

# Stanford

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## David A. Relman

Thomas C. and Joan M. Merigan Professor and Professor of Microbiology and Immunology

Medicine - Infectious Diseases

### Bio

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#### BIO

David A. Relman, MD is the Thomas C. and Joan M. Merigan Professor in Medicine, and Professor of Microbiology & Immunology, and Senior Fellow at the Freeman Spogli Institute for International Studies at Stanford University. He is also Chief of Infectious Diseases at the Veterans Affairs Palo Alto Health Care System in Palo Alto, California. Relman was an early pioneer in the modern study of the human indigenous microbiota (microbiome). A landmark paper in 1999 and another in 2005 were among the first to describe the human oral and gut microbiota, respectively, with modern molecular methods. Most recently, his work has focused on human microbial community assembly, and community stability and resilience. Principles of disturbance and landscape ecology are tested in clinical studies of the human microbiome. Previous work included the development of methods for pathogen discovery, and the identification of several historically important and novel microbial disease agents. He has advised the U.S. Government on emerging infectious diseases, human-microbe interactions, and future biological threats. He is a member of the Intelligence Community Studies Board at the National Academies of Science, Engineering and Medicine, and served as Chair of the Boards of Scientific Counselors at the National Institute for Dental and Craniofacial Research, and at the National Center for Biotechnology Information, both at NIH, and as President of the Infectious Diseases Society of America (2012-2013). He is a Fellow of the American Academy of Microbiology, a Member of the National Academy of Medicine, and a Member of the American Academy of Arts & Sciences.

#### ACADEMIC APPOINTMENTS

- Professor, Medicine - Infectious Diseases
- Professor, Microbiology & Immunology
- Member, Bio-X
- Senior Fellow, Center for International Security and Cooperation
- Member, Maternal & Child Health Research Institute (MCHRI)
- Member, Stanford Medicine Children's Health Center for IBD and Celiac Disease
- Member, Stanford Cancer Institute

#### ADMINISTRATIVE APPOINTMENTS

- Member, Center for Computational, Evolutionary and Human Genomics, (2018- present)
- Faculty Fellow, Center for Innovation in Global Health, Stanford University, (2015- present)
- Senior Fellow, Freeman Spogli Institute for International Studies, Stanford University, (2013- present)
- Chief, Infectious Diseases Section, VA Palo Alto Health Care System, (2002- present)
- Chair, Administrative Panel on Biosafety, Stanford University, (2001-2018)
- Co-Director, Center for International Security and Cooperation (CISAC), Stanford University, (2013-2017)

## HONORS AND AWARDS

- Member, American Academy of Arts & Sciences (2022-)
- Alexander Fleming Award, Infectious Diseases Society of America (2021)
- Special Achievement Award, 2020 Miami Winter Symposium, University of Miami (2020)
- Walsh McDermott Medal, National Academy of Medicine (2020)
- NIH Transformative Research Award, NIH (2013)
- Member, National Academy of Medicine, National Academies of Science, Engineering, and Medicine (2011-)
- Fellow, American Association for the Advancement of Science (2010)
- Thomas C. and Joan M. Merigan Professor, Stanford University (2009-)
- Distinguished Clinical Scientist Award, Doris Duke Charitable Foundation (2006)
- NIH Director's Pioneer Award, NIH (2006)
- Kinyoun Lecturer, NIAID/NIH (2005)
- Fellow, American Academy of Microbiology (2003)
- Senior Scholar Award in Global Infectious Diseases, Ellison Medical Foundation (2002)
- Squibb Award, Infectious Diseases Society of America (2001)

## BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Member, Defense Science Board, Department of Defense (2022 - present)
- Member, Science and Security Board, Bulletin of the Atomic Scientists (2022 - present)
- Member, Standing Committee on Emerging Infectious Diseases and 21st Century Health Threats, National Academies of Science, Engineering, and Medicine (2020 - present)
- Member, Committee on Data Needs to Monitor Evolution of SARS-CoV-2, NASEM (2020 - 2023)
- Chair, Standing Committee to Advise the Dept of State on Unexplained Health Effects, National Academies of Science, Engineering, and Medicine (2019 - 2020)
- Member, Intelligence Community Studies Board, National Academies of Science, Engineering, and Medicine (2016 - 2023)
- Member (Chair, 2018-2019), Board of Scientific Counselors, National Center for Biotechnology Information, NIH (2015 - 2019)
- Member, Working Group on Biodefense President's Council of Advisors on Science and Technology, The White House (2015 - 2016)
- Member, Working Group on Antimicrobial Resistance, President's Council of Advisors on Science and Technology (2014 - 2014)
- Member, Committee on Science, Technology and Law, National Academy of Science (2012 - 2017)
- President, Infectious Diseases Society of America (2012 - 2013)
- Chair, Forum on Microbial Threats, Institute of Medicine (National Academies of Science) (2007 - 2017)
- Member, Science, Technology, and Engineering Advisory Panel, Lawrence Livermore National Laboratory (2007 - 2017)
- Member, National Science Advisory Board for Biosecurity (2005 - 2014)

## PROFESSIONAL EDUCATION

- S.B., M.I.T. , Biology (1977)
- M.D., Harvard Medical School , Medicine (1982)

## COMMUNITY AND INTERNATIONAL WORK

- Chief Medical Officer, Rock Medicine, Haight-Ashbury Medical Clinics

## LINKS

- <http://reiman.stanford.edu>: <https://sites.google.com/site/davidreimanlab/Home>

## Research & Scholarship

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### CURRENT RESEARCH AND SCHOLARLY INTERESTS

My primary research focus is the human indigenous microbiota (microbiome), and in particular, the nature and mechanisms of variation in patterns of microbial diversity within the human body as a function of time (microbial succession), space (biogeography within the host landscape), and in response to perturbation, e.g., antibiotics (community robustness and resilience). One of the goals of this work is to define the role of the human microbiome in health and disease. We are particularly interested in measuring and understanding resilience in the human microbial ecosystem. Our work includes the human oral cavity, gut, and female reproductive tract, as well as an analysis of microbial diversity in marine mammals. This research integrates theory and methods from ecology, population biology, environmental microbiology, genomics and clinical medicine.

During the past few decades, my research directions have also included pathogen discovery and the development of new strategies for identifying previously-unrecognized microbial agents of disease. This work has included the use of host gene expression response patterns to recognize and understand early stages of systemic infection. Currently, we are examining genomic patterns of host response in dengue fever and in cases of undiagnosed febrile illness, for diagnostic and prognostic purposes, as well as to understand better disease mechanism.

## Teaching

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### STANFORD ADVISEES

#### Postdoctoral Faculty Sponsor

Melissa Salm, Valeri Vasquez

#### Postdoctoral Research Mentor

Stephanie Bachas-Daunert, Jessica Grembi, Katherine Xue

### GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Medicine (Masters Program)
- Microbiology and Immunology (Phd Program)

## Publications

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### PUBLICATIONS

- **Neurological Illness and National Security: Lessons to Be Learned.** *JAMA*  
Relman, D. A.  
2024
- **Public role in research oversight.** *Journal of virology*  
Lipsitch, M., Inglesby, T. V., Cicero, A., Relman, D. A.  
2024: e0006124
- **Competition for shared resources increases dependence on initial population size during coalescence of gut microbial communities.** *bioRxiv : the preprint server for biology*  
Goldman, D. A., Xue, K. S., Parrott, A. B., Jeeda, R. R., Franzese, L. R., Lopez, J. G., Vila, J. C., Petrov, D. A., Good, B. H., Relman, D. A., Huang, K. C.  
2023
- **Sub-communities of the vaginal microbiota in pregnant and non-pregnant women.** *Proceedings. Biological sciences*  
Symul, L., Jegannathan, P., Costello, E. K., France, M., Bloom, S. M., Kwon, D. S., Ravel, J., Relman, D. A., Holmes, S.  
2023; 290 (2011): 20231461
- **Prolonged delays in human microbiota transmission after a controlled antibiotic perturbation.** *bioRxiv : the preprint server for biology*

Xue, K. S., Walton, S. J., Goldman, D. A., Morrison, M. L., Verster, A. J., Parrott, A. B., Yu, F. B., Neff, N. F., Rosenberg, N. A., Ross, B. D., Petrov, D. A., Huang, K. C., Good, et al  
2023

- **Abrupt perturbation and delayed recovery of the vaginal ecosystem following childbirth.** *Nature communications*  
Costello, E. K., DiGiulio, D. B., Robaczewska, A., Symul, L., Wong, R. J., Shaw, G. M., Stevenson, D. K., Holmes, S. P., Kwon, D. S., Relman, D. A.  
2023; 14 (1): 4141
- **Rookery through rehabilitation: Microbial community assembly in newborn harbour seals after maternal separation.** *Environmental microbiology*  
Switzer, A. D., Callahan, B. J., Costello, E. K., Bik, E. M., Fontaine, C., Gulland, F. M., Relman, D. A.  
2023
- **Are bacteria, fungi, and archaea present in the midtrimester amniotic fluid?** *Journal of perinatal medicine*  
Romero, R., Gervasi, M. T., DiGiulio, D. B., Jung, E., Suksai, M., Miranda, J., Theis, K. R., Gotsch, F., Relman, D. A.  
2023
- **Profiling the human intestinal environment under physiological conditions.** *Nature*  
Shalon, D., Culver, R. N., Grembi, J. A., Folz, J., Treit, P. V., Shi, H., Rosenberger, F. A., Dethlefsen, L., Meng, X., Yaffe, E., Aranda-Diaz, A., Geyer, P. E., Mueller-Reif, et al  
2023
- **Human metabolome variation along the upper intestinal tract.** *Nature metabolism*  
Folz, J., Culver, R. N., Morales, J. M., Grembi, J., Triadafilopoulos, G., Relman, D. A., Huang, K. C., Shalon, D., Fiehn, O.  
2023
- **Previously uncharacterized rectangular bacterial structures in the dolphin mouth.** *Nature communications*  
Dudek, N. K., Galaz-Montoya, J. G., Shi, H., Mayer, M., Danita, C., Celis, A. I., Viehboeck, T., Wu, G., Behr, B., Bulgheresi, S., Huang, K. C., Chiu, W., Relman, et al  
2023; 14 (1): 2098
- **Motivating Proactive Biorisk Management.** *Health security*  
Greene, D., Palmer, M. J., Relman, D. A.  
2023
- **The impact of iron and heme availability on the healthy human gut microbiome invivo and invitro.** *Cell chemical biology*  
Celis, A. I., Relman, D. A., Huang, K. C.  
2023
- **A robust host-response-based signature distinguishes bacterial and viral infections across diverse global populations.** *Cell reports. Medicine*  
Rao, A. M., Popper, S. J., Gupta, S., Davong, V., Vaidya, K., Chanthongthip, A., Dittrich, S., Robinson, M. T., Vongsouvath, M., Mayxay, M., Nawtaisong, P., Karmacharya, B., Thair, et al  
2022; 3 (12): 100842
- **Early prediction and longitudinal modeling of preeclampsia from multiomics.** *Patterns (New York, N.Y.)*  
Maric, I., Contrepois, K., Moufarrej, M. N., Stelzer, I. A., Feyaerts, D., Han, X., Tang, A., Stanley, N., Wong, R. J., Traber, G. M., Ellenberger, M., Chang, A. L., Fallahzadeh, et al  
2022; 3 (12): 100655
- **Strengthen oversight of risky research on pathogens.** *Science (New York, N.Y.)*  
Panmu, J., Palmer, M. J., Cicero, A., Relman, D. A., Lipsitch, M., Inglesby, T.  
2022: eadfc6020
- **Influential factors of saliva microbiota composition.** *Scientific reports*  
Wells, P. M., Sprockett, D. D., Bowyer, R. C., Kurushima, Y., Relman, D. A., Williams, F. M., Steves, C. J.  
2022; 12 (1): 18894
- **Host Genotype Links to Salivary and Gut Microbiota by Periodontal Status.** *Journal of dental research*  
Kurushima, Y., Wells, P. M., Bowyer, R. C., Zoheir, N., Doran, S., Richardson, J. P., Sprockett, D. D., Relman, D. A., Steves, C. J., Nibali, L.  
2022: 220345221125402
- **Short-Term Dairy Product Elimination and Reintroduction Minimally Perturbs the Gut Microbiota in Self-Reported Lactose-Intolerant Adults.** *mBio*

Smith, C. J., Dethlefsen, L., Gardner, C., Nguyen, L., Feldman, M., Costello, E. K., Kolodny, O., Relman, D. A.

2022; e0105122

• **The Tabula Sapiens: A multiple-organ, single-cell transcriptomic atlas of humans.** *Science (New York, N.Y.)*

Jones, R. C., Karkanias, J., Krasnow, M. A., Pisco, A. O., Quake, S. R., Salzman, J., Yosef, N., Bulthaup, B., Brown, P., Harper, W., Hemenez, M., Ponnusamy, R., Salehi, et al

2022; 376 (6594): eabl4896

• **Optimization of the 16S rRNA sequencing analysis pipeline for studying invitro communities of gut commensals.** *iScience*

Celis, A. I., Aranda-Diaz, A., Culver, R., Xue, K., Relman, D., Shi, H., Huang, K. C.

2022; 25 (4): 103907

• **Precise genotyping of circular mobile elements from metagenomic data uncovers human-associated plasmids with recent common ancestors.** *Genome research*

Shalon, N., Relman, D. A., Yaffe, E.

2022

• **Characterizing the oral and distal gut microbiota of the threatened southern sea otter (*Enhydra lutris nereis*) to enhance conservation practice.** *Conservation science and practice*

Dudek, N. K., Switzer, A. D., Costello, E. K., Murray, M. J., Tomoleoni, J. A., Staedler, M. M., Tinker, M. T., Relman, D. A.

2022; 4 (4)

• **Publisher Correction: Cell types of origin of the cell-free transcriptome.** *Nature biotechnology*

Vorperian, S. K., Moufarrej, M. N., Tabula Sapiens Consortium, Quake, S. R., Jones, R. C., Karkanias, J., Krasnow, M., Pisco, A. O., Quake, S. R., Salzman, J., Yosef, N., Bulthaup, B., Brown, P., et al

2022

• **Cysteine dependence of *Lactobacillus iners* is a potential therapeutic target for vaginal microbiota modulation.** *Nature microbiology*

Bloom, S. M., Mafunda, N. A., Woolston, B. M., Hayward, M. R., Frempong, J. F., Abai, A. B., Xu, J., Mitchell, A. J., Westergaard, X., Hussain, F. A., Xulu, N., Dong, M., Dong, et al

2022; 7 (3): 434-450

• **Cell types of origin of the cell-free transcriptome.** *Nature biotechnology*

Vorperian, S. K., Moufarrej, M. N., Tabula Sapiens Consortium, Quake, S. R., Jones, R. C., Karkanias, J., Krasnow, M., Pisco, A. O., Quake, S. R., Salzman, J., Yosef, N., Bulthaup, B., Brown, P., et al

2022

• **Characterizing the oral and distal gut microbiota of the threatened southern sea otter (*Enhydra lutris nereis*) to enhance conservation practice** *CONSERVATION SCIENCE AND PRACTICE*

Dudek, N. K., Switzer, A. D., Costello, E. K., Murray, M. J., Tomoleoni, J. A., Staedler, M. M., Tinker, M., Relman, D. A.

2022

• **MULTIOMICS LONGITUDINAL MODELING OF PREECLAMPTIC PREGNANCIES**

Espinosa, C., Maric, I., Contrepois, K., Moufarrej, M., Stelzer, I. S., Feyaerts, D., Han, X., Tang, A., Wong, R. J., Darmstadt, G. L., Winn, V. D., Shaw, G. M., Relman, et al

BMJ PUBLISHING GROUP.2022: 309

• **Protocols and risks: when less is more.** *Nature protocols*

Pannu, J., Sandbrink, J. B., Watson, M., Palmer, M. J., Relman, D. A.

2021

• **Unappreciated Systemic Metabolic Functions of the Canonical B Cell Cytokines, BAFF and APRIL: Regulation of Lipolysis and Non-shivering Thermogenesis and Protection from Obesogenic Diet Induced Weight Gain**

Harley, I., Chan, C., Pfluger, P., Aurelien, T., Stankiewicz, T., Allen, J., Moreno-Fernandez, M., Damen, M., Oates, J., Alarcon, P., Doll, J., Flick, M., Flick, et al

WILEY.2021: 5-6

• **A BAFF/APRIL axis regulates obesogenic diet-driven weight gain.** *Nature communications*

Chan, C. C., Harley, I. T., Pfluger, P. T., Trompette, A., Stankiewicz, T. E., Allen, J. L., Moreno-Fernandez, M. E., Damen, M. S., Oates, J. R., Alarcon, P. C., Doll, J. R., Flick, M. J., Flick, et al

2021; 12 (1): 2911

- **Investigate the origins of COVID-19.** *Science (New York, N.Y.)*  
Bloom, J. D., Chan, Y. A., Baric, R. S., Bjorkman, P. J., Cobey, S., Deverman, B. E., Fisman, D. N., Gupta, R., Iwasaki, A., Lipsitch, M., Medzhitov, R., Neher, R. A., Nielsen, et al  
2021; 372 (6543): 694
- **Understanding how biologic and social determinants affect disparities in preterm birth and outcomes of preterm infants in the NICU.** *Seminars in perinatology*  
Stevenson, D. K., Aghaeepour, N., Maric, I., Angst, M. S., Darmstadt, G. L., Druzin, M. L., Gaudilliere, B., Ling, X. B., Moufarrej, M. N., Peterson, L. S., Quake, S. R., Relman, D. A., Snyder, et al  
2021: 151408
- **Lessons learned from the prenatal microbiome controversy.** *Microbiome*  
Blaser, M. J., Devkota, S., McCoy, K. D., Relman, D. A., Yassour, M., Young, V. B.  
2021; 9 (1): 8
- **Topical emollient therapy with sunflower seed oil alters the skin microbiota of young children with severe acute malnutrition in Bangladesh: A randomised, controlled study.** *Journal of global health*  
Fischer, N., Darmstadt, G. L., Shahunja, K. M., Crowther, J. M., Kendall, L., Gibson, R. A., Ahmed, T., Relman, D. A.  
2021; 11: 04047
- **Microbiota assembly, structure, and dynamics among Tsimane horticulturalists of the Bolivian Amazon.** *Nature communications*  
Sprockett, D. D., Martin, M., Costello, E. K., Burns, A. R., Holmes, S. P., Gurven, M. D., Relman, D. A.  
2020; 11 (1): 3772
- **Towards personalized medicine in maternal and child health: integrating biologic and social determinants.** *Pediatric research*  
Stevenson, D. K., Wong, R. J., Aghaeepour, N., Maric, I., Angst, M. S., Contrepois, K., Darmstadt, G. L., Druzin, M. L., Eisenberg, M. L., Gaudilliere, B., Gibbs, R. S., Gotlib, I. H., Gould, et al  
2020
- **Unraveling the Role of the Gut Microbiome in Iron-Deficiency Anemia During Pregnancy**  
Celis, A., Relman, D.  
WILEY.2020
- **Thinking about the microbiome as a causal factor in human health and disease: philosophical and experimental considerations.** *Current opinion in microbiology*  
Relman, D. A.  
2020; 54: 119–26
- **Clades of huge phages from across Earth's ecosystems.** *Nature*  
Al-Shayeb, B., Sachdeva, R., Chen, L., Ward, F., Munk, P., Devoto, A., Castelle, C. J., Olm, M. R., Bouma-Gregson, K., Amano, Y., He, C., Meheust, R., Brooks, et al  
2020
- **Microbial biogeography and ecology of the mouth and implications for periodontal diseases.** *Periodontology 2000*  
Proctor, D. M., Shelef, K. M., Gonzalez, A., Davis, C. L., Dethlefsen, L., Burns, A. R., Loomer, P. M., Armitage, G. C., Ryder, M. I., Millman, M. E., Knight, R., Holmes, S. P., Relman, et al  
2020; 82 (1): 26–41
- **Multiomic immune clockworks of pregnancy.** *Seminars in immunopathology*  
Peterson, L. S., Stelzer, I. A., Tsai, A. S., Ghaemi, M. S., Han, X. n., Ando, K. n., Winn, V. D., Martinez, N. R., Contrepois, K. n., Moufarrej, M. N., Quake, S. n., Relman, D. A., Snyder, et al  
2020
- **Competitors versus Collaborators: Micronutrient Processing by Pathogenic and Commensal Human-Associated Gut Bacteria.** *Molecular cell*  
Celis, A. I., Relman, D. A.  
2020; 78 (4): 570–76
- **Complete Genome Sequences of Six *Lactobacillus iners* Strains Isolated from the Human Vagina.** *Microbiology resource announcements*  
France, M. T., Rutt, L. n., Narina, S. n., Arbaugh, S. n., McComb, E. n., Humphrys, M. S., Ma, B. n., Hayward, M. R., Costello, E. K., Relman, D. A., Kwon, D. S., Ravel, J. n.  
2020; 9 (20)

- **Opinion: To stop the next pandemic, we need to unravel the origins of COVID-19.** *Proceedings of the National Academy of Sciences of the United States of America*  
Relman, D. A.  
2020
- **Microbiota assembly, structure, and dynamics among Tsimane horticulturalists of the Bolivian Amazon** *Nature Communications*  
Sprockett, D. D., Martin, M., Costello, E. K., Burns, A. R., Holmes, S. P., Gurven, M., Relman, D. A.  
2020; in press
- **The biosecurity benefits of genetic engineering attribution.** *Nature communications*  
Lewis, G., Jordan, J. L., Relman, D. A., Koblenz, G. D., Leung, J., Dafoe, A., Nelson, C., Epstein, G. L., Katz, R., Montague, M., Alley, E. C., Filone, C. M., Luby, et al  
2020; 11 (1): 6294
- **Maternal IgA: Matchmaking in Early Childhood.** *Immunity*  
Relman, D. A.  
2019; 51 (2): 211–13
- **Treatment-Specific Composition of the Gut Microbiota Is Associated With Disease Remission in a Pediatric Crohn's Disease Cohort.** *Inflammatory bowel diseases*  
Sprockett, D., Fischer, N., Boneh, R. S., Turner, D., Kierkus, J., Sladek, M., Escher, J. C., Wine, E., Yerushalmi, B., Dias, J. A., Shaoul, R., Kori, M., Snapper, et al  
2019
- **Understanding health disparities** *JOURNAL OF PERINATOLOGY*  
Stevenson, D. K., Wong, R. J., Aghaeepour, N., Angst, M. S., Darmstadt, G. L., DiGiulio, D. B., Druzin, M. L., Gaudilliere, B., Gibbs, R. S., Gould, J. B., Katzl, M., Li, J., Moufarrej, et al  
2019; 39 (3): 354–58
- **Tracking microbial evolution in the human gut using Hi-C reveals extensive horizontal gene transfer, persistence and adaptation.** *Nature microbiology*  
Yaffe, E. n., Relman, D. A.  
2019
- **Reduced Gut Microbiome Diversity and Metabolome Differences in Rhinoceros Species at Risk for Iron Overload Disorder.** *Frontiers in microbiology*  
Roth, T. L., Switzer, A., Watanabe-Chailland, M., Bik, E. M., Relman, D. A., Romick-Rosendale, L. E., Ollberding, N. J.  
2019; 10: 2291
- **Multomics modeling of the immunome, transcriptome, microbiome, proteome and metabolome adaptations during human pregnancy.** *Bioinformatics (Oxford, England)*  
Ghaemi, M. S., DiGiulio, D. B., Contrepois, K., Callahan, B., Ngo, T. T., Lee-McMullen, B., Lehallier, B., Robaczewska, A., Mcilwain, D., Rosenberg-Hasson, Y., Wong, R. J., Quaintance, C., Culos, et al  
2019; 35 (1): 95–103
- **Microbiome as a tool and a target in the effort to address antimicrobial resistance.** *Proceedings of the National Academy of Sciences of the United States of America*  
Relman, D. A., Lipsitch, M.  
2018; 115 (51): 12902–10
- **Understanding health disparities.** *Journal of perinatology : official journal of the California Perinatal Association*  
Stevenson, D. K., Wong, R. J., Aghaeepour, N., Angst, M. S., Darmstadt, G. L., DiGiulio, D. B., Druzin, M. L., Gaudilliere, B., Gibbs, R. S., B Gould, J., Katz, M., Li, J., Moufarrej, et al  
2018
- **Simple statistical identification and removal of contaminant sequences in marker-gene and metagenomics data.** *Microbiome*  
Davis, N. M., Proctor, D. M., Holmes, S. P., Relman, D. A., Callahan, B. J.  
2018; 6 (1): 226
- **Simple statistical identification and removal of contaminant sequences in marker-gene and metagenomics data** *MICROBIOME*  
Davis, N. M., Proctor, D. M., Holmes, S. P., Relman, D. A., Callahan, B. J.  
2018; 6

- **Early Transcriptional Responses After Dengue Vaccination Mirror the Response to Natural Infection and Predict Neutralizing Antibody Titers** *JOURNAL OF INFECTIOUS DISEASES*  
Popper, S. J., Strouts, F. R., Lindow, J. C., Cheng, H. K., Montoya, M., Balmaseda, A., Durbin, A. P., Whitehead, S. S., Harris, E., Kirkpatrick, B. D., Relman, D. A.  
2018; 218 (12): 1911–21
- **Metagenomic analysis with strain-level resolution reveals fine-scale variation in the human pregnancy microbiome** *GENOME RESEARCH*  
Goltsman, D., Sun, C. L., Proctor, D. M., DiGiulio, D. B., Robaczewska, A., Thomas, B. C., Shaw, G. M., Stevenson, D. K., Holmes, S. P., Banfield, J. F., Relman, D. A.  
2018; 28 (10): 1467–80
- **Metagenomic analysis with strain-level resolution reveals fine-scale variation in the human pregnancy microbiome.** *Genome research*  
Goltsman, D. S., Sun, C. L., Proctor, D. M., DiGiulio, D. B., Robaczewska, A., Thomas, B. C., Shaw, G. M., Stevenson, D. K., Holmes, S. P., Banfield, J. F., Relman, D. A.  
2018
- **Poverty and Community-Acquired Antimicrobial Resistance with Extended-Spectrum ss-Lactamase-Producing Organisms, Hyderabad, India** *EMERGING INFECTIOUS DISEASES*  
Alsan, M., Kammili, N., Lakshmi, J., Xing, A., Khan, A., Rani, M., Kolli, P., Relman, D. A., Owens, D. K.  
2018; 24 (8): 1490–96
- **The human microbiome**  
Relman, D.  
ELSEVIER SCI LTD.2018: 70
- **Early transcriptional responses after dengue vaccination mirror the response to natural infection and predict neutralizing antibody titers.** *The Journal of infectious diseases*  
Popper, S. J., Strouts, F. R., Lindow, J. C., Cheng, H. K., Montoya, M., Balmaseda, A., Durbin, A. P., Whitehead, S. S., Harris, E., Kirkpatrick, B. D., Relman, D. A.  
2018
- **A spatial gradient of bacterial diversity in the human oral cavity shaped by salivary flow.** *Nature communications*  
Proctor, D. M., Fukuyama, J. A., Loomer, P. M., Armitage, G. C., Lee, S. A., Davis, N. M., Ryder, M. I., Holmes, S. P., Relman, D. A.  
2018; 9 (1): 681
- **Clostridium difficile, Aging, and the Gut: Can Microbiome Rejuvenation Keep Us Young and Healthy?** *The Journal of infectious diseases*  
Fischer, N. n., Relman, D. A.  
2018; 217 (2): 174–76
- **Enterotypes in the landscape of gut microbial community composition.** *Nature microbiology*  
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