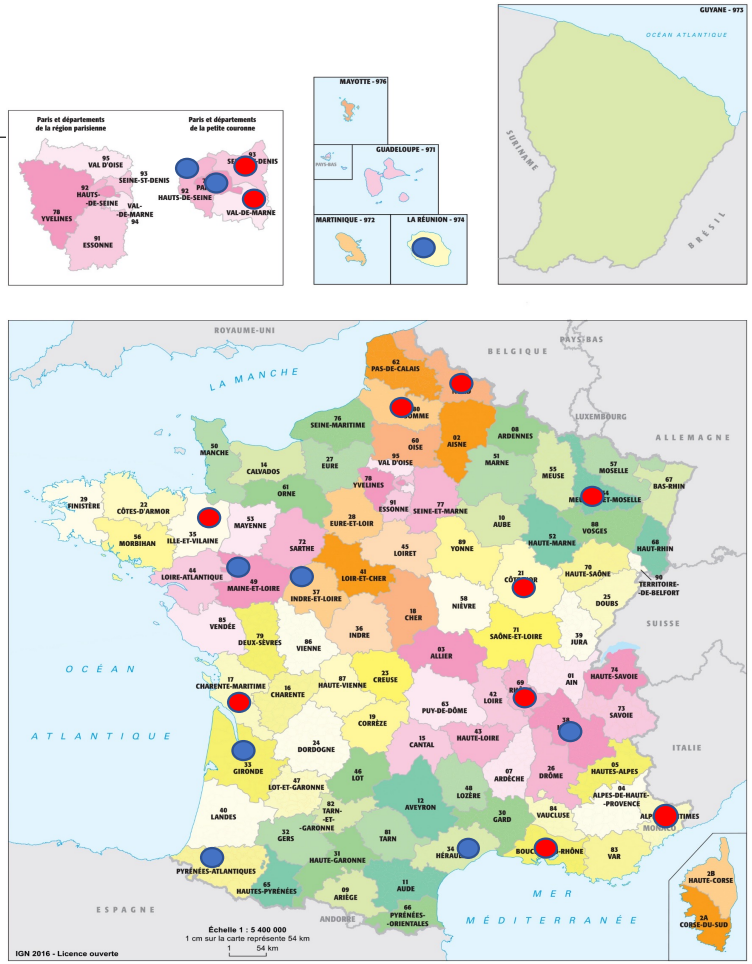
- 3 isolats environnementaux Clade I
- 50 isolats cliniques de 34 patients Clade I et Clade III
- Tous résistants au fluconazole (CMI ≥64 mg/L)
- **Aucun isolat CMI élevée aux échinocandines ni à l'amphotéricinB**

Valeurs des CMI_{50} / CMI_{90} (mg/L) pour les antifongiques de 53 isolats de *Candida auris*								
	AMB	5-FC	Fluco	Vori	Posa	Isavu	Caspo	Mica
Clade I (n=43)	1/1	≤0.12/≥64	64/≥64	1/2	0,03/0,125	0,06/0,25	0.03/0.03	0,25/0,5
Clade III (n=10)	0,5/-	0,124/0,25	≥64/≥64	1/2	0,06/-	0,06/0,125	0,015/0,03	0,25/-

Diapositive Marie Desnos-Ollivier

Candidozyma auris en France





19 candidémies , 8 infections autres, 57 colonisations depuis 2007
> 23 hôpitaux

https://www.pasteur.fr/fr/sante-publique/centres-nationaux-reference/cnr/mycoses-invasives-antifongiques/actualites-epidemiologiques

Diapositive Marie Desnos-Ollivier

Pays d'importation des cas déclarés en France depuis 2007

Cas importés 35/57 (« nouveaux pays depuis 2023 » : Ukraine (Clade III), Grèce)

Diapositive Marie Desnos-Ollivier

Comparative Outcomes *of Candida auris* Bloodstream Infections: A Multicenter Retrospective Case-Control Study

Samuel P. Simon,[1] Rosanna Li,[1] Michael Silver,[1] Justin Andrade,[2] Biju Tharian,[3] Lung Fu,[1] Diana Villanueva,[3] Daniel Gonzalez Abascal,[3] Ariel Mayer,[1] James Truong,[2] Nilka Figueroa,[3] Monica Ghitan,[1] Edward Chapnick,[1] and Yu Shia Lin[1]

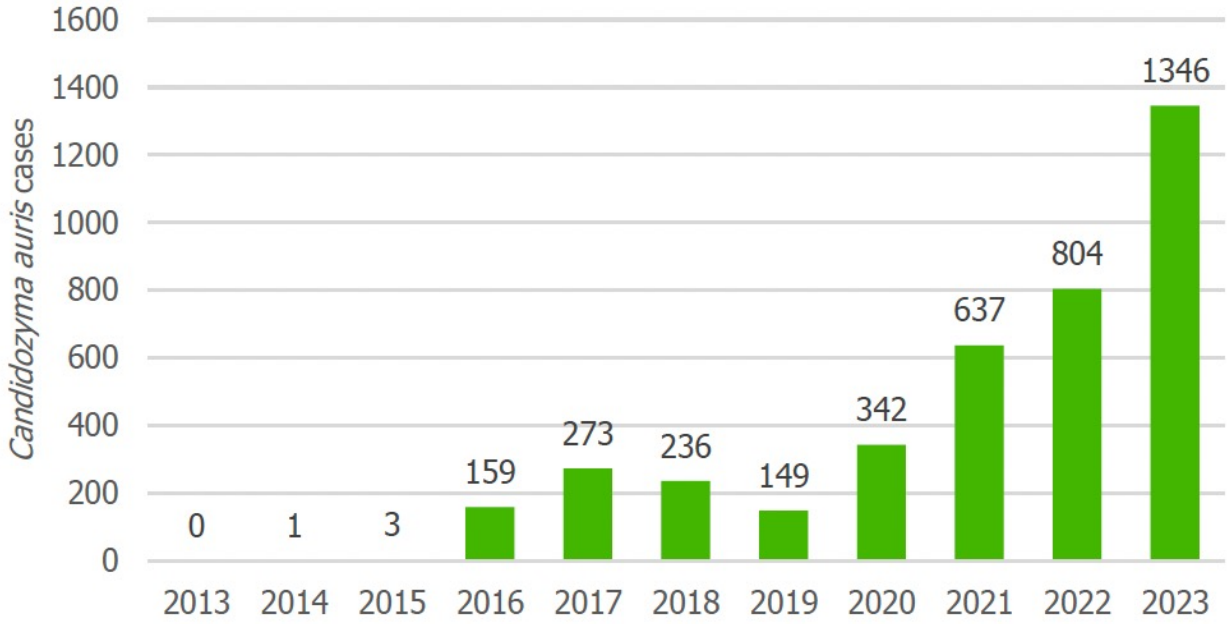
Outcome	Patients, No. (%)				
	Candida auris (n = 83)	Other *Candida* spp. (n = 113)	*P* Value	aOR (95% CI)	*P* Value
30-d mortality rate	25 (30.1)	44 (38.9)	.20	1.014 (.563–1.828)	.96
In-hospital mortality rate	37 (44.6)	48 (42.4)	.76	1.40 (.787–2.489)	.25
90-d mortality rate	37 (44.6)	53 (46.9)	.75	0.863 (.478–1.558)	.62
14-d clinical failure	21 (25.3)	36 (31.9)	.32	1.28 (.698–2.364)	.42
60-d microbiologic recurrence	8/67(11.9)	3/75 (4.0)	.08	4.461 (1.033–19.263)	.04
Sequelae of candidemia					
Endophthalmitis	0 (0)	2 (1.8)	.51	…	…
Persistently positive blood cultures	9 (10.8)	22 (19.5)	.10	…	…
Endocarditis (confirmed)	2 (2.4)	3 (2.7)	>.99	…	…
Endocarditis (probable)	4 (4.8)	2 (1.8)	.24	…	…

Abbreviations: aOR, adjusted odds ratio; CI, confidence interval.

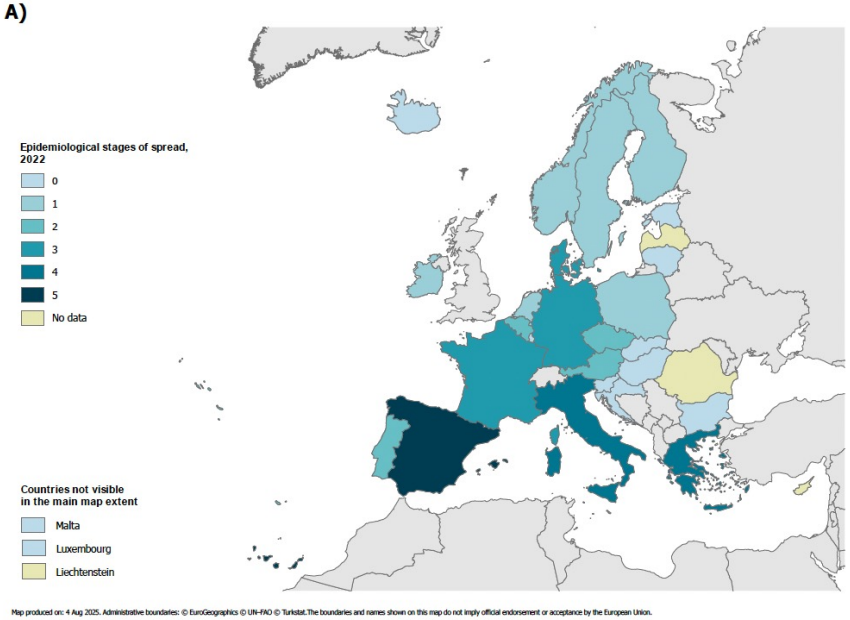
SURVEILLANCE AND MONITORING

Survey on the epidemiological situation, laboratory capacity and preparedness for *Candidozyma (Candida) auris*, 2024

11 September 2025



A)



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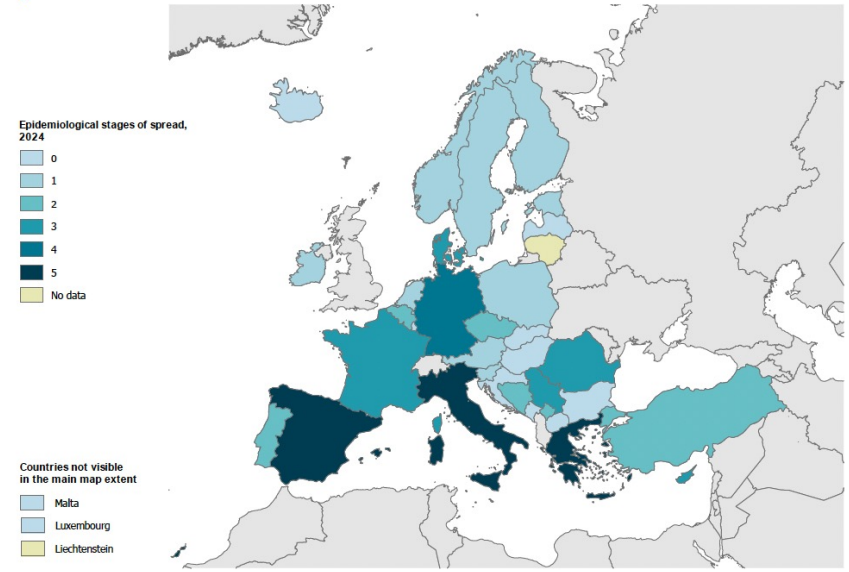
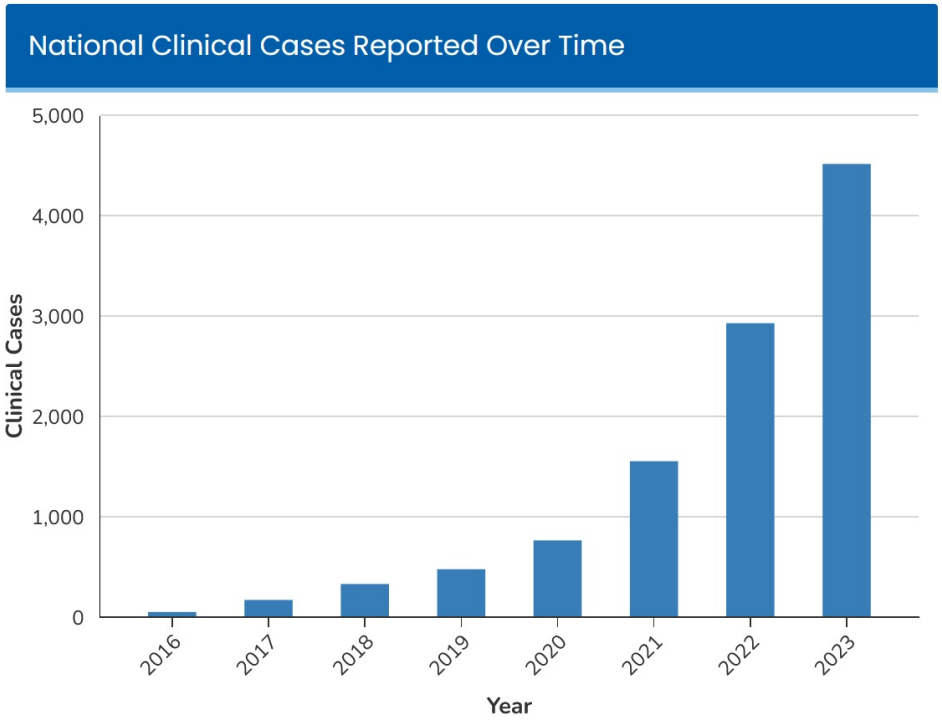
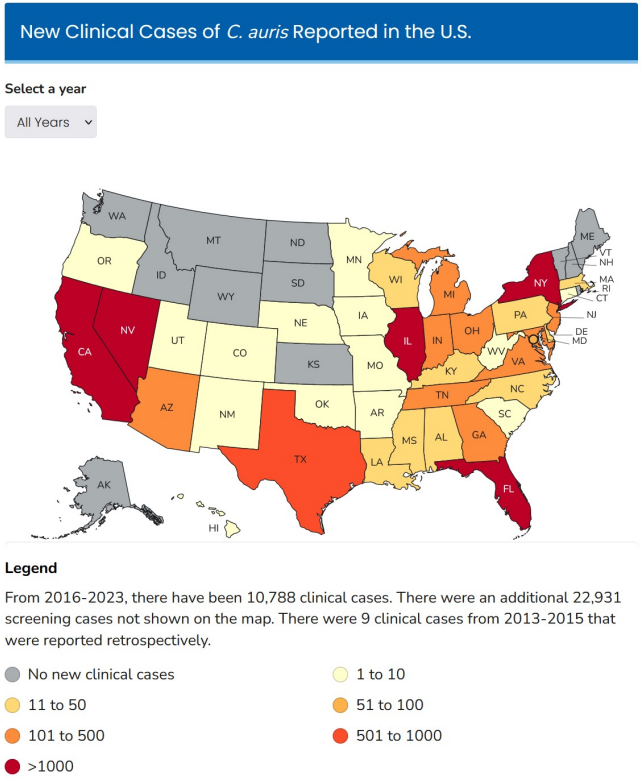
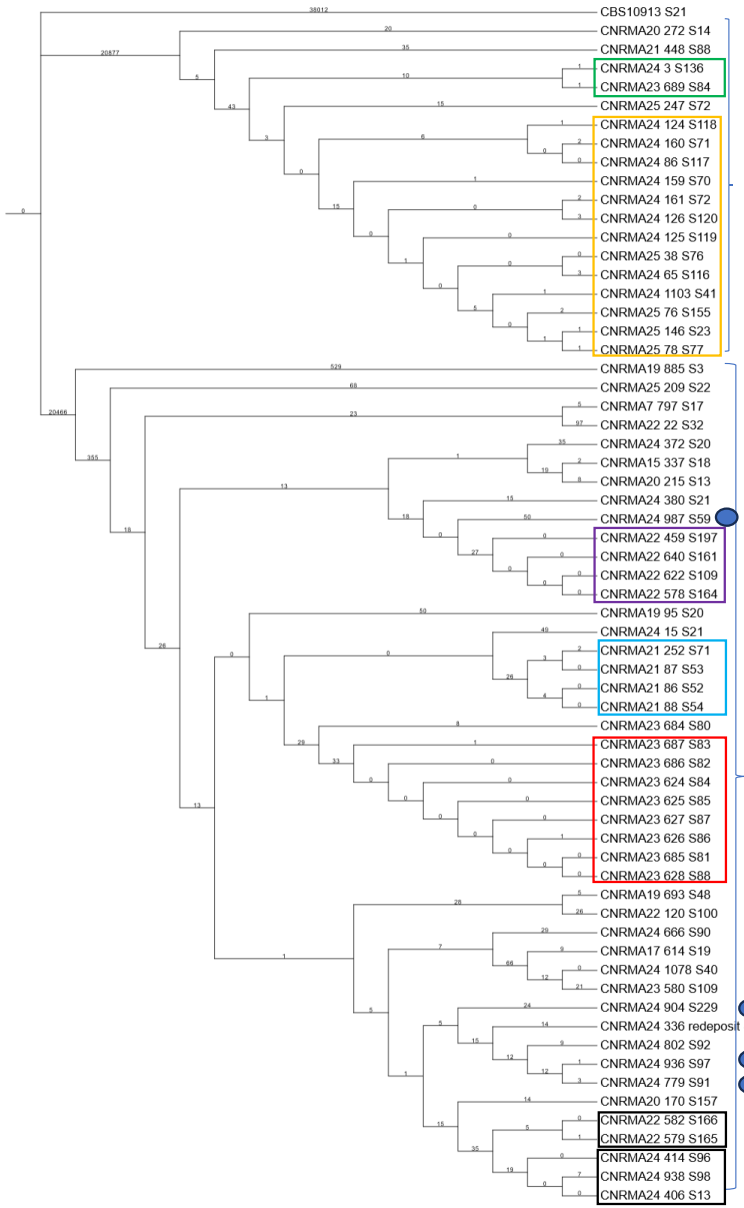


Cas recensés aux Etats-Unis, données CDC





https://www.cdc.gov/candida-auris/tracking-c-auris/index.html#cdc_data_surveillance_section_2-reported-clinical-case-counts (12/03/2025)



Clade II (Japon, Corée)

Hôpital 1, 2 patients

Clade III (Sud Africain)

Hôpital 2, 8 patients

- Plusieurs isolats pour un même patient
- 3 souches de l'environnement
- 64 souches séquencées (Illumina)

02/11/2024, FEL S, liquide péricardique, Roumanie

Clade I (Indien)

Hôpital 3, 3 patients

Hôpital 4, 2 patients

Hôpital 5, 2 patients + environnement

01/10/2024 DEG O, expectoration, Madagascar

10/09/2024, CAN A, cicatrice post-chir, Crète

08/08/2024, TAL O, hemoculture, Egypte

Diapositive Marie Desnos-Ollivier

Conclusion

Levure émergente dont la prévalence reste limitée en France

Pose peu de problème si gestion efficace au départ incluant des outils performants

Peu de problème de surmortalité

Pas encore de problème de multirésistance

Remerciements

Equipe CNRMA-IFI

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- **Dea Garcia-Hermoso**: Adjoint
- **Marie Desnos-Ollivier**: Adjoint
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- **Nathalia Arrifana** Technicienne
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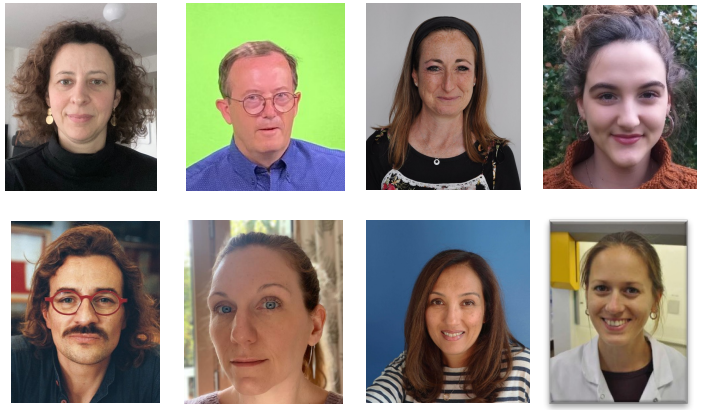
- **Eric Dannaoui** : Collaborateur
- **Laurence Millon** : Collaborateur
- **Florent Morio**: Collaborateur



Hôpital Saint-Louis APHP

Médecins du CTB -> recommandation APHP

CLIN central APHP

Sandra Fournier -> recommandation APHP

SFMM

SF2H