Arun R. Chavan, Ph.D.

Postdoctoral Associate
Yale University
New Haven CT, USA

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Education

Ph.D., Yale University (Ecology and Evolutionary Biology; Adviser: Dr. Gunter Wagner) 2012–2018
M.Sc., Tata Institute of Fundamental Research (Biology; Adviser: Dr. Himanshu Sinha) 2009–2012
B.Sc., Fergusson College, University of Pune (Biotechnology) 2006–2009

Appointments

Postdoctoral Associate & 2021–Present
CRI Irvington Postdoctoral Fellow 2019–2021
Department of Immunobiology,
Yale University, School of Medicine
Adviser – Dr. Ruslan Medzhitov

Publications

Peer-reviewed

1. Tissue Biology: In Search of a New Paradigm
Annual Review of Cell and Developmental Biology 39(1)
Adler M*, **Chavan AR***, Medzhitov R (2023)
(*equal contribution)

2. SARS-CoV-2 infection in pregnancy is associated with robust inflammatory response at the maternal-fetal interface
Med 2(5), 591-610
Lu-Culligan A, **Chavan AR**, Vijayakumar P, Irshaid L, Courchaine EM, Milano KM, Tang Z, Pope SD, Song E, Vogels CBF, Lu-Culligan WJ, Campbell KH, Casanovas-Massana A, Bermejo S, Toothaker JM, Lee HJ, Liu F, Schulz W, Fournier J, Muenker MC, Moore AJ, Yale IMPACT Team, Konnikova L, Neugebauer KM, Ring A, Grubaugh ND, Ko AI, Morotti R, Guller S, Kliman HJ, Iwasaki A, Farhadian SF (2021)

3. Evolution of embryo implantation was enabled by the origin of decidual stromal cells in eutherian mammals
Molecular Biology and Evolution msaa274
Chavan AR, Griffith OW, Stadtmauer D, Maziarz J, Pavlicev M, Fishman R, Koren L, Romero R, Wagner GP (2020)

4. Endometrial recognition of pregnancy occurs in the grey short-tailed opossum (*Monodelphis domestica*)
Proc. R. Soc. B 286: 20190691
Griffith OW, **Chavan AR**, Pavlicev M, Protopapas S, Callahan R, Maziarz J, Wagner GP (2019)

5. The mammalian decidual cell evolved from a cellular stress response
PLOS Biology 16(8): e2005594
Erkenbrack EM, Maziarz JD, Griffith OW, Liang C, **Chavan AR**, Nnamani MC, Wagner GP (2018)

6. Reply to Liu: Inflammation before implantation both in evolution and development
PNAS 115(1):E3–E4
Griffith OW, **Chavan AR**, Protopapas S, Maziarz J, Romero R, Wagner GP (2017)

7. Genetic Associations with Gestational Duration and Spontaneous Preterm Birth
New England Journal of Medicine 377(12):1156–1167
Zhang G, Feenstra B, Bacelis J, Liu X, Muglia L.M, Juodakis J, Miller DE, Litterman N, Jiang PP, Russell L, Hinds DA, Hu Y, Weirauch MT, Chen X, **Chavan AR**, Wagner GP, Pavličev M, Nnamani MC, Maziarz J, Karjalainen MK, Rämet M, Sengpiel V,

Geller F, Boyd HA, Palotie A, Momany A, Bedell B, Ryckman KK, Huusko JM, Forney CR, Kottyan LC, Hallman M, Teramo K, Nohr EA, Davey Smith G, Melbye M, Jacobsson B, Muglia LJ (2017)

8. The inflammation paradox in the evolution of mammalian pregnancy: turning a foe into a friend
Current Opinion in Genetics & Development 47:24–32
Chavan AR, Griffith OW, Wagner GP (2017)

9. Embryo implantation evolved from an ancestral inflammatory attachment reaction
PNAS 114(32):E6566–E6575
Griffith OW, **Chavan AR**, Protopapas S, Maziarz J, Romero R, Wagner GP (2017)

10. Evolution of gene expression in the uterine cervix related to steroid signaling: conserved features in the regulation of cervical ripening
Scientific Reports 7(1):4439
Wagner GP, Nnamani MC, **Chavan AR**, Maziarz J, Protopapas S, Condon J, Romero R (2017)

11. Single-cell transcriptomics of the human placenta: inferring the cell communication network of the maternal-fetal interface
Genome Research 27:349–361
Pavlicev M, Wagner GP, **Chavan AR**, Owens K, Maziarz J, Dunn-Fletcher C, Kallapur SG, Muglia L, Jones H (2017)

12. The transcriptomic evolution of mammalian pregnancy: gene expression innovations in endometrial stromal fibroblasts
Genome Biology & Evolution 8:2459–2473
Kin K, Maziarz J, **Chavan AR**, Kamat M, Vasudevan S, Birt A, Emera D, Lynch VJ, Ott TL, Pavlicev M, Wagner GP (2016)

13. The fetal-maternal interface of the nine-banded armadillo: endothelial cells of maternal sinus are partially replaced by trophoblast
Zoological Letters 2:11
Chavan AR, and Wagner GP (2016)

14. What was the ancestral function of decidual stromal cells? A model for the evolution of eutherian pregnancy
Placenta 40:40–51
Chavan AR, Bhullar B-AS, and Wagner GP (2016)

15. Polygenic *cis*-regulatory adaptation in the evolution of yeast pathogenicity
Genome Research 22:1930–1939
Fraser HB, Levy S*, **Chavan A***, Shah HB, Perez JC, Zhou Y, Siegal ML, Sinha H (2012)
(*equal contribution)

Dissertations

1. *Evolutionary origin of cell types: a case study of decidual cells in mammalian pregnancy*
Chavan AR (2018). Yale University.

2. *Allelic variation in yeast: its role in* cis*-regulatory adaptation and its pleiotropic consequences*
Chavan AR (2012). Tata Institute of Fundamental Research.

Funding, Fellowships, and Prizes

Fellowships and Prizes

John Spangler Nicholas Prize (for doctoral dissertation, Yale University)	2019
CRI Irvington Postdoctoral Fellowship (Cancer Research Institute, New York)	2019–2021
Finalist, Best Student Presentation Award (Society for Integrative and Comparative Biology; DEDB)	2018
Student Poster Prize (Complex Traits Symposium, Society for Molecular Biology and Evolution)	2017

Research and Travel Grants

Travel Award (Developmental Biology of Sea Urchin and other Marine Invertebrates)	2023
Young Investigator Travel Award (Society for Molecular Biology and Evolution)	2017
Chair's Fund, Ecology & Evolutionary Biology (Yale University)	2016

Conference Travel Fellowship (Yale University) 2016
Chair's Fund, Ecology & Evolutionary Biology (Yale University) 2014

Graduate School Funding Sources

Charles A. & June R. P. Ross Fellowship (Yale University) 2016–2017
Leo F. Rettger Fellowship (Yale University) 2014–2015
Robert W. Carle Scholarship (Yale University) 2013–2014
Junior Research Scholarship (Tata Institute of Fundamental Research, Government of India) 2009–2012

Media Coverage

- Coverage for talk at SICB, San Francisco 2018 (now published as Chavan et al, *Mol Biol Evol* 2020)
  - Tamed immune reaction aids pregnancy, Elizabeth Pennisi, *Science* 359(6373):260
  - Armadillo and rabbit genes reveal how pregnancy evolved, Amy Maxmen, *Nature* (Republished by *Scientific American*)
  - When bad things become good: was inflammation modified to become implantation in placental mammals?, Ashley Booth, *SICB Press Release*
- Coverage for Griffith et. al, *PNAS* 2017
  - Evolution of pregnancy may be key to better reproductive technologies today, Jon Atherton, *Yale News* on July 24th, 2017
- Coverage for Pavlicev et al, *Genome Res.* 2017
  - What's in a placenta? A transcriptomic view, *PLOS Blogs* by Ricki Lewis on March 30, 2017
- Coverage for Lu-Culligan et al, *Med* 2021
  - Immune response to COVID virus may pose greater risk to pregnant women than virus itself, *Yale News* by Bill Hathaway on April 22, 2021

Teaching

Teaching Fellow, Yale University

EEB 290: Comparative Vertebrate Anatomy 2014 & 2015 Spring
EEB 291L: Comparative Vertebrate Anatomy Lab 2014 & 2015 Spring
EEB 210: Introduction to Statistics: for Life Sciences 2013 Fall
EEB 225: Introduction to Evolution 2013 Spring

Students mentored

Meena Ambati, Yale College, New Haven CT 2022–Present
Ben Nikitin, Yale College, New Haven CT 2021–2022
Mita Kale, Glastonbury High School, Glastonbury CT 2016 Summer
Haleigh Larson, Yale College, New Haven CT 2016
Minnah Thomas, Tata Institute of Fundamental Research, Mumbai 2011 Summer

Academic Service

Journal referee

BMC Genomics
Frontiers in Cell and Developmental Biology
Integrative and Comparative Biology
Journal of Experimental Zoology Part B: Molecular and Developmental Evolution
The Journal of Maternal-Fetal & Neonatal Medicine
Scientific Reports

Grant reviewer

Yale Institute for Biospheric Studies Doctoral Pilot Grants 2019 & 2020
Yale Institute for Biospheric Studies Doctoral Dissertation Improvements Grants 2019 & 2020

Presentations

Talks

Yale Single Cell Symposium, New Haven, CT, USA 2023
Developmental Biology of Sea Urchin and other Marine Invertebrates, Woods Hole, MA, USA 2023
Amphioxus Satellite Meeting, European Society for Evolutionary Developmental Biology, Naples, Italy 2022
3rd Yale Devo-Evo Congress, New Haven, CT, USA 2022
Indian Society of Developmental Biology, IIT Kanpur, India 2018
Evo-Devo Symposium, Yale University, West Haven, CT, USA 2018
Society for Integrative and Comparative Biology, San Francisco, CA, USA 2018
West Campus Seminar Series, Yale University, West Haven, CT, USA 2017
Evo-Devo Symposium, Yale University, West Haven, CT, USA 2017
Graduate Student Symposium, Ecology & Evolutionary Biology, Yale University, New Haven, CT, USA 2017
European Society for Evolutionary Developmental Biology, Uppsala, Sweden (Invited symposium talk) 2016
Graduate Student Symposium, Ecology & Evolutionary Biology, Yale University, New Haven, CT, USA 2016

Posters

EMBO | EMBL Symposium: The identity and Evolution of Cell Types, Heidelberg, Germany 2021
EMBO | EMBL Symposium: The identity and Evolution of Cell Types, Heidelberg, Germany 2019
Society for Molecular Biology and Evolution, Austin, TX, USA 2017
Systems Biology Institute Symposium, Yale University, West Haven, CT, USA 2017
Gordon Research Conference on Mammalian Reproduction, Waterville Valley, NH, USA 2016
Graduate Student Symposium, Ecology & Evolutionary Biology, Yale University, New Haven, CT, USA 2014
International Conference on Yeast Biology, Mumbai, India 2011

Outreach

eMediator at The School in the Cloud (weekly Skype sessions with school students in Phaltan, India) 2015–2016
Represented the Department of Biological Sciences on Science Popularization and Public Outreach Committee, Tata Institute of Fundamental Research, India 2011–2012
Volunteered fortnightly in organizing sessions of ‘Chai and Why?’, a forum for interactive scientific discussions outside the academic setting. (Organized by Tata Institute of Fundamental Research and held at Ruia College and Prithvi Theater, Mumbai, India) 2009–2011

Academic References

Dr. Ruslan Medzhitov (postdoctoral adviser): ruslan.medzhitov@yale.edu
Dr. Gunter P. Wagner (doctoral thesis adviser): gunter.wagner@yale.edu
Dr. Mihaela Pavlicev (doctoral thesis committee member): mihaela.pavlicev@univie.ac.at
Dr. Richard O. Prum (doctoral thesis committee member): richard.prum@yale.edu
Dr. Himanshu Sinha (master’s thesis adviser): sinha@iitm.ac.in