

Kevin C. Johnson, Ph.D.

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CURRENT POSITION

The Jackson Laboratory for Genomic Medicine
Postdoctoral Fellow

Farmington, CT
2016 – Present

EDUCATION

Ph.D., Experimental and Molecular Medicine
Dartmouth College

Hanover, NH
2011 – 2016

B.S., Food Science and Technology
University of Massachusetts – Amherst

Amherst, MA
2007 – 2011

RESEARCH EXPERIENCE

The Jackson Laboratory for Genomic Medicine
Postdoctoral Fellow; Advisor: Dr. Roel Verhaak

2016 – Present

Genetic and epigenetic evolution of glioma

- Co-led the international Glioma Longitudinal Analysis (GLASS) Consortium of glioma researchers to sequence initial and recurrent tumor pairs
- Investigated the selective pressures that shape glioma evolution through multiple time point whole genome sequencing data
- Established internal single-cell reduced representation bisulfite sequencing protocol to profile DNA methylation heterogeneity in glioma

Geisel School of Medicine at Dartmouth

2011 – 2016

Graduate Researcher; Advisor: Dr. Brock Christensen

Epigenetic biomarkers of disease progression in human cancers

- Determined DNA methylation alterations across the spectrum of normal breast tissues, precancerous lesions, and invasive breast cancer in population-based studies
- Applied integrative epigenomic analyses to simultaneously profile 5-methylcytosine and 5-hydroxymethylcytosine in glioblastoma and their relation with clinical outcomes

FUNDING SECURED

American Cancer Society Postdoctoral Fellowship

2017 – 2020

Role: Principal investigator

Title: DNA methylation dynamics in glioma progression

Duration: 3 years

Total Amount: \$163,500

Department of Defense Idea Award

2019 – 2021

Role: Significant author

Title: Single-cell approaches to determine mode of disease progression in IDH-mutant glioma

Duration: 2 years

Total Amount: \$400,000

The Jackson Laboratory Scientific Services Innovation Fund

2018

Role: Co-Principal investigator

Title: Development and implementation of a single-cell DNA methylation protocol

Last Updated: December 2nd, 2019

Duration: 1 year
Total Amount: \$78,818

HONORS AND AWARDS

Albert J. Ryan Pre-doctoral Fellow	2014 – 2016
Neukom Prize for Outstanding Graduate Research in Computational Science	2016
Norris Cotton Cancer Center at Dartmouth Travel Award	2016
Dartmouth Graduate Student Poster Competition Winner	2016
Dartmouth Cancer Epidemiology Program Travel Award	2016
Dartmouth Integrative Biology Symposium Poster Winner	2015
NCAA First-Team Academic All-American (Track and Field)	2011
B.S., <i>summa cum laude</i> (Cumulative GPA: 4.0)	2011

PUBLICATIONS

First author manuscripts published

*Co-first authors

1. **Johnson KC***, Anderson KJ*, Courtois ET, Barthel FP, Varn FS, Luo D, Seignon M, Yi E, Kim H, Estecio MRH, Tang M, Navin NE, Maurya R, Ngan CY, Verburg N, Witt Hamer PCD, Bulsara K, Samuels ML, Das S, Robson P, Verhaak RGW. Single-cell multimodal glioma analyses reveal epigenetic regulators of cellular plasticity and environmental stress response. *bioRxiv*. 2020 July 22. <https://doi.org/10.1101/2020.07.22.215335>.
2. Barthel FP*, **Johnson KC***, Varn FS, Moskalik AD, Tanner G, Huse JT, de Groot JF, Stead LS, The Glioma Longitudinal Analysis (GLASS) Consortium, Verhaak RGW. Longitudinal molecular trajectories of diffuse glioma in adults. **Nature**. 2019 Nov 20. PMID: 31748746.
3. **Johnson KC**, Houseman EA, King JE, Christensen BC. DNA methylation differences at regulatory elements are associated with the cancer risk factor age in normal breast tissue. **Breast Cancer Research**. 2017 Jul 10;19(1):81. PMID: 28693600.
4. **Johnson KC**, Houseman EA, King JE, von Herrmann KM, Fadul CE, Christensen BC. 5-Hydroxymethylcytosine localizes to enhancer elements and is associated with survival in glioblastoma patients. **Nature Communications**. 2016 Nov 25;7:13177. PMID: 27886174.
Featured on NIH Director's Blog and Genome Web
5. O'Sullivan DE*, **Johnson KC***, Skinner L, Koestler DC, Christensen BC. Epigenetic and genetic burden measures are associated with tumor characteristics in invasive breast carcinoma. **Epigenetics**. 2016 May 3;11(5):344-53. PMID: 27070496.
6. **Johnson KC**, Koestler DC, Fleischer T, Chen P, Jenson EG, Marotti JD, Onega T, Kristensen VN, Christensen BC. DNA methylation in ductal carcinoma in situ related with future development of invasive breast cancer. **Clinical Epigenetics**. 2015;7:75. PMID: 26213588.
7. **Johnson KC**, Koestler DC, Cheng C, Christensen BC. Age-related DNA methylation in normal breast tissue and its relationship with invasive breast tumor methylation. **Epigenetics**. 2014 Feb;9(2):268-75. PMID: 24196486.

Co-author manuscripts published

8. Amin SB, Anderson KJ, Boudreau CE, Martinez-Ledesma E, Kocakavuk E, **Johnson KC**, Barthel FP, Varn FS, Kassab C, Ling X, Kim H, Barter M, Ngan CY, Chapman M, Koehler JW, Miller AD, Miller CR, Porter BF, Rissi DR, Mazcko C, LeBlanc AK, Dickinson PJ, Packer R, Taylor AR, Rossmeisl JH,

Heimberger A, Levine JM, Verhaak RGW. Comparative molecular life history of spontaneous canine and human gliomas. **Cancer Cell**. 2020;37(2):243-257. PMID: 32049048.

9. Wilkins OM, **Johnson KC**, Houseman EA, King JE, Marsit CJ, Christensen BC. Genome-wide distribution and function of 5-hydroxymethylcytosine in normal breast tissue. **Epigenetics**. 2020 Apr15(4):398-418. PMID:31842685.
10. Sachdeva R, Wu MY, **Johnson KC**, Kim H, Celebre A, Shahzad U, Graham M, Kessler J, Chuang J, Karamchandani J, Bredel M, Verhaak RGW, Das S. BMP signaling mediates glioma stem cell quiescence and confers treatment resistance in glioblastoma. **Scientific Reports**. 2019 Oct 10;9(1):14569. PMID: 31602000.
11. Barthel FP, **Johnson KC**, Wesseling P, Verhaak RGW. Evolving Insights into the Molecular Neuropathology of Diffuse Gliomas in Adults. **Neurology Clinics**. 2018 Aug;36(3):421-437. PMID: 30072063.
12. Salas LA. **Johnson KC**, Koestler DC, O'Sullivan DE, Christensen, BC. Integrative epigenetic and genetic pan-cancer somatic alteration portraits. **Epigenetics**. 2017 Jul 3;12(7):561-574. PMID: 2842676.
13. Titus AJ, Houseman EA, **Johnson KC**, Christensen BC. methylTolover: cross-platform DNA methylation data integration. **Bioinformatics**. 2016 Aug 15;32(16):2517-9. PMID: 27153617.
14. Houseman EA, **Johnson KC**, Christensen BC. OxyBS: estimation of 5-methylcytosine and 5-hydroxymethylcytosine from tandem-treated oxidative bisulfite and bisulfite DNA. **Bioinformatics**. 2016 Aug 15;32(16):2505-7. PMID: 27153596.
15. Green BB, Houseman EA, **Johnson KC**, Guerin DJ, Armstrong DA, Christensen BC, Marsit CJ. Hydroxymethylation is uniquely distributed within term placenta, and is associated with gene expression. **FASEB**. 2016 Aug;30(8):2874-84. PMID: 27118675.
16. Kresoja-Rakic J, Kapaklikaya E, Ziltener G, Dalcher D, Santoro R, Christensen BC, **Johnson KC**, Schwaller B, Weder W, Stahel RA, Felley-Bosco E. Identification of cis- and trans-acting elements regulating calretinin expression in mesothelioma cells. **Oncotarget**. 2016 Apr 19;7(16):21272-86. PMID: 26848772.
17. Fleischer T, Frigessi A, **Johnson KC**, Edvardsen H, Touleimat N, Klajic J, Riis ML, Haakensen VD, Wärnberg F, Naume B, Helland A, Børresen-Dale AL, Tost J, Christensen BC, Kristensen VN. Genome-wide DNA methylation profiles in progression to in situ and invasive carcinoma of the breast with impact on gene transcription and prognosis. **Genome Biology**. 2014;15(8):435. PMID: 25146004.
18. Ung M, Ma X, **Johnson KC**, Christensen BC, Cheng C. Effect of estrogen receptor α binding on functional DNA methylation in breast cancer. **Epigenetics**. 2014 Apr;9(4):523-32. PMID: 24434785.
19. Busch AM, **Johnson KC**, Stan RV, Sanglikar A, Ahmed Y, Dmitrovsky E, Freemantle SJ. Evidence for tankyrases as antineoplastic targets in lung cancer. **BMC Cancer**. 2013 Apr 28;13:211. PMID: 23621985.
20. Galimberti F, Busch AM, Chinyengetere F, Ma T, Sekula D, Memoli VA, Dragnev KH, Liu F, **Johnson KC**, Guo Y, Freemantle SJ, Andrew AS, Greninger P, Robbins DJ, Settleman J, Benes C, Dmitrovsky E. Response to inhibition of smoothed in diverse epithelial cancer cells that lack smoothed or patched 1 mutations. **International Journal of Oncology**. 2012 Nov;41(5):1751-61. PMID: 22923130.
21. Ankolekar C, Terry T, **Johnson KC**, Johnson D, Barbosa AC, Shetty K. Anti-hyperglycemia properties of Tea (*Camellia sinensis*) bioactives using in vitro assay models and influence of extraction time. **Journal of Medicinal Food**. 2011 Oct;14(10):1190-7. PMID: 21859352.

Book Chapters

- **Johnson KC**, Christensen BC. Genome-wide DNA methylation changes during aging. Epigenomics in Health and Disease, Translational Epigenetics series from Elsevier, Fraga M, and Fernandez-Fernandez A, Editors.

INVITED TALKS

Oral Presentations

- **Johnson KC**. Tracking glioma evolution through space and time. Invited Seminar. University of Rochester Medical Center. Rochester, NY. March 2020.
- **Johnson KC**. Characterizing epigenetic intratumoral heterogeneity in glioma using single-cell bisulfite sequencing. Conference Presentation, Society for Neuro-Oncology Meeting. Phoenix, AZ. November 2019.
- **Johnson KC**. Profiling DNA methylation in glioma at single-cell resolution. Conference Presentation, Society for Neuro-Oncology Meeting. San Francisco, CA. November 2017.
- **Johnson KC**. Breast cancer risk factors are associated with DNA methylation in non-diseased breast tissue independent of cell-type. Conference Presentation, Gordon Research Seminar. Barga, Italy. May 2016.
- **Johnson KC**. Epigenetic deregulation during aging and cancer progression. Invited Speaker, Research Center for Molecular Medicine of the Austrian Academy of Sciences. Vienna, Austria. March 2016.
- **Johnson KC**. Tandem genome-wide single base resolution profiling of 5-methyl and 5-hydroxymethylcytosine in glioblastoma. Conference Presentation, Epigenomics of Common Diseases. Cambridge, UK. November 2015.
- **Johnson KC**. DNA methylation in DCIS related with future development of invasive breast cancer. Conference Presentation, Symposium of Albert J. Ryan Fellows. North Conway, NH. May 2015.

TECHNICAL SKILLS

- *Data analysis*: R/Bioconductor, UNIX/Linux shell scripting
- *Bioinformatics*: Analysis of whole genome sequencing, RNA sequencing, Illumina DNA methylation microarrays, bisulfite sequencing, and single-cell genomic data
- *Molecular biology*: clinical tissue handling and dissociation, single-cell genomic assays, cell culture, RT-PCR, and DNA sequencing library preparation

MENTORING EXPERIENCE

- Emre Kocakavuk, University of Duisburg-Essen, Medical student 2019
- Anzhela Moskalik, UConn Health, Medical student 2018 – 2019
- Yong-hun Kim, Stanford University, Undergraduate student 2018
- Alex Titus, Dartmouth College, Ph.D. candidate 2016
- David Chen, Dartmouth College, Ph.D. candidate 2016
- Owen Wilkins, Dartmouth College, Ph.D. candidate 2015 – 2016
- Dylan O'Sullivan, Dartmouth College, Undergraduate student 2014 – 2015

PROFESSIONAL ACTIVITIES

Ad-hoc reviewer for:

- *Breast Cancer Research* 2017 – Present
- *Oncotarget* 2017 – Present
- *Epigenetics* 2017 – Present
- *eLife* 2020 – Present
- *Scientific Reports* 2020 – Present
- *Communications Biology* 2020 – Present
- *Neuro-Oncology* 2020 – Present

LEADERSHIP POSITIONS

- Organizer, The Jackson Laboratory Career Roundtable 2018 – 2019
- Editor, *The Dartmouth Graduate Weekly* 2015 – 2016
- Frequent Contributor, *Dartmouth Graduate Forum* 2015 – 2016
- Founder, Dartmouth Molecular Epidemiology Working Group 2013 – 2016
- Departmental Representative, Dartmouth Graduate Student Council 2013

REFERENCES

Dr. Roel Verhaak

Applicant's postdoctoral advisor
Professor and Associate Director of Computational Biology
The Jackson Laboratory for Genomic Medicine
Phone: 860-837-2140
Email: Roel.Verhaak@jax.org

Dr. Brock Christensen

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Associate Professor of Epidemiology, Molecular and Systems Biology
Geisel School of Medicine at Dartmouth
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Dr. Paul Robson

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