

Boaz Barak  
Associate Professor  
School of Psychological Sciences  
Sagol School of Neuroscience



## Employment

### Associate Professor

Associate Professor  
School of Psychological Sciences  
Tel Aviv University  
1 Dec 2022 → present

### Senior Lecturer

Senior Lecturer  
School of Psychological Sciences  
Tel Aviv University  
1 Oct 2017 → 30 Nov 2022

### School of Psychological Sciences

Tel Aviv University  
1 Aug 2017 → 30 Sep 2017

## Research outputs

### Long-Term Excessive Alcohol Consumption Enhances Myelination in the Mouse Nucleus Accumbens

Liran, M., Fischer, I., Elboim, M., Rahamim, N., Gordon, T., Urshansky, N., Assaf, Y., Barak, B. & Barak, S., 2 Apr 2025, In: *Journal of Neuroscience*. 45, 14, e0280242025.

### Drug delivery systems for treating neurodevelopmental disorders

Barak, B. & Decuzzi, P., Jan 2025, In: *Advanced Drug Delivery Reviews*. 216, 115473.

### Shank3 mutation impairs glutamate signaling and myelination in ASD mouse model and human iPSC-derived OPCs

Fischer, I., Shohat, S., Leichtmann-Bardoogo, Y., Nayak, R., Wiener, G., Rosh, I., Shemen, A., Tripathi, U., Rokach, M., Bar, E., Hussein, Y., Castro, A. C., Chen, G., Soffer, A., Schokoroy-Trangle, S., Elad-Sfadia, G., Assaf, Y., Schroeder, A., Monteiro, P. & Stern, S. & 2 others, Maoz, B. M. & Barak, B., 11 Oct 2024, In: *Science advances*. 10, 41, eadl4573.

### Neuronal deletion of Gtf2i results in developmental microglial alterations in a mouse model related to Williams syndrome

Bar, E., Fischer, I., Rokach, M., Elad-Sfadia, G., Shirenova, S., Ophir, O., Trangle, S. S., Okun, E. & Barak, B., Jun 2024, In: *GLIA*. 72, 6, p. 1117-1135 19 p.

### Tackling myelin deficits in neurodevelopmental disorders using drug delivery systems

Rokach, M., Portioli, C., Brahmachari, S., Estevão, B. M., Decuzzi, P. & Barak, B., Apr 2024, In: *Advanced Drug Delivery Reviews*. 207, 115218.

### Neuronal Gtf2i deletion alters mitochondrial and autophagic properties

Nir Sade, A., Levy, G., Schokoroy Trangle, S., Elad Sfadia, G., Bar, E., Ophir, O., Fischer, I., Rokach, M., Atzmon, A., Parnas, H., Rosenberg, T., Marco, A., Elroy Stein, O. & Barak, B., Dec 2023, In: *Communications Biology*. 6, 1, 1269.

### Impaired myelin ultrastructure is reversed by citalopram treatment in a mouse model for major depressive disorder

Israel-Elgali, I., Pan, H., Oved, K., Pillar, N., Levy, G., Barak, B., Carneiro, A., Gurwitz, D. & Shomron, N., Oct 2023, In: *Journal of Psychiatric Research*. 166, p. 100-114 15 p.

**Deletion of Gtf2i via Systemic Administration of AAV-PHP.eB Virus Increases Social Behavior in a Mouse Model of a Neurodevelopmental Disorder**

Ophir, O., Levy, G., Bar, E., Kimchi Feldhorn, O., Rokach, M., Elad Sfadia, G. & Barak, B., Aug 2023, In: Biomedicines. 11, 8, 2273.

**In individuals with Williams syndrome, dysregulation of methylation in non-coding regions of neuronal and oligodendrocyte DNA is associated with pathology and cortical development**

Trangle, S. S., Rosenberg, T., Parnas, H., Levy, G., Bar, E., Marco, A. & Barak, B., Mar 2023, In: Molecular Psychiatry. 28, 3, p. 1112-1127 16 p.

**Hyperbaric Oxygen Therapy Alleviates Social Behavior Dysfunction and Neuroinflammation in a Mouse Model for Autism Spectrum Disorders**

Fischer, I., Shohat, S., Levy, G., Bar, E., Trangle, S. S., Efrati, S. & Barak, B., Oct 2022, In: International Journal of Molecular Sciences. 23, 19, 11077.

**SH3- and actin-binding domains connect ADNP and SHANK3, revealing a fundamental shared mechanism underlying autism**

Ivashko-Pachima, Y., Ganaiem, M., Ben-Horin-Hazak, I., Lobyntseva, A., Bellaiche, N., Fischer, I., Levy, G., Sragovich, S., Karmon, G., Giladi, E., Shazman, S., Barak, B. & Gozes, I., Aug 2022, In: Molecular Psychiatry. 27, 8, p. 3316-3327 12 p.

**Altered White Matter and microRNA Expression in a Murine Model Related to Williams Syndrome Suggests that miR-34b/c Affects Brain Development via Ptpu and Dcx Modulation**

Grad, M., Nir, A., Levy, G., Trangle, S. S., Shapira, G., Shomron, N., Assaf, Y. & Barak, B., 1 Jan 2022, In: Cells. 11, 1, 158.

**Behavioral aspects and neurobiological properties underlying medical cannabis treatment in Shank3 mouse model of autism spectrum disorder**

Poleg, S., Kourieh, E., Ruban, A., Shapira, G., Shomron, N., Barak, B. & Offen, D., Dec 2021, In: Translational Psychiatry. 11, 1, 524.

**miR-128 as a Regulator of Synaptic Properties in 5xFAD Mice Hippocampal Neurons**

Shvarts-Serebro, I., Sheinin, A., Gottfried, I., Adler, L., Schottlender, N., Ashery, U. & Barak, B., Dec 2021, In: Journal of Molecular Neuroscience. 71, 12, p. 2593-2607 15 p.

**Williams syndrome**

Kozel, B. A., Barak, B., Kim, C. A., Mervis, C. B., Osborne, L. R., Porter, M. & Pober, B. R., Dec 2021, In: Nature Reviews Disease Primers. 7, 1, 42.

**Postnatal therapeutic approaches in genetic neurodevelopmental disorders**

Levy, G. & Barak, B., Mar 2021, In: Neural Regeneration Research. 16, 3, p. 414-422 9 p.

**White matter alterations in Williams syndrome related to behavioral and motor impairments**

Nir, A. & Barak, B., Jan 2021, In: GLIA. 69, 1, p. 5-19 15 p.

**Myeltracer: A semi-automated software for myelin g-ratio quantification**

Kaiser, T., Allen, H. M., Kwon, O., Barak, B., Wang, J., He, Z., Jiang, M. & Feng, G., 2021, In: eNeuro. 8, 4, ENEURO.0558-20.2021.

**Molecular and therapeutic aspects of hyperbaric oxygen therapy in neurological conditions**

Fischer, I. & Barak, B., Sep 2020, In: Biomolecules. 10, 9, p. 1-17 17 p., 1247.

**Shank3 mutation in a mouse model of autism leads to changes in the S-nitroso-proteome and affects key proteins involved in vesicle release and synaptic function**

Amal, H., Barak, B., Bhat, V., Gong, G., Joughin, B. A., Wang, X., Wishnok, J. S., Feng, G. & Tannenbaum, S. R., 1 Aug 2020, In: Molecular Psychiatry. 25, 8, p. 1835-1848 14 p.

An Ultra-Sensitive Step-Function Opsin for Minimally Invasive Optogenetic Stimulation in Mice and Macaques  
Gong, X., Mendoza-Halliday, D., Ting, J. T., Kaiser, T., Sun, X., Bastos, A. M., Wimmer, R. D., Guo, B., Chen, Q., Zhou, Y., Pruner, M., Wu, C. W. H., Park, D., Deisseroth, K., Barak, B., Boyden, E. S., Miller, E. K., Halassa, M. M., Fu, Z. & Bi, G. & 2 others, Desimone, R. & Feng, G., 8 Jul 2020, In: *Neuron*. 107, 1, p. 38-51.e8

**Erratum: An Ultra-Sensitive Step-Function Opsin for Minimally Invasive Optogenetic Stimulation in Mice and Macaques (*Neuron* (2020) 107(1) (38–51.e8), (S0896627320302397), (10.1016/j.neuron.2020.03.032))**

Gong, X., Mendoza-Halliday, D., Ting, J. T., Kaiser, T., Sun, X., Bastos, A. M., Wimmer, R. D., Guo, B., Chen, Q., Zhou, Y., Pruner, M., Wu, C. W. H., Park, D., Deisseroth, K., Barak, B., Boyden, E. S., Miller, E. K., Halassa, M. M., Fu, Z. & Bi, G. & 2 others, Desimone, R. & Feng, G., 8 Jul 2020, In: *Neuron*. 107, 1, p. 197 1 p.

Author Correction: Systematic comparison of single-cell and single-nucleus RNA-sequencing methods (*Nature Biotechnology*, (2020), 38, 6, (737-746), 10.1038/s41587-020-0465-8)

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Systematic comparison of single-cell and single-nucleus RNA-sequencing methods

Ding, J., Adiconis, X., Simmons, S. K., Kowalczyk, M. S., Hession, C. C., Marjanovic, N. D., Hughes, T. K., Wadsworth, M. H., Burks, T., Nguyen, L. T., Kwon, J. Y. H., Barak, B., Ge, W., Kedaigle, A. J., Carroll, S., Li, S., Hacohen, N., Rozenblatt-Rosen, O., Shalek, A. K. & Villani, A. C. & 2 others, Regev, A. & Levin, J. Z., 1 Jun 2020, In: *Nature Biotechnology*. 38, 6, p. 737-746 10 p.

Differential excitatory vs inhibitory SCN expression at single cell level regulates brain sodium channel function in neurodevelopmental disorders

Du, J., Simmons, S., Brunklaus, A., Adiconis, X., Hession, C. C., Fu, Z., Li, Y., Shema, R., Møller, R. S., Barak, B., Feng, G., Meisler, M., Sanders, S., Lerche, H., Campbell, A. J., McCarroll, S., Levin, J. Z. & Lal, D., Jan 2020, In: *European Journal of Paediatric Neurology*. 24, p. 129-133 5 p.

**Microglia roles in synaptic plasticity and myelination in homeostatic conditions and neurodevelopmental disorders**

Bar, E. & Barak, B., 1 Nov 2019, In: *GLIA*. 67, 11, p. 2125-2141 17 p.

**Publisher Correction: Neuronal deletion of *Gtf2i*, associated with Williams syndrome, causes behavioral and myelin alterations rescuable by a remyelinating drug (*Nature Neuroscience*, (2019), 22, 5, (700-708), 10.1038/s41593-019-0380-9)**

Barak, B., Zhang, Z., Liu, Y., Nir, A., Trangle, S. S., Ennis, M., Levandowski, K. M., Wang, D., Quast, K., Boulting, G. L., Li, Y., Bayarsaihan, D., He, Z. & Feng, G., 1 Jul 2019, In: *Nature Neuroscience*. 22, 7, p. 1197 1 p.

**Neuronal deletion of *Gtf2i*, associated with Williams syndrome, causes behavioral and myelin alterations rescuable by a remyelinating drug**

Barak, B., Zhang, Z., Liu, Y., Nir, A., Trangle, S. S., Ennis, M., Levandowski, K. M., Wang, D., Quast, K., Boulting, G. L., Li, Y., Bayarsaihan, D., He, Z. & Feng, G., 1 May 2019, In: *Nature Neuroscience*. 22, 5, p. 700-708 9 p.

Dichotomous parvalbumin interneuron populations in dorsolateral and dorsomedial striatum

Monteiro, P., Barak, B., Zhou, Y., McRae, R., Rodrigues, D., Wickersham, I. R. & Feng, G., 15 Aug 2018, In: *Journal of Physiology*. 596, 16, p. 3695-3707 13 p.

Direct modulation of GFAP-expressing glia in the arcuate nucleus bi-directionally regulates feeding

Chen, N., Sugihara, H., Kim, J., Fu, Z., Barak, B., Sur, M., Feng, G. & Han, W., 18 Oct 2016, In: *eLife*. 5, OCTOBER2016, e18716.

Neurobiology of social behavior abnormalities in autism and Williams syndrome

Barak, B. & Feng, G., 26 Apr 2016, In: *Nature Neuroscience*. 19, 6, p. 647-655 9 p.

**Mice with Shank3 Mutations Associated with ASD and Schizophrenia Display Both Shared and Distinct Defects**  
Zhou, Y., Kaiser, T., Monteiro, P., Zhang, X., Van der Goes, M. S., Wang, D., Barak, B., Zeng, M., Li, C., Lu, C., Wells, M., Amaya, A., Nguyen, S., Lewis, M., Sanjana, N., Zhou, Y., Zhang, M., Zhang, F., Fu, Z. & Feng, G., 6 Jan 2016, In: *Neuron*. 89, 1, p. 147-162 16 p.

**Cardiovascular fitness and cognitive spatial learning in rodents and in humans**  
Barak, B., Feldman, N. & Okun, E., Sep 2015, In: *Journals of Gerontology - Series A Biological Sciences and Medical Sciences*. 70, 9, p. 1059-1066 8 p.

**Toll-like receptors as developmental tools that regulate neurogenesis during development: an update**  
Barak, B., Feldman, N. & Okun, E., 1 Aug 2014, In: *Frontiers in Neuroscience*. 8

**ER stress-induced eIF2-alpha phosphorylation underlies sensitivity of striatal neurons to pathogenic huntingtin**  
Leitman, J., Barak, B., Benyair, R., Shenkman, M., Ashery, U., Hartl, F. U. & Lederkremer, G. Z., 3 Mar 2014, In: *PLoS ONE*. 9, 3, e90803.

#### **The Molecular Mechanisms Underlying Synaptic Transmission**

Ashery, U., Bielopolski, N., Lavi, A., Barak, B., Michaeli, L., Ben-Simon, Y., Sheinin, A., Bar-On, D., Shapira, Z. & Gottfried, I., Dec 2013, *The Synapse: Structure and Function*. Elsevier Inc., p. 21-109 89 p.

**Neuron-specific expression of tomosyn1 in the mouse hippocampal dentate gyrus impairs spatial learning and memory**  
Barak, B., Okun, E., Ben-Simon, Y., Lavi, A., Shapira, R., Madar, R., Wang, Y., Norman, E., Sheinin, A., Pita, M. A., Yizhar, O., Mughal, M. R., Stuenkel, E., Van Praag, H., Mattson, M. P. & Ashery, U., Jun 2013, In: *NeuroMolecular Medicine*. 15, 2, p. 351-363 13 p.

#### **Opposing actions of environmental enrichment and Alzheimer's disease on the expression of hippocampal microRNAs in mouse models.**

Barak, B., Shvarts-Serebro, I., Modai, S., Gilam, A., Okun, E., Michaelson, D. M., Mattson, M. P., Shomron, N. & Ashery, U., 2013, In: *Translational Psychiatry*. 3, p. e304

#### **Evidence for a Developmental Role for TLR4 in Learning and Memory**

Okun, E., Barak, B., Saada-Madar, R., Rothman, S. M., Griffioen, K. J., Roberts, N., Castro, K., Mughal, M. R., Pita, M. A., Stranahan, A. M., Arumugam, T. V. & Mattson, M. P., 11 Oct 2012, In: *PLoS ONE*. 7, 10, e47522.

**Highly ordered large-scale neuronal networks of individual cells - Toward single cell to 3D nanowire intracellular interfaces**  
Kwiat, M., Elnathan, R., Pevzner, A., Peretz, A., Barak, B., Peretz, H., Ducobni, T., Stein, D., Mittelman, L., Ashery, U. & Patolsky, F., 25 Jul 2012, In: *ACS Applied Materials and Interfaces*. 4, 7, p. 3542-3549 8 p.

#### **Tomosyn expression pattern in the mouse hippocampus suggests both presynaptic and postsynaptic functions**

Barak, B., Williams, A., Bielopolski, N., Gottfried, I., Okun, E., Brown, M. A., Matti, U., Rettig, J., Stuenkel, E. L. & Ashery, U., 20 Dec 2010, In: *Frontiers in Neuroanatomy*. DEC

#### **Toll-like receptor 3 inhibits memory retention and constrains adult hippocampal neurogenesis**

Okun, E., Griffioen, K., Barak, B., Roberts, N. J., Castro, K., Pita, M. A., Cheng, A., Mughal, M. R., Wan, R., Ashery, U. & Mattson, M. P., 31 Aug 2010, In: *Proceedings of the National Academy of Sciences of the United States of America*. 107, 35, p. 15625-15630 6 p.

#### **Friends and foes in synaptic transmission: the role of tomosyn in vesicle priming**

Ashery, U., Bielopolski, N., Barak, B. & Yizhar, O., May 2009, In: *Trends in Neurosciences*. 32, 5, p. 275-282 8 p.