



Dario Mizrachi, Ph.D. Assistant Professor  
College of Life Sciences  
Department of Physiology and Developmental Biology  
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#### EDUCATION

**Doctor of Philosophy: *Physiology, Animal Reproduction***

Hebrew University of Jerusalem, Israel

(2002)

*The role of gonadotropins in the regulation of bovine uterine physiology.*

**Master in Science *Biochemistry***

(1995)

University of Santiago de Chile, Chile

*Study of the genetic and allelic frequency of the locus HLA-DQ  $\alpha$  in the Chilean population, and its correlation with gastric adenocarcinoma.*

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#### POSTDOCTORAL TRAINING

- **05/2003-10/2004** Postdoctoral Scholar with Dr. S. Ramaswamy, Dept of Biochemistry, University of Iowa, Iowa City, Iowa.

Area developed: **structural biology, computational biology (Homology Modeling: Amber software for Molecular Dynamics)**

- **08/1999-10/2004** Postdoctoral Fellow with Dr. Deborah Segaloff, Dept of Physiology and Biophysics, University of Iowa, Iowa City, Iowa.

Area developed: **endocrine and reproductive physiology, cell biology, molecular biology, structure-function studies**

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#### POSITIONS

- **01/01/2017 – present Assistant Professor BYU Physiology and Developmental Biology**
- **11/2012-12/2016** Postdoctoral Associate, Laboratory of Professor Matthew DeLisa. Chemical and Biomolecular Engineering, Cornell University (Synthetic Biology)
- **10/2011-10/2012** Research Scientist, Laboratory of Professor Varda Shoshan-Barmatz, Dept. of Life Sciences Ben Gurion University, Israel
- **03/2007-08/2011** Instructor, Laboratory of Professor Richard J. Auchus, Dept of Internal Medicine, UT Southwestern Medical Center, Dallas, Texas.
- **11/2004-02/2007** Instructor, Laboratory of Dr. Stephen Sprang, Dept of Biochemistry, UT Southwestern Medical Center, Dallas, Texas.

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#### HONORS AND PROFESSIONAL AFFILIATIONS

**Honors:**

April 2001-March 2003 Lalor Foundation Postdoctoral Fellowship

**Professional Affiliations:**

- American Heart Association
- American Society of Biochemistry and Molecular Biology
- Biophysical Society

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## Manuscripts in preparation

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1. Engineering Tight Junctions in *E. coli*: high throughput technology for drug discovery. **Rollins, Worthington, Garner, Morgan, Bailey** and **Mizrachi** (Target journal: Nature Methods)
2. Claudin protein engineering: a door into Tight Junction assembly. **LeCheminant, Memmott, Miskin, Warner**, Suli and **Mizrachi** (Target journal: Nature Communications)
3. A new size exclusion protein standard that enables statistical analysis. **Uribe, Castro, Smith, Anderson**, and **Mizrachi** (Target journal: Protein Engineering Design and Selection)

\*\* Undergraduate students are highlighted in green.

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## PUBLICATIONS

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1. Identification and kinetics characterization of a wax ester hydrolase from a feather-degrading actinomycete. Barcus M., **Mizrachi D**, Lei X.G. (**bioRxiv August 2017**)
1. A water-soluble DsbB variant that catalyzes disulfide-bond formation *in vivo*. **Dario Mizrachi**, Michael-Paul Robinson, Guoping Ren, Na Ke, Mehmet Berkmen, Matthew P DeLisa. **Nature Chemical Biology** (13, 1022–1028 (2017))
2. Smilansky A, Dangoor L, Nakdimon I, Ben-Hail D, **Mizrachi D**, Shoshan-Barmatz V. The Voltage-dependent Anion Channel 1 Mediates Amyloid  $\beta$  Toxicity and Represents a Potential Target for Alzheimer Disease Therapy. *J Biol Chem*. 2015 Dec 25;290(52):30670-83
3. Conley A, Corbin J, **Mizrachi D**, Holien J, Rodgers R, Parker M., Martin L. Evolutionary comparisons predict that dimerization of human cytochrome P450 aromatase increases its enzymatic activity and efficiency. *J. of Steroid Biochemistry and Molecular Biology* 2015 Nov;154:294-301
4. **Dario Mizrachi**, Yujie Chen, Jiayan Liu, Hwei-Ming Peng, Ailong Ke, Lois Pollack, Richard Auchus, Raymond J Turner, Matthew P DeLisa. Making water-soluble integral membrane proteins using an engineered amphipathic protein fusion." **Nature Communications** (2015 Apr 8;6:6826)
5. Shoshan-Barmatz V., Shteinfer A., Ben Hail D., Arif T., and **Mizrachi D**. At the crossroads between mitochondrial metabolite transport and apoptosis: VDAC1 as an emerging cancer drug target. Chapter 16 in book *Stress Response Pathways in Cancer*, Springer Science 2015 (DOI 10.1007/978-94-017-9421-3)
6. Boock JT, Waraho-Zhmeyev D, **Mizrachi D**, and DeLisa MP. Beyond the cytoplasm of *Escherichia coli*: localizing recombinant proteins where you want them. Methods Mol Biol (2015;1258:79-97)
7. Hans K. Ghayee, Vikash J. Bhagwandin, Victor Stastny, Arielle Click, Liang-Hao Ding, **Dario Mizrachi**, Ying S. Zou, Raj Chari, Wan L. Lam, Robert M. Bachoo, Alice L. Smith, Michael D. Story, Stan Sidhu, Bruce G. Robinson, Fiemu E. Nwariaku, Adi F. Gazdar, Richard J. Auchus, Jerry W. Shay. Progenitor Cell Line (hPheo1) Derived from a Human Pheochromocytoma Tumor. PLoS One. 2013 Jun 13;8(6)
8. Shoshan-Barmatz V., **Mizrachi D.**, Keinan N. Oligomerization of the mitochondrial protein VDAC1: From structure to function and cancer therapy. Chapter contribution to "OLIGOMERIZATION IN HEALTH AND DISEASE" of the Prog Mol Biol Transl Sci. 2013;117:303-34 Shoshan-Barmatz V. and **Mizrachi D**. VDAC1: from structure to cancer therapy. Front Oncol. 2012 Nov 29;2:164



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9. Shoshan-Barmatz V. and **Mizrachi D.** VDAC1 (voltage-dependent anion channel 1). Atlas of Genetics and Cytogenetics in Oncology and Haematology (Online: <http://atlasgeneticsoncology.org/index.html>)
10. Ana F. Trueba, Pia Vogel, **Dario Mizrachi**, Richard Auchus and Thomas Ritz. Effects of Psychosocial Stress on the Pattern of Salivary Protein Release. Physiol Behav 2011 Oct 25;105(3):841-849
11. Anil K. Agarwal\*, Suja Sukumaran, Víctor A. Cortés, Katie Tunison, **Dario Mizrachi**, Robert Gerard, Kate Luby-Phelps, Jay D. Horton and Abhimanyu Garg. Biochemical characterization of human AGPAT isoforms 1 and 2 and their inability to rescue hepatic steatosis in Agpat2<sup>-/-</sup> lipodystrophic mice. J Biol Chem 2011 Oct 28;286(43):37676-91
12. **Dario Mizrachi**, Zhu Wang, Kamalesh Sharma, Manisha K. Gupta, Keliang Xu, Christopher R. Dwyer, and Richard J. Auchus. Why Human Cytochrome P450c21 is a Progesterone 21-Hydroxylase. Biochemistry. 2011 May 17;50(19):3968-74
13. Anil K. Agarwal, Chao Xing, George N. DeMartino, **Dario Mizrachi**, Maria Dolores Hernandez, Ana Berta Sousa, Laura Martínez de Villarreal, Heloísa G. dos Santos, Abhimanyu Garg. PSMB8, a gene encoding a catalytic subunit of the proteasome, is mutated in patients with joint contractures, muscle atrophy, microcytic anemia and panniculitis-induced lipodystrophy (JMP) syndrome.
14. Jennifer Bartlett, LoKesh Gakhar, **Dario Mizrachi**, Subramanian Ramaswamy, Paul McCray. PLUNC is a secreted product of airway epithelia and neutrophil granules with surfactant activity. PLoS One. 2010 Feb 9;5(2):e9098. Am J Hum Genet. 2010 Dec 10;87(6):866-72.
15. Sherbet DP, Guryev OL, Papari-Zareei M, **Mizrachi D**, Rambally S, Akbar S, Auchus RJ. Biochemical factors governing the steady-state estrone/estradiol ratios catalyzed by human 17beta-hydroxysteroid dehydrogenases types 1 and 2 in HEK-293 cells. Endocrinology. 2009 Sep; 150(9): 4154-62.
16. **Dario Mizrachi**, Richard Auchus. Androgens, estrogens, and hydroxysteroid dehydrogenases. Mol Cell Endocrinol. 2009 Mar 25;301(1-2):37-42.
17. Feng X, Mueller T\*, **Mizrachi D\***, Fanelli F, and Segaloff DL. The Role of a Non-Conserved Residue in the Second Intracellular Loop in Conferring Different Basal Constitutive Activities of the Human Lutropin and Thyrotropin Receptors. Endocrinology. 2008 Apr;149(4):1705-18. (\*contributed equally)
17. Segaloff, D.L. and **Mizrachi, D.** Structure-function relationships of gonadotropin action. In: Updates in Infertility Treatment 2004 (Filicori, M., ed.), Medimond, 17-28, 2005.
18. Zhang, M., **Mizrachi, D.**, Fanelli, F., and Segaloff, D.L. The formation of a salt bridge between helices 3 and 6 is responsible for the constitutive activity and lack of hormone

responsiveness of the naturally occurring L457R mutation of the human lutropin receptor. J. Biol. Chem. 2005 Jul 15;280(28):26169-76.

19. **Mizrachi, D.**, and Segaloff, D.L. Intracellularly Located Misfolded Glycoprotein Hormone Receptors Associate with Different Chaperone Proteins than their Cognate Wild-Type Receptors. Mol. Endocrinol. 2004 Jul;18(7):1768-77
20. Ascoli, M., **Mizrachi, D.** and Segaloff, D.L. Thyroid-Stimulating Hormone/Luteinizing Hormone/Follicle-Stimulating Hormone Receptors. In: Encyclopedia of Biological Chemistry (Lennarz, W.J and Lane, M.D., eds.) Elsevier Science, 2004
21. Tao, Y.-X., **Mizrachi, D.**, and Segaloff, D.L. Chimeras of the rat and human follitropin receptors (FSHR) identify residues that permit or suppress TM6 mutation-induced constitutive activation of the hFSHR via rearrangements of hydrophobic interactions between helices 6 and 7. Mol. Endocrinol. 2002 Aug;16(8):1881-92.
22. Shemesh, M., **Mizrachi, D.**, Gurevich, M., Shore, L.S., Reed, J., Chang, S.-M.T., Thatcher, W.W., and Fields, M.J. Expression of functional luteinizing hormone (LH) receptor and its messenger ribonucleic acid in bovine endometrium: LH augmentation of cAMP and inositol phosphate *in vitro* and human chorionic gonadotropin (hCG) augmentation of peripheral prostaglandin *in vivo*. Reprod. Biol. 1:15-34, 2001.
23. Shemesh, M., **Mizrachi, D.**, Gurevich, M., Stram, Y., Shore, L.S., Fields, M.J. Functional importance of bovine myometrial and vascular LH receptors and cervical FSH receptors. Seminars in Reproductive Endocrinology, 19:87-96, 2001.
24. Shemesh, M., **Mizrachi, D.**, Gurevich, M., Stram, Y., Shore, L.S., and Fields, M.J. Direct involvement of LH in uterine function. Reproduction in Domestic Animals 35:163-166, 2000.
25. **Mizrachi, D.** and Shemesh, M. Follicle stimulating hormone receptor and its messenger RNA are present in the bovine cervix and can regulate cervical prostanoid. Biol Reprod., 61:776-784, 1999.
26. **Mizrachi, D.** and Shemesh, M. Expression of functional luteinizing hormone receptor and its mRNA in bovine cervix: LH augmentation of cAMP, phosphate inositol and cyclooxygenase. Mol. Cell. Endocrinol. 157:191-200, 1999
27. Shemesh, M., Gurevich, M., **Mizrachi, D.**, Dombrovski, L., Fields, M.J., and Shore, L.S. Expression of functional luteinizing hormone receptor and its mRNA in bovine uterine veins; Luteinizing hormone induction of cyclooxygenase and augmentation of prostaglandin production in bovine uterine veins. Endocrinology 138:4844-4851, 1997.



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## Patent Applications

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- DeLisa, M.P. and **Mizrachi, D.** “Compositions and methods for making water-soluble integral membrane proteins” Provisional patent filed. (2014)
- **Mizrachi D.** E. coli tight junction expression. Provisional patent filed **(2019)**  
<http://techtransfer.byu.edu/#/technology/2017-072>

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## Grants

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- **R15 NIH**, Soluble tight junction membrane proteins for the control of the paracellular space (submitted 10/2018). As PI.
- **American Heart Association** Regulating endothelial barrier’s permeability to control inflammation (Submitted July 2018). As PI.
- **Open Philanthropies** Regulating endothelial barriers’ permeability, a clinician’s dream (Submitted October 2018) . As PI.
- **IDR (BYU)** Restoring brain privileges to prevent pathologies. (Submitted January 2019). As PI.
- **James Bobbit Alzheimer’s Research (BYU)** Relationship between blood-brain barrier permeability and insulin resistance. (Submitted January 2019). As PI.
- **CURA 2019 (BYU)**. Awarded. Student: Cristian Valencia (Engineering). As PI.

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## Student Internships

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**Marcos Castro and Atenea Uribe** from Universidad Austral de **Chile** (January-March 2018)

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## Oral Presentations

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- **Chemical Engineering**, Integral Membrane Proteins Engineering (September 10/2017)
- **BIOPHYSICS 2018** A water-soluble DsbB variant that catalyzes disulfide bonds formation *in vivo* (February 2018)

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## Poster Presentations

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- **ASBMB 2018** Engineering Tight Junctions in E. coli (**Rollins, Worthington and Mizrachi**)
- **Biophysical Society 2019** High-throughput technology to identify absorption enhancers (**Rollins, Worthington and Mizrachi**)

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## External Reviewer activity 2018

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- **MJ Murdock Charitable Trust**
- **Journal of Chemical Education**
- **CURA awards, BYU**
- **JoVE, video journals**

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## Teaching

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**365 Pathophysiology. (4:4:0)**

Variations in physiological mechanisms that account for development of common disturbances in normal control and activities of body's organs and organ systems.

**295 R Introductory Undergraduate Research.** Fall 2018 with **10** students enrolled. Winter 2019 with **6** enrolled

**495 R Advanced Undergraduate Research.** Fall 2018 with **9** students. Winter 2019 with **10** enrolled.

**PDBio 568 Biophysics.** Delivered 1 lecture (Fall 2018)

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## Collaborations

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Professor Richard J Auchus, University of Michigan (USA) [rauchus@med.umich.edu](mailto:rauchus@med.umich.edu)

Professor Raymond J Turner, University of Calgary (Canada) [turnerr@ucalgary.ca](mailto:turnerr@ucalgary.ca)

Professor Lisa L Martin, Monarch Univ. (Australia) [lisa.martin@monash.edu](mailto:lisa.martin@monash.edu)

Professor Alan J Conley, University of California Davis (USA) [ajconley@ucdavis.edu](mailto:ajconley@ucdavis.edu)

Professor Varda Shoshan-Barmatz, Ben-Gurion Univ. (Israel) [vardasb@bgu.ac.il](mailto:vardasb@bgu.ac.il)

Professor Ailong Ke, Cornell University (USA) [ailong.ke@cornell.edu](mailto:ailong.ke@cornell.edu)

Professor Subramanian Ramaswamy, Institute for Stem Cell Biology and Regenerative Medicine (India) [ramas@ncbs.res.in](mailto:ramas@ncbs.res.in)

Doctor Hans Ghayee, University of Florida (USA) [hans.ghayee@medicine.ufl.edu](mailto:hans.ghayee@medicine.ufl.edu)

**Benjamin Bikman, BYU**

**Lon Cook, BYU**

**James Moody, BYU**

**Arminda Suli, BYU**

**Scott Stephensen, BYU**

**Jordan Yorgason, BYU**

**Pam Van Ry, BYU**