



Duke Microbiome Center

Spring 2020 DMC Newsletter

This quarterly newsletter is provided by the Duke Microbiome Center to inform the Duke University community about activities, resources, news, funding and educational opportunities, and recent highlights in the microbiome sciences at Duke and beyond. If you have items you would like for us to include in a future newsletter, or if you would like to add someone to our newsletter listserv to receive future issues, please email [Pat Massard](mailto:pat.massard@duke.edu). For further information on the DMC, please visit our [website](http://www.duke.edu/microbiome).

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A Message from the Director:

Microbiome Science in the COVID-19 Pandemic

Dear DMC Community,

The COVID-19 pandemic has presented myriad challenges to our institution, our community, and our lives. As we all work together to navigate these personal and professional challenges, I am happy to share with you today several positive ways members of the Duke Microbiome Center (DMC) have been responding.

- **COVID-19 Biorepositories:** Duke has established multiple biorepositories to gather samples from COVID-19 patients and their contacts. DMC faculty Drs. Paul Wischmeyer and Matthew Kelly were among those who coordinated those efforts. Dr. Kelly and colleagues helped establish Duke's Biospecimens from Respiratory Virus-Exposed Kids (BRAVE Kids) biorepository, and Dr. Wischmeyer worked with Dr. Bryan Kraft and others to establish the Duke COVID-19 ICU Biospecimen Repository. With consultation and support from the DMC, both of these biorepositories have been designed to include samples that will be amenable to future microbiome studies.
- **COVID-19 Microbiome Research:** The COVID-19 pandemic quickly raised a wide range of clinical, translational, and basic research questions. The DMC responded by organizing a new urgent request for applications for [DMC COVID-19 Development Grants](#) to support innovative research projects that address the microbiome and COVID-19. The DMC

subsequently awarded two projects - one led by Drs. Anthony Sung and Paul Wischmeyer that explores the possibility of using probiotics to reduce SARS-CoV-2 transmission in exposed household contacts, and one led by Dr. Matthew Kelly to define the impact of the gut and respiratory microbiota on susceptibility to SARS-CoV-2 in children.

- **Core Facilities and Human Samples:** The COVID-19 pandemic creates new biohazard concerns for newly collected human samples which are particularly relevant to core facilities that handle human samples. Duke's [Microbiome Shared Resource](#) led by Dr. Holly Dressman has been working proactively to modify their protocols and facility to safely accommodate microbial extractions from human samples once they reopen later this summer, and thereby be able to continue to provide their important services to the Duke community.

These are of course just a few ways that our community has been responding positively to the current and future challenges presented by COVID-19. As our institution begins the [process of reopening research operations](#), please be sure to monitor and adhere to all institutional policies and let us in the DMC leadership team know how we can help. In closing, I'll remind you that all DMC monthly seminars and faculty meetings will be held remotely until further notice, and that important deadlines for the regular [DMC Development Grant RFA](#) (5/18) and for [IBIEM Training Grant](#) (5/15) are fast approaching. Details on these and other important DMC news items can be found below. As always, please let us know if you have other news or highlights you'd like to share with the DMC community in future newsletters.

Best wishes to you and yours,

John Rawls

Director, Duke Microbiome Center

Funding Opportunities through the DMC

The DMC has two active funding opportunities:

DMC Development Grants: The Duke Microbiome Center (DMC) supports microbiome science at Duke University through pilot project funding. The DMC is pleased to announce a new request for proposals for DMC Development Grants. The objective of the DMC Development Grant program is to support interdisciplinary and collaborative research projects in the microbiome sciences at Duke University. **The deadline is May 18, 2020.** For more information, see [the program announcement](#).

DMC Rolling Voucher Program: Duke University has established shared resources that avail state-of-the-art technologies to interrogate microbiome structure and function to Duke investigators. The Duke Microbiome Center offers a rolling voucher program to provide its investigators access to these shared resources, particularly for microbiome projects that are not yet externally funded. Eligibility is limited to Duke Microbiome Center faculty and their trainees, and the maximum budget is \$5,000. There is no deadline for these proposals. For more information, see [the program announcement](#).

Fellowship Opportunities for Graduate Students

The 2020 application cycle is now open for the Integrative Bioinformatics for Investigating and Engineering Microbiomes (IBIEM) [training program](#). IBIEM is an NSF-funded interdisciplinary graduate training program between Duke

University and North Carolina A&T State University which brings together graduate researchers from various fields with an interest in microbiome research. This program is intended to supplement the training students receive from their home graduate programs and will include quantitative skills workshops, an annual IBIEM symposium, professional development workshops and team-building activities. Click [here](#) for more information and [here](#) for the IBIEM information flyer, and apply before the **deadline of May 15th**.

New Bass Connections Project Opportunity for Undergraduate Students

There is a new Bass Connections Project in 2020-2021 that focuses on microbiomes and complex systems analysis. Led by DMC's Dr. Zackary Johnson, the "Oceans of Microbiomes" project will have opportunities for folks from across the DMC to participate. More information on the project is available [here](#).

If you know of undergraduates that may be interested in being involved in the field/lab component of the project, which starts fall 2020 at the Duke Marine Lab in Beaufort, please share this information with them so that they may formally submit an application [here](#).

Upcoming DMC Meetings

** Note: all DMC seminars and faculty meetings will be held remotely until*

*further notice. Videoconference links will be provided by email. **

DMC Microbiome Noon Seminar: This monthly research-in-progress series is held on third Wednesdays at 12PM and is open to the entire DMC community. The schedule of speakers and location can be viewed [here](#). OurIf you would like to present your work in a future DMC Microbiome Noon Seminar, please contact [Pat Massard](#).

DMC Faculty Meetings: In response to faculty discussions, we will move next year's quarterly DMC faculty meetings to Mondays from 12:45-2:00PM. The next DMC faculty meeting will be Monday July 20 at 12:45PM via Zoom. Subsequent DMC faculty meetings will be on Mondays October 26, January 25, and April 26.

Please mark your calendars!

Old DMC Server "gemscompute01" Decommissioned

Since 2013, DMC maintained a server named "gemscompute01" which was managed by the GCB IT group, hosted by DHTS, and provided the DMC community with a large collection of installed bioinformatics software. This machine was decommissioned in April since most of those tasks can now be carried out on other research computing infrastructures run by GCB, DHTS, and OIT. Those of you who had used gemscompute01 in recent months should have already received correspondence about transferring files, but if you have remaining questions, please contact <gcb-help@duke.edu>. For a list of

computational resources at Duke, see this [list](#) developed by the DMC's Josh Granek.

Upcoming Conferences

For a full list of upcoming microbiome conferences, click [here](#).

Microbiome Funding Opportunities

Duke Microbiome Center Development Grants [Duke Internal Funding -- For Duke Faculty and Staff only] \$100,000 (see [here](#)) 5/18/2020

Genomics of HIV/AIDS Drug Response and Co-Morbidities (R01) Award Amount: See solicitation for details (see [here](#)) 5/7/2020

Research Towards Developing a Cure for HBV in HIV/HBV Co-Infection (R21 Clinical Trial Not Allowed) Award Amount: See solicitation for details (see [here](#)) 5/7/2020

Combating Antibiotic-Resistant Bacteria (CAR B) Interdisciplinary Research Units (U19 Clinical Trial Not Allowed) \$7,500,000 (see [here](#)) 5/8/2020

NARMS Cooperative Agreement Program to Strengthen Antibiotic

Resistance Surveillance in Retail Food Specimens (U01) Clinical Trials Not Allowed Award Amount: See solicitation for details (see [here](#)) 5/11/2020

Centers of Excellence in Genomic Science (RM1 Clinical Trial Optional) Award Amount: See solicitation for details (see [here](#)) 5/18/2020

Initiative to Maximize Research Education in Genomics: Courses (R25 Clinical Trial Not Allowed) \$750,000 (see [here](#)) 5/25/2020

AHRQ -- Large Research Projects for Combating Antibiotic-Resistant Bacteria (CARB) (R01, R18) \$2,500,000 (see [here](#)) 6/5/2020

Generating New Insights and Mechanistic Understanding of Antibiotic Resistance Development (R01, R21 Clinical Trial Not Allowed) Award Amount: See solicitation for details (see [here](#)) 6/5/2020

The Mechanistic Role of the Microbiome in the Pathobiology of Heart, Lung, Blood, and Sleep Diseases (R01 - Clinical Trial Not Allowed) Award Amount: See solicitation for details (see [here](#)) 6/5/2020

Microbial-based Cancer Therapy - Bugs as Drugs (R01, R21 Clinical Trial Not Allowed) Award Amount: See solicitation for details (see [here](#)) 6/5/2020

Advancing Translational and Clinical Probiotic/Prebiotic and Human Microbiome Research (R01 Clinical Trial Optional) Award Amount: See solicitation for details (see [here](#)) 6/5/2020

Secondary Analysis of Existing Alcohol Epidemiology Data (R01, R03) Award Amount: See solicitation for details (see [here](#)) 6/5/2020

Omics-guided Biobehavioral Interventions for Improved Health Outcomes: A Step Forward in Translation (R01 Clinical Trial Optional) Award Amount: See solicitation for details (see [here](#)) 6/5/2020

Advancing Mechanistic Probiotic/Prebiotic and Human Microbiome Research (R01) Award Amount: See solicitation for details (see [here](#)) 6/5/2020

NIDCR Research Grants for Analyses of Existing Genomics Data (R01, R03 Clinical Trial Not Allowed) Award Amount: See solicitation for details (see [here](#)) 6/5/2020

Comparative Genomics Research Program (R01-Clinical Trial Not Allowed) Award Amount: See solicitation for details (see [here](#)) 6/5/2020

Ethical, Legal, and Social Implications (ELSI) of Genomics Research Project Grant Program (R01, R03, R21) Award Amount: See solicitation for details (see [here](#)) 6/5/2020

Age-related Microbiota Changes and their Implications in Chronic Disease Prevention, Treatment and Progression (R01, R21 Clinical Trial Optional) Award Amount: See solicitation for details (see [here](#)) 6/5/2020

Role of Gut Microbiome in Regulating Reproduction and Its Impact on Fertility Status in Women Living with and Without HIV (R01, R21 Clinical Trial Optional) Award Amount: See solicitation for details (see [here](#)) 6/5/2020

Research to Advance HBV Cure: HIV/HBV Co-Infection and HBV Mono-infection (R01 Clinical Trial Not Allowed) Award Amount: See solicitation for details (see [here](#)) 6/5/2020

Modulating Intestinal Microbiota to Enhance Protective Immune Responses against Cancer (R01 Clinical Trial Not Allowed) Award Amount: See solicitation for details (see [here](#)) 6/10/2020

Short-term Mentored Career Enhancement Award in Dental, Oral and Craniofacial Research for Mid-Career and Senior Investigators (K18 Independent Clinical Trial Not Allowed) Award Amount: See solicitation for details (see [here](#)) 6/12/2020

Biological Technologies Office -- ADvanced Acclimation and Protection Tool for Environmental Readiness (ADAPTER) Award Amount: See solicitation for details (see [here](#)) 6/18/2020

Gastrointestinal (GI) and Microbiome Explorers: Development of Swallowable Smart Pills or Devices for Precision Nutrition, Microbiome and Digestive Disease Applications (R21/R33 Clinical Trial Required) Award Amount: See solicitation for details (see [here](#)) 6/18/2020

Novel Nucleic Acid Sequencing Technology Development (R01, R21, R43/R44) \$2,100,000 (see [here](#)) 6/24/2020

Congressionally Directed Medical Research Programs -- Prostate Cancer Research Program -- Population Science and Outcomes Research Award \$1,000,000 (see [here](#)) 6/25/2020

Investigator Initiated Research in Computational Genomics and Data Science (R01 Clinical Trial Not Allowed) Award Amount: See solicitation for details (see [here](#)) 7/16/2020

Ecology and Evolution of Infectious Diseases (EEID) Award Amount: See

solicitation for details (see [here](#))11/18/2020

Post-Doctoral Training in Genomic Medicine Research Award Amount: See solicitation for details (see [here](#)) 12/1/2020

Notice of Special Interest (NOSI) regarding the Availability of Urgent Competitive Revisions for Research on Coronavirus Disease 2019 (COVID-19) and the Causative Virus SARS-CoV-2 Award Amount: See solicitation for details (see [here](#)) 2/5/2021

News

[One quarter of bacterial pathogens can spread antibiotic resistance directly to peers](#) - 1/29/2020

"Biomedical engineers at Duke University have demonstrated that at least 25 percent of antibiotic-resistant pathogenic bacteria found in clinical settings are capable of spreading their resistance directly to other bacteria."

[Bloom Science granted exclusive option to license gut microbiome-based therapies for ALS, other neurological disorders](#) - 2/4/2020

"Bloom Science and Duke University have entered into an exclusive licensing agreement that provides the biopharmaceutical company access to the intellectual property and technology related to unique strain isolates and genetic variants of *Akkermansia* genus bacteria"

[Pasireotide does not decrease risk of GI toxicity or acute GVHD following HSCT](#) - 2/24/2020

"In an interview with OncLive during the 2020 TCT Meetings, Anthony D. Sung, MD, assistant professor of medicine at Duke University Medical Center, discussed the findings from the phase II trial of pasireotide as a method to prevent GI toxicity and acute GVHD in patients who undergo allogeneic HSCT."

[Her parents taught her grit, caring for others. She's using those traits to fight heart disease.](#) - 2/28/2020

"On stage at the Miss America 2020 pageant, Svati Shah looked into the camera and delivered her important message....'By ensuring women are included in medical research. By empowering women to change the fact that women living 20 miles apart can have a 20-year difference in lifespan. When women come together to demand change, change happens.'"

[What we've learned about coronavirus](#) - 3/10/2020

"Infectious disease experts on the spread, the science and the scenarios for the virus"

[Duke researchers identify role that skin plays in Zika virus protection](#) - 4/2/2020

"When a mosquito infected with Zika virus bites someone, the skin is the first line of defense against infection. A Duke research team was able to pinpoint exactly how the skin responds to the invader in a paper published April 1 in *Science Advances*."

Recent DMC Publications

Bethke JH; Davidovich A; Cheng L; Lopatkin AJ; Song W; Thaden JT; Fowler VG; Xiao M; You L. Environmental and genetic determinants of plasmid mobility

in pathogenic *Escherichia coli*. *Sci Adv* 6:eaax3173 (Jan 2020)

<https://scholars.duke.edu/individual/pub1431685>

Chiang RS; Parish A; Niedzwiecki D; Kappus MR; Muir AJ. Impact of Malnutrition on Outcomes in Patients Undergoing Transjugular Intrahepatic Portosystemic Shunt Insertion. *Digest Dis Sci*

(1/21/2020) <https://scholars.duke.edu/individual/pub1428417>

Dobretsov S; Rittschof D. Love at First Taste: Induction of Larval Settlement by Marine Microbes. *Int J Mol Sci vol 21* (1/22/2020)

<https://scholars.duke.edu/individual/pub1428470>

Bickhaus JA; Vaughan M; Truong T; Li Y-J; Siddiqui NY. A comparison of antibiotic prophylaxis regimens to decrease the risk of post-procedure urinary tract infection after onabotulinum toxin A injection. *Int Urogynecol J* (1/27/2020)

<https://scholars.duke.edu/individual/pub1428916>

Hussain S; Johnson CG; Scirba J; Meng X; Stober VP; Liu C; Cyphert-Daly JM; Bulek K; Qian W; Solis A. TLR5 participates in the TLR4 receptor complex and promotes MyD88-dependent signaling in environmental lung injury. *eLife vol 9* (1/28/2020)

<https://scholars.duke.edu/individual/pub1379728>

Vellanki S; Billmyre RB; Lorenzen A; Campbell M; Turner B; Huh EY; Heitman J; Lee SC. A Novel Resistance Pathway for Calcineurin Inhibitors in the Human-Pathogenic Mucorales *Mucor circinelloides*. *mBio vol 11* (1/28/2020)

<https://scholars.duke.edu/individual/pub1429340>

Ganley JG; Derbyshire ER. Linking Genes to Molecules in Eukaryotic Sources: An Endeavor to Expand Our Biosynthetic Repertoire. *Molecules vol 25*

(1/31/2020) <https://scholars.duke.edu/individual/pub1431215>

Komesu YM; Dinwiddie DL; Richter HE; Lukacz ES; Sung VW; Siddiqui NY; Zyczynski HM; Ridgeway B; Rogers RG; Arya LA. Defining the relationship between vaginal and urinary microbiomes. *Am J Obstet Gynecol* 222:154.e1 (2/1/2020) <https://scholars.duke.edu/individual/pub1404180>

McGarrah RW; Zhang G-F; Christopher BA; Deleye Y; Walejko JM; Page S; Ilkayeva O; White PJ; Newgard CB. Dietary branched-chain amino acid restriction alters fuel selection and reduces triglyceride stores in hearts of Zucker fatty rats. *Am J Physiol-Endoc M* 318:E216 (2/1/2020) <https://scholars.duke.edu/individual/pub1423033>

Gesquiere LR; Habig B; Hansen C; Li A; Freid K; Learn NH; Alberts SC; Graham AL; Archie EA. Noninvasive measurement of mucosal immunity in a free-ranging baboon population. *Am J Primatol* 82:e23093 (2/1/2020) <https://scholars.duke.edu/individual/pub1428080>

Cable J; Srikantiah P; Crowe JE; Pulendran B; Hill A; Ginsberg A; Koff W; Mathew A; Ng T; Jansen K. Vaccine innovations for emerging infectious diseases-a symposium report. *Ann NY Acad Sci* 1462:14 (2/1/2020) <https://scholars.duke.edu/individual/pub1418077>

Sagues WJ; Assis CA; Hah P; Sanchez DL; Johnson Z; Acharya M; Jameel H; Park S. Decarbonizing agriculture through the conversion of animal manure to dietary protein and ammonia fertilizer. *Bioresource Technol* 297:122493 (2/1/2020) <https://scholars.duke.edu/individual/pub1423738>

Schmid AK; Allers T; DiRuggiero J. SnapShot: Microbial Extremophiles. *Cell* 180:818 (2/1/2020) <https://scholars.duke.edu/individual/pub1433142>

Toro-Moreno M; Derbyshire ER. It's about Time: Insights into the Modes of Action of Antimalarials. *Cell Chem Biol* 27:139 (2/1/2020)

<https://scholars.duke.edu/individual/pub1432817>

Younossi ZM; Stepanova M; Racila A; Afendy A; Lawitz EJ; Schwabe C; Ruane PJ; Lalezari J; Reddy KR; Jacobson IM. Long-term Benefits of Sustained Virologic Response for Patient-Reported Outcomes in Patients With Chronic Hepatitis C Virus Infection. *Clin Gastroenterol H* 18:468 (2/1/2020)

<https://scholars.duke.edu/individual/pub1402375>

Ocal S; Muir AJ. Addressing Hepatitis C in the American Incarcerated Population: Strategies for Nationwide Elimination. *Curr HIV-AIDS Rep* 17:18 (2/1/2020) <https://scholars.duke.edu/individual/pub1428416>

Butt J; Blot WJ; Shrubsole MJ; Varga MG; Hendrix LH; Crankshaw S; Waterboer T; Pawlita M; Epplein M. Performance of multiplex serology in discriminating active vs past *Helicobacter pylori* infection in a primarily African American population in the southeastern United States. *Helicobacter* 25:e12671 (2/1/2020) <https://scholars.duke.edu/individual/pub1421640>

Fitch KV; Kileel EM; Looby SE; Zanni MV; Sanchez LR; Fichtenbaum CJ; Overton ET; Malvestutto C; Aberg JA; Klingman KL. Successful recruitment of a multi-site international randomized placebo-controlled trial in people with HIV with attention to diversity of race and ethnicity: critical role of central coordination. *HIV Res Clin Pract* 21:11 (2/1/2020)

<https://scholars.duke.edu/individual/pub1435453>

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<https://scholars.duke.edu/individual/pub1417867>

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Christensen J; Ma L. A Bayesian hierarchical model for related densities by using Pólya trees. *J Roy Stat Soc B* 82:127 (2/1/2020) <https://scholars.duke.edu/individual/pub1422949>

Gerhard WA; Gunsch CK. Higher normalized concentrations of tetracycline resistance found in ballast and harbor water compared to ocean water. *Mar Pollut Bull* 151:110796 (2/1/2020) <https://scholars.duke.edu/individual/pub1427198>

Marshall AL; Dversdal RK; Murphy M; Prill DM; Zhang T; Jain S. WOMENtorship: The #WomenInMedicine perspective. *Med Teach* 42:228 (2/1/2020) <https://scholars.duke.edu/individual/pub1415569>

Zhong Z; Virshup DM. Wnt Signaling and Drug Resistance in Cancer. *Mol Pharmacol* 97:72 (2/1/2020) <https://scholars.duke.edu/individual/pub1423137>

Metin B; Heitman J. "She Loves Me She Loves Me Not: On the Dualistic Asexual/Sexual Nature of Dermatophyte Fungi." *Mycopathologia* 185:87 (2/1/2020) <https://scholars.duke.edu/individual/pub1415008>

Vera Cruz D; Nelson CS; Tran D; Barry PA; Kaur A; Koelle K; Permar SR. Intrahost cytomegalovirus population genetics following antibody pretreatment in a monkey model of congenital transmission. *PLoS Pathog* 16:e1007968 (2/1/2020) <https://scholars.duke.edu/individual/pub1432253>

Bordt EA; Bilbo SD. Stressed-Out T Cells Fragment the Mind. *Trends Immunol* 41:94 (2/1/2020) <https://scholars.duke.edu/individual/pub1426907>

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Davey L; Valdivia RH. Bacterial genetics and molecular pathogenesis in the age of high throughput DNA sequencing. *Curr Opin Microbiol* 54:59 (2/7/2020) <https://scholars.duke.edu/individual/pub1431868>

Chhetri A; Lokszejn A; Nguyen H; Pianalto KM; Kim MJ; Hong J; Alspaugh JA;

Yokoyama K. Length Specificity and Polymerization Mechanism of (1→3)-β-d-Glucan Synthase in Fungal Cell Wall Biosynthesis. *Biochemistry* 59:682 (2/11/2020) <https://scholars.duke.edu/individual/pub1426925>

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Nelson CS; Jenks JA; Pardi N; Goodwin M; Roark H; Edwards W; McLellan JS; Pollara J; Weissman D; Permar SR. HCMV glycoprotein B nucleoside-modified mRNA vaccine elicits antibody responses with greater durability and breadth than MF59-adjuvanted gB protein immunization. *J Virol* (2/12/2020) <https://scholars.duke.edu/individual/pub1432254>

Mayer EF; Maron G; Dallas RH; Ferrolino J; Tang L; Sun Y; Danziger-Isakov L; Paulsen GC; Fisher BT; Vora SB. A multicenter study to define the epidemiology and outcomes of *Clostridioides difficile* infection in pediatric hematopoietic cell and solid organ transplant recipients. *Am J Transplant* (2/16/2020) <https://scholars.duke.edu/individual/pub1433148>

Puia-Dumitrescu M; Younge N; Benjamin DK; Lawson K; Hume C; Hill K; Mengistu J; Wilson A; Zimmerman KO; Ahmad K. Medications and in-hospital outcomes in infants born at 22-24 weeks of gestation. *J Perinatol* (2/17/2020) <https://scholars.duke.edu/individual/pub1432761>

Weimer KED; Roark H; Fisher K; Cotten CM; Kaufman DA; Bidegain M; Permar SR. Breast Milk and Saliva Lactoferrin Levels and Postnatal Cytomegalovirus Infection. *Am J Perinat* (2/18/2020) <https://scholars.duke.edu/individual/pub1432994>

Cullen CM; Aneja KK; Beyhan S; Cho CE; Woloszynek S; Convertino M; McCoy SJ; Zhang Y; Anderson MZ; Alvarez-Ponce D. Emerging Priorities for Microbiome Research. *Front Microbiol vol 11* (2/19/2020) <https://scholars.duke.edu/individual/pub1435337>

Siegel AM; Clinton CM; Post AL; Truong T; Pieper CF; Hughes BL. Assessing patient perceptions of cytomegalovirus infection in pregnancy. *J Med Virol* (2/19/2020) <https://scholars.duke.edu/individual/pub1432920>

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Duin D; Lodise T; Fowler VG; Thaden JT. Positive follow-up blood cultures identify high mortality risk among patients with Gram-negative bacteraemia. *Clin Microbiol Infec* (2/28/2020) <https://scholars.duke.edu/individual/pub1433723>

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