

Mark A. Johnson

Professor

Brown University

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(a) Professional Preparation

Wake Forest University NC Biology
B.S. 1993

Michigan State University MI Microbiology & Cellular & Molecular Biology Ph.D. 2000

The University of Chicago IL Plant Reproduction 2000-2004

(b) Appointments

2023 - Present Professor of Biology, Department of Molecular Biology, Cell Biology, and Biochemistry (MCB), Brown University
2010 - 2023 Associate Professor of Biology, MCB, Brown University
2004 - 2010 Assistant Professor of Biology, MCB, Brown University
2000 - 2004 Postdoctoral Fellow with Dr. Daphne Preuss, HHMI/Molecular Genetics and Cell Biology, The University of Chicago

(c) Products**Five most closely related to the current project:**

Ouonkap SVY, Oseguera Y, Okihiro B, Johnson MA. Semi-automated high content analysis of pollen performance using tubetracker. (2025) *Plant Reprod.* Jun 16;38(3):16. doi: 10.1007/s00497-025-00526-0. PMID: 40522339

Ouonkap SVY, Palaniappan M, Pryze K, Jong E, Foteh Ali M, Styler B**, Althiab Almasaud R, Harkey AF, Reid RW, Loraine AE, Smith SE, Pease JB, Muday GK, Palanivelu R, Johnson MA. (2024) Enhanced pollen tube performance at high temperature contributes to thermotolerant fruit and seed production in tomato. *Curr Biol.* Nov 18;34(22):5319-5333.e5. doi: 10.1016/j.cub.2024.10.025. PMID: 39510073H.

Sze, B. Klodová, J. M. Ward, J. F. Harper, R. Palanivelu, M. A. Johnson, D. Honys, A wave of specific transcript and protein accumulation accompanies pollen dehydration. *Plant Physiol.*, doi: 10.1093/plphys/kiae177 (2024).

Julca, I, C. Ferrari, M. Flores-Tornero, S. Proost, A.-C. Lindner, D. Hackenberg, L. Steinbachová, C. Michaelidis, S. Gomes Pereira, C. S. Misra, T. Kawashima, M. Borg, F. Berger, J. Goldberg, M. Johnson, D. Honys, D. Twell, S. Sprunck, T. Dresselhaus, J. D. Becker, M. Mutwil. (2021) Comparative transcriptomic analysis reveals conserved programmes underpinning organogenesis and reproduction in land plants. *Nature Plants* 7, 1143–1159 .

Fedry J, Forcina J, Legrand P, Péhau-Arnaudet G, Haouz A, Johnson MA, Rey FA, Krey T. (2018) Evolutionary diversification of the HAP2 membrane insertion motifs to drive gamete fusion across eukaryotes. *PLoS Biology*. 2018 Aug 13;16(8):e2006357.

Five additional publications:

H. Sze, R. Palanivelu, J. F. Harper, M. A. Johnson, (2021) Holistic insights from pollen omics: co-opting stress-responsive genes and ER-mediated proteostasis for male fertility. *Plant Physiol.* 187, 2361–2380 .

Johnson MA, Harper JF, Palanivelu R. (2019) A Fruitful Journey: Pollen Tube Navigation from Germination to Fertilization. *Annu Rev Plant Biol.* 2019 Mar 1. Doi: 10.1146/annurev-arplant-050718-100133.

- Leydon AR, Weinreb, C, Venable E, Reinders A, Ward JM, Johnson MA (2017) The molecular dialog between flowering plant reproductive partners defined by SNP-informed RNA-Sequencing. *The Plant Cell* May;29(5):984-1006
- Beale KM, Leydon AR, Johnson MA (2012) Gamete fusion is required to block multiple pollen tubes from entering an Arabidopsis ovule. *Curr Biol.* Jun 19;22(12):1090-4.
- Qin Y, Leydon AR, Manziello A, Pandey R, Mount D, Denic S, Vasic B, Johnson MA, Palanivelu R (2009) Penetration of the stigma and style elicits a novel transcriptome in pollen tubes, pointing to genes critical for growth in a pistil. *PLoS Genet.* 2009 Aug;5(8):e1000621.

D. Synergistic Activities

1. Innovations in teaching and training: I am the Director of Brown University's HHMI Driving Change Initiative that seeks to identify barriers that students from excluded groups face in pursuing science degrees at our university. Through this work, I have had the opportunity to impact policy, formation of new initiatives, and curriculum design across our institution. One important outcome of this work has been a major increase in the number of research based courses on our campus. I have taught a research-based course that focuses on how climate change affects plant reproduction for several years.

2. Development and refinement of research tools: We have developed methods that take advantage of RNA-seq technology to quantify pollen tube and pistil gene expression as the pollen tube grows in the pistil). We have also made significant contributions to methods that quantify pollen performance parameters.

3. Broadening the participation of groups underrepresented in science: I am the founding faculty advisor for Brown's Society for Advancement of Chicanos and Native American Scientists (SACNAS) Chapter (2012) and help to organize the annual inclusive Samuel Nabrit Early Career Scholars Conference. This conference features the research of people from excluded groups and serves as a focal point for innovation in inclusion on our campus.

4. Service to the scientific community: I was the lead co-Instructor for NSF-sponsored Cold Spring Harbor Laboratory course on Frontiers & Techniques in Plant Science from 2013 to 2015 and served as a lecturer for several years. I recently organized and hosted the 27th International Congress on Sexual Plant Reproduction, which brought 200 scientists from 22 countries to Providence RI in July 2024. .

5. Outreach: I have collaborated with Brown Students on three *SciToons* YouTube projects to explain concepts like mutations, genome engineering, and plant reproduction to a broad audience. I host annual lab tours and experiment sessions with the Providence SquashBusters after school academic mentoring program.

Publications 2025 - 2021 (last four years, reverse chronological order)

Ouonkap SVY[‡], Oseguera Y^{**}, Okihiro B^{**}, Johnson MA^{*}. Semi-automated high content analysis of pollen performance using tubetracker. (2025) *Plant Reprod.* Jun 16;38(3):16. doi: 10.1007/s00497-025-00526-0. PMID: 40522339

Liu L, Gong W, Stöckl R, Denninger P, Schwartz U, Johnson MA, Dresselhaus T. Mago nashi controls auxin-mediated embryo patterning in Arabidopsis by regulating transcript abundance. (2025) *New Phytol.* Jul;247(1):14-23. doi: 10.1111/nph.70154. Epub 2025 Apr 18. PMID: 40251862

Ouonkap SVY[‡], Palaniappan M, Pryze K, Jong E, Foteh Ali M, Styler B^{**}, Althiab Almasaud R, Harkey AF, Reid RW, Loraine AE, Smith SE, Pease JB, Muday GK, Palanivelu R, Johnson MA^{*}. (2024) Enhanced pollen tube performance at high temperature contributes to thermotolerant fruit and seed production in tomato. *Curr Biol.* Nov 18;34(22):5319-5333.e5. doi: 10.1016/j.cub.2024.10.025. PMID: 39510073

N. Sugi, A. R. M. Calhau, N. M. A. Jacquier, M. Millan-Blanchuez, J. D. Becker, K. Begcy, F. Berger, C. Bousquet-Antonelli, D. Bouyer, G. Cai, A. Y. Cheung, S. Coimbra, P. Denninger, T. Dresselhaus, J. A. Feijó, J. E. Fowler, D. Geelen, U. Grossniklaus, T. Higashiyama, D. Honys, T. Igawa, G. Ingram, Y. Jaillais, M. A. Johnson, M. Kato, M. Kawachi, T. Kawashima, Y.-J. Kim, H.-J. Li, S. Mongrand, K. Motomura, S. Nagahara, K. P. Nakajima, B. Nelms, L.-J. Qu, A. Schnittger, S. Scholten, S. Sprunck, M.-X. Sun, D. Twell, D. Weijers, W.-C. Yang, D. Maruyama, T. Widiez. (2024) The peri-germ cell membrane: poorly characterized but key interface for plant reproduction. *Nature Plants*, doi: 10.1038/s41477-024-01818-5.

Sze H, Klodová B, Ward JM, Harper JF, Palanivelu R, Johnson MA, Honys D. (2024) A wave of specific transcript and protein accumulation accompanies pollen dehydration. *Plant Physiol.* Mar 26;kiae177. doi: 10.1093/plphys/kiae177. PMID: 38530638

Althiab-Almasaud R^Δ, Teyssier E, Chervin C, Johnson MA, Mollet JC. (2023) Pollen viability, longevity, and function in angiosperms: key drivers and prospects for improvement. *Plant Reprod.* 2023 Nov 5. doi: 10.1007/s00497-023-00484-5. PMID: 37926761

Ponvert N[‡], Johnson MA^{*}. (2023) Synergid cell calcium oscillations refine understanding of FERONIA/LORELEI signaling during interspecific hybridization. *Plant Reprod.* 2023 Nov 7. doi: 10.1007/s00497-023-00483-6. PMID: 37934279

Julca I, Ferrari C, Flores-Tornero M, Proost S, Lindner AC, Hackenberg D, Steinbachová L, Michaelidis C, Gomes Pereira S, Misra CS, Kawashima T, Borg M, Berger F, Goldberg J^{**}, Johnson MA, Honys D, Twell D, Sprunck S, Dresselhaus T, Becker JD, Mutwil M. (2021) Comparative transcriptomic analysis reveals conserved programmes underpinning organogenesis and reproduction in land plants. *Nat Plants.* 2021 Aug;7(8):1143-1159. doi:10.1038/s41477-021-00958-2. Epub 2021 Jul 12. PMID: 34253868

Sze H, Palanivelu R, Harper JF, Johnson MA. (2021) Holistic insights from pollen omics: Co-opting stress-responsive genes and ER-mediated proteostasis for male fertility. *Plant Physiol.* 2021 Oct 2;187(4):2361-80. doi: 10.1093/plphys/kiab463. PMID: 34601610

Cohen KL, Wright MC, Johnson MA, Lawrence S. (2021) Preserving the Positive Student Outcomes of CUREs Through Disruption: Implications for Remote Learning. Perspectives on Undergraduate Research and Mentoring. Special Issue: Continuity of Mentoring Undergraduate Research in the Face of Uncertainty. Issue 10.1