Nermin Sumru Bayin, PhD

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RESEARCH INTERESTS

Neural Development and Neurogenesis
Regeneration in The Central Nervous System
Cancer Stem Cells in Brain Tumors

EDUCATION

PhD in Stem Cell Biology *2010-January 2016*
New York University Medical Center (NYUMC), Sackler Institute of Biomedical Sciences, New York, USA

MSc in Molecular Biology and Genetics *2008-2010*
Bilkent University, Department of Molecular Biology and Genetics, Ankara, TURKEY
CGPA: 3.93/4.00

BSc in Molecular Biology and Genetics *2004-2008*
Bilkent University, Department of Molecular Biology and Genetics, Ankara, TURKEY
CGPA: 3.81/4.00

EMPLOYMENT

starting March 2022

Group Leader
Gurdon Institute, University of Cambridge, UK

March 2021- Present

Senior Scientist
Developmental Biology Program, Sloan Kettering Institute, New York, USA

RESEARCH EXPERIENCE

March 2016- March 2021

Research Associate: Developmental neurogenetics focusing on the role of stem/progenitor cells in cerebellum development and injury.
Supervisor: Dr. Alexandra Joyner, Developmental Biology Program,
Sloan Kettering Institute, New York, USA

Fall 2011-February 2016

PhD Thesis: Interplay between tumor microenvironment and glioblastoma stem cells: insights for novel targeted therapeutics.
Supervisor: Dr. Dimitris Placantonakis MD. PhD., New York University Medical Center, New York, USA

Fall 2008-Summer 2010

MSc Thesis: Cancer stem cells in hepatocellular carcinoma (HCC) and the link between liver regeneration and hepatocellular carcinogenesis.
Supervisor: Dr. Kamil Can Akcali, Bilkent University, Ankara, TURKEY

Fall 2007-Spring 2008

Senior Project: Characterization of cancer stem cells in hepatocellular carcinoma based on expression of FLT3 in HCC cell lines.
Supervisor: Dr. Kamil Can Akcali, Bilkent University, Ankara, TURKEY

Summer 2007

Summer Internship: Identification of genetically interacting partners of the Apc5 subunit of APC/C in a temperature sensitive mutant of *S.pombe* and identification of new phosphorylation sites using GST fusion proteins of APC/C activator Fizzy protein.

Supervisor: Dr. Hiro Yamano, Marie Curie Research Institute, Cell Cycle Control Laboratory, Oxted, UK

Summer 2006

Summer Internship: Effect of estrogen on mesenchymal stem cell differentiation and apoptosis, and screening for FLT3 expression in rat tissues.
Supervisor: Dr. Kamil Can Akcali, Bilkent University, Ankara, TURKEY

Summer 2005

Summer Internship: DNA translocation analysis using quantitative PCR.
Supervisor: Dr. Tezer Kutluk, Hacettepe University, Oncology Hospital, Drug Resistance Laboratory, Ankara, TURKEY

TEACHING AND MENTORING EXPERIENCE

Facilitator for Biology: SUNY Farmingdale, Research Aligned Mentorship Program, New York, USA, Summer 2020
Tutor: G16.2001 Foundations Cell and Molecular Biology I, New York University, New York, USA, Fall 2011
Teaching Assistant: MBG 102 Introduction to Biology, Bilkent University, Ankara, TURKEY, Spring 2010
Teaching Assistant: MBG 470 Immunology, Bilkent University, Ankara, TURKEY, Fall 2009
Teaching Assistant: MBG 102 Introduction to Biology, Bilkent University, Ankara, TURKEY, Spring 2009
Laboratory Mentor: High school students (2), undergraduate students (4), PhD rotation students (7), visiting master's students (2), medical students (4), 2011-

HONORS AND ACHIEVEMENTS

2019-2024: NINDS K99/R00 Pathway to Independence Award
2020: Leading Edge Fellow (www.leadingedgesymposium.org)
2020: Best Oral Presentation Award at Memorial Sloan Kettering Cancer Center Postdoc Symposium
2020: MSKCC Postdoctoral Research Award (recognizing the accomplishments and promise of outstanding MSKCC postdocs)
2018-2019: NYSTEM Postdoctoral Fellowship at MSKCC (C32599GG)
2017: Best Poster Presentation Award at Memorial Sloan Kettering Cancer Center Postdoc Symposium "Neurons in the postnatal brain can be replaced by resident stem/progenitor cells that are activated in an age-dependent manner"
2015: Sackler Institute Special McCracken Award (given to students with high scholastic achievement, energetic spirit, contributions to graduate school activities and a willingness to embrace leadership roles)
2015: Outstanding Poster Award at NYUMC Helen L. and Martin S. Kimmel Center for Stem Cell Biology Retreat 2015, New York, USA "Dissecting glioblastoma stem cell heterogeneity"
2013-2015: NYSTEM Institutional Training Studentship at NYUMC (C026880)
2010: European Association for the Study of the Liver Young Investigators' Full Bursary (given to top abstracts submitted to the Annual International Liver Congress)
2008-2010: TUBITAK-BIDEB (The Scientific and Technological Research Council of Turkey) Graduate Study Scholarship (MSc)
2008-2010: Bilkent University, Full Scholarship for Graduate Study (MSc)
2007: Marie Curie Research Institute Summer Studentship
2004-2008: Bilkent University High Honor (for 4 academic years)
2005-2008: Bilkent University Success Scholarships for three academic years (given to students with top GPA and covers tuition)

PUBLICATIONS

Peer reviewed publications

1. **Bayin N.S[+]**., Mizrak M., Stephen N.D., Lao Z., Sims P.A., Joyner A.L[+]. (2020) Injury induced ASCL1 expression orchestrates a transitory cell state required for repair of the neonatal cerebellum. *Science Advances,* 7, eabj1598
   [+]*co-corresponding author*

2. Tan, I., Arifa, R.D.N., Rallapalli, H., Kana, V., Lao, Z., Sanghrajka R.M., **Bayin, N.S.,** Tanne, A., Wojcinski, A., Korshunoc A., Bhardwaj, N., Merad, M., Turnbull, D.H., Lafaille, J.J., Joyner, A.L. (2021) CSF1R inhibition depletes tumor-associated Macrophages and attenuates tumor progression in a mouse Sonic Hedgehog-Medulloblastoma model. *Oncogene*, 2021;40,396-407
3. Mizrak M., **Bayin N.S.,** Yuan J., Liu Z., Suciu R., Niphakis M.J., Ngo N., Lum K.M., Cravatt B.F., Joyner A.L., Sims, P.A. (2020) Single-Cell Profiling and SCOPE-Seq Reveal Lineage Dynamics of Adult Ventricular-Subventricular Zone Neurogenesis and NOTUM as a Key Regulator. *Cell Reports* 2020;31(12):107805
4. Ahmadzadeh E., **Bayin N.S.,** Singh A., Qu X., Madisen L., Stephen D., Zehg H., Joyner A.L., Rosello-Diez, A. (2020) A collection of genetic mouse lines and related tools for inducible and reversible intersectional mis-expression. *Development* 2020;147(10):dev186650
5. Willett, R.T.*, **Bayin, N.S.*,** Lee, A.S.*, Krishnamurthy A.*, Wojcinski, A.*, Lao, Z., Stephen, D., Rosello-Diez, A., Dauber-Decker, K.L., Orvis, G.D., Wu, Z., Tessier-Lavigne, M., Joyner, A.L. (2019). Cerebellar nuclei excitatory neurons regulate developmental scaling of presynaptic Purkinje cell number and organ growth. *eLife* 2019;8:e50617.
   ** equal contribution*
6. Stafford J.M., Lee C., Voight P., Descostes N., Meyer R., Yu J.R., Leroy G., Oksuz O., Chapman J.R., Suarez F., Modrek A.S., **Bayin N.S.,** Placantonakis D.G., Karajannis M., Snuderl M., Ueberheide B., Reingber D. (2018) Multiple modes of PRC2 inhibition elicit global chromatin alteration in H3K27M pediatric glioma, *Science Advances*, Oct 31;4(10):eaau5935
7. **Bayin N.S.,** Wojcinski A., Mourton A., Saito H., Suzuki N., Joyner A.L. (2018) Age-dependent dormant resident progenitors are stimulated by injury to regenerate Purkinje neurons. *eLife* 2018;7:e39879. PMID:30091706
8. Frenster J.D., Inocencio J.F., Xu Z., Dhaliwal J., Alghamdi A., Zagzag D., **Bayin N.S.,** & Placantonakis D.G. (2017) GPR133 promotes glioblastoma growth in hypoxia. *Neurosurgery* 64(CN_suppl_1):177-181. PMID: 28899043
9. Modrek A.S., Golub D., Khan T., Bready D., Prado J., Bowman C., Deng J., Zhang G., Rocha P., Raviram R., Lazaris H., Stafford J., LeRoy G., Kader M., Dhaliwal J., **Bayin N.S.,** Frenster J., Serrano J., Chiriboga L., Baitalmal R., Chi A., Golfinos J.G., Wang J., Karajannis M., Bonneau R., Reinberg D., Tsirigos A., Snuderl M., Zagzag D., Skok J., Neubert T., & Placantonakis D.G. (2017) Low-grade astrocytoma mutations IDH1, P53 and ATRX cooperate to block differentiation of human neural stem cells via repression of SOX2. *Cell Reports* 21(5):1267-1280. PMID: 29091765
10. Wojcinski A., Lawton A., **Bayin N.S.**, Lao Z. and Joyner A.L. (2017) Cerebellar Granule Cell Replenishment Post-Injury by Adaptive Reprogramming of Nestin+ Progenitors, *Nature Neuroscience* Oct;20(10):1361-1370 PMID:28805814
11. **Bayin N.S.,** Frenster J., Sen R., Si S., Modrek A., Ortenzi V., Zagzag D., Chiriboga., Snuderl M., Golfinos J.G., Doyle W., Galifianakis N., Chesler M., Illa-Bochaca., Barceloss-Hoff M.H., Dolgalev I., Heguy A., Placantonakis D.G. (2017) Non-uniform Notch signaling underlies heterogeneity within the glioblastoma stem cell population*, Oncotarget,* 8:64932-64953, PMID: 28586758
12. **Bayin N.S.*,** Frenster D.J.*, Kane J.R., Rubenstein J., Modrek A.S., Baitalmal R., Dolgalev I., Rudzenski K., Scarabottolo L., Crespi D., Radaelli L., Snuderl M., Golfinos J.G., Doyle W., Pacione D., Parker E.C., Chi A.S., Heguy A., MacNeil D.J., Shohdy N., Zagzag D., Placantonakis D.G. (2016) GPR133 (ADGRD1), an adhesion G protein-coupled receptor, is necessary for glioblastoma growth. *Oncogenesis* 5(10):e263. PMCID: PMC5117849
    ** equal contribution*
13. **Bayin N.S.*,** Ma, L.*, Thomas C., Baitalmal R., Sure A., Fansiwala K., Bustoros M., Golfinos J.G., Pacione D., Snuderl M., Zagzag D., Barcellos-Hoff M.H., & Placantonakis D.G. (2016) Patient-specific

screening using high-grade glioma explants to determine potential radiosensitization by a TGF-β small molecule inhibitor. *Neoplasia* (12):795-805. PMCID: PMC5156509
** equal contribution*

14. Aydin M.M., **Bayin N.S.,** Acun T., Yakicier M.C., Akcali K.C. 2016. Role of FLT3 in the proliferation and aggressiveness of hepatocellular carcinoma. (2016) *Turk J Med Sci* 46(2):572-81 PMID: 27511526
15. Basu-Roy U., **Bayin N.S.,** Rattanakorn K., Han E., Placantonakis D.G., Mansukhani A., & Basilico C. (2015) SOX2 antagonizes the Hippo pathway to maintain stemness in cancer cells. *Nature Communications* 2;6:6411. PMCID: PMC4429898
16. Murtha M., Strino F. Tokcaer-Keskin Z., **Bayin N.S.,** Shalabi D., Xi X., Kluger Y., Dailey L., (2015) Comparative FAIRE-Seq analysis reveals distinguishing features of the chromatin structure of ground state and primed pluripotent cells. *Stem Cells* 33(2):378-91. PMCID: PMC4304912
17. **Bayin N.S.,** Modrek A., Dietrich A., Abel T., Song H.-R., Schober M., Buchholz C., Chao M.V., Placantonakis D.G. (2014) Selective lentiviral gene delivery into CD133-expressing human glioblastoma stem sells. *PLoSOne* 9:e116114. PMCID: PMC4277468
18. **Bayin N.S.,** Modrek A.S. & Placantonakis D.G. (2014) Glioblastoma stem cells: molecular characteristics and therapeutic implications. *World Journal of Stem Cells* 6:230-238. PMCID: PMC3999780 (*Invited Review)*
19. Modrek A.S., **Bayin N.S.** & Placantonakis D.G. (2014) Stem cells as the cell of origin in glioma. *World Journal of Stem Cells* 6:43-52. PMCID: PMC3927013 (*Review*)
20. Labit H., Fujimitsu K., **Bayin N.S.,** Takaki T., Gannon J., Yamano H. (2012) Dephosphorylation of Cdc20 is required for its C-box-dependent activation of the APC/C. *EMBO J.* 31(15):3351-62. PMCID: PMC3411074

Manuscripts in preparation or under revision

1. **Bayin N.S.,** Joyner A.L. Stimulation of rare endogenous adult stem cells in the cerebellum upon injury (*in preparation*)
2. Ahn H.J., Snuderl M., **Bayin N.S.,** Thomas C., Placantonakis D.G., Zou J., Yaroslavsky A., Dietz M.P., Jacques S.L., Strickland S., Krueger J., Gareau D. Fiberoptic spectroscopic brain oximetry analyzes cerebral perfusion in mouse models of Alzheimer's disease and glioma (*under revision*)

Book Chapters and Editorial

1. **Bayin N.S.,** Ma L., Placantonakis D.G., Barcellos-Hoff M.H. (2018) Evaluation of radioresponse and radiosensitizers in glioblastoma organotypic cultures. *Methods in Molecular Biology* (ed. D.G. Placantonakis) Springer
2. **Bayin N.S.,** Placantonakis D.G. (2018) Evaluation of vascularity, blood perfusion and oxygen tension in tumor xenografts with fluorescent microscopy. *Methods in Molecular Biology* (ed. D.G. Placantonakis) Springer
3. **Bayin N.S.,** Placantonakis D.G. (2018) Selective targeting of CD133-expressing glioblastoma stem cells using lentiviral vectors. *Methods in Molecular Biology* (ed. D.G. Placantonakis) Springer
4. Sen R., Dolgalev I., **Bayin N.S.,** Heguy A., Tsirigos A., Placantonakis D.G. (2018) Single-Cell RNA Sequencing of
glioblastoma cells. *Methods in Molecular Biology* (ed. D.G. Placantonakis) Springer
5. **Bayin, N.S.,** Modrek, A. & Placantonakis, D.G. (2013) Brain tumor stem cells in molecular pathology of nervous system tumors: biological stratification and targeted therapies (ed. M. A. Karajannis & D. Zagzag). Springer
6. **Bayin, N.S.,** & Placantonakis, D.G. (2014) Heterogeneity and diversity of cancer stem cells in Glioblastoma. *International Journal of Stem Cell Research and Therapy* 1:001e. *(Editorial)*

ORAL PRESENTATIONS

Invited Talk

"Utilizing developmental programs to enable and enhance regeneration" HHMI Janelia Planning Workshop, R3-Replace, Repair, Regenerate, July 2021

Invited Talks Based on Submitted Abstracts

1. "Unraveling stem cell behaviors upon injury to the brain" MSKCC Postdoc Symposium, 2020
2. "Neural stem cell diversity and age dependent regenerative mechanisms in the brain" Virtual Leading Edge Symposium, 2020
3. "Unraveling stem cell behaviors upon injury to the brain" Cold Spring Harbor Laboratories, Stem Cell Meeting, 2019
4. "Neurons in the postnatal brain can be replaced by resident stem/progenitor cells that are activated in an age-dependent manner" EMBO Workshop on the Molecular and Cellular Basis of Regeneration and Tissue Repair, 2018
5. "Neurons in the postnatal brain can be replaced by resident stem/progenitor cells in an age-dependent manner", Cold Spring Harbor Laboratories, Stem Cell Meeting, 2017
6. "Defining glioblastoma stem cell heterogeneity", Society for Neuro-Oncology Annual Meeting, 2015
7. "Glioblastoma stem cell heterogeneity", Next Gen Stem Cell Conference, 2015
8. "Glioblastoma stem cell heterogeneity", NYSTEM Annual Meeting, 2015
9. "A novel gene therapy approach in glioblastoma that targets tumor stem cells", NYSTEM Annual Meeting, 2013

Local Meeting Presentations

1. "Unraveling stem cell behaviors upon injury to the brain" Developmental Biology Program Colloquium, 2020
2. "Stem Cells in development and disease" Summer Research Seminar Series at MSKCC, 2020
3. "Unraveling stem cell behaviors upon injury to the brain" NYC wide NYSTEM Trainee Meeting, 2019
4. "Unraveling stem cell behaviors upon injury to the brain" Center for Stem Cell Biology Postdoc and Student Stem Cell Forum, 2019
5. "Unraveling stem cell behaviors upon injury to the brain" Neurodevelopment Group Meeting, 2019,
6. "Age-dependent dormant resident progenitors are stimulated by injury to regenerate Purkinje neurons" Developmental Biology Program Colloquium, 2018
7. ""Age-dependent dormant resident progenitors are stimulated by injury to regenerate Purkinje neurons" Center for Stem Cell Biology Postdoc and Student Stem Cell Forum, 2018
8. "Age-dependent dormant resident progenitors are stimulated by injury to regenerate Purkinje neurons" Neurodevelopment Group Meeting, 2018
9. "Glioblastoma stem cell heterogeneity", Stem Cells in the City Meeting, 2014
10. "Glioblastoma stem cell heterogeneity", NYU Neuro-oncology Working Group Monthly Meeting, 2015

POSTER PRESENTATIONS (Selected 13/19)

1. "Dissecting postnatal cerebellar progenitor diversity and plasticity during development and regeneration" Gordon Research Conference Cerebellum, Les Diableretes, SWITZERLAND, 2019
2. "Age dependent regeneration of Purkinje neurons in the neonatal cerebellum" Annual Postdoc Symposium, MSKCC, New York, USA, 2018
3. "Neurons in the postnatal brain can be replaced by resident stem/progenitor cells activated in an age-dependent manner" Annual Postdoc Symposium, MSKCC, New York, USA, 2017
4. "GPR133, an adhesion G-protein coupled receptor, is necessary for glioblastoma growth", Society of Neuro-Oncology Annual Meeting, San Antonio, USA, 2015
5. "Dissecting glioblastoma stem cell heterogeneity", Helen L. and Martin S. Kimmel Center for Stem Cell Biology Retreat, New York, USA, 2015
6. "Non-uniform Notch signaling underlies heterogeneity within glioblastoma stem cell population", Society

for Neuro-Oncology Annual Meeting, Miami, USA, 2014

7. "Glioblastoma stem cell heterogeneity", International Society of Stem Cell Research Annual Meeting, Vancouver, CANADA, 2014
8. "Dissecting glioblastoma stem cell heterogeneity", Helen L. and Martin S. Kimmel Center for Stem Cell Biology Retreat, New York, USA, 2014
9. "Selective targeting of glioblastoma stem cells", Helen L. and Martin S. Kimmel Center for Stem Cell Biology Retreat, New York, USA, 2013
10. "A novel gene therapy approach in glioblastoma that targets tumor stem cells", Society for Neuro-Oncology Annual Meeting, Washington DC, USA, 2012
11. "Specific targeting of glioblastoma stem cells", Society for Neuroscience Annual Meeting, New Orleans, USA, 2012
12. "Specific targeting of glioblastoma stem cells with lentiviral vectors", Helen L. and Martin S. Kimmel Center for Stem Cell Biology Retreat, New York, USA, 2012
13. "FLT3 may function as a link between liver regeneration and hepatocellular carcinogenesis", European Association for the Study of the Liver Monothematic Conference on Signaling in the Liver, Amsterdam, The NETHERLANDS, 2010

PATENTS

04/29/2015 U.S. Provisional Appl. No. 62/154,173. Method for treating high-grade gliomas.
04/29/2016 U.S. Non-Provisional Appl. Serial No. PCT/US16/3020. Method for treating high-grade gliomas.

SERVICE AND OUTREACH

1. Ad Hoc Reviewer (2020-): eLife, Developmental Biology, Science Advances, Nature Communications, Cerebellum
2. Co-organizer of the Leading Edge Symposium "Build Your Brand" and "How to Give an Effective Chalk Talk" Workshops (2021)
3. Co-organizer of the Single cell 'omics focus group (March 2020-): a monthly work in progress series for the Developmental Biology Program at MSKCC
4. MSKCC representative (2019) and organizer of the city-wide NYSTEM trainee meetings