**May 2017**

CURRICULUM VITAE AND LIST OF PUBLICATIONS

• **Personal Details**

Name: **Ran Zalk, Ph.D**

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• **Education**

 B.Sc. - 1994 - 1997 – Ben-Gurion University – Department of Life Sciences

Ph.D. - 1998 - 2005 – Ben-Gurion University - Department of Life Sciences

Thesis advisor: Prof. Varda Shoshan-Barmatz

Thesis title: ATP accumulated in synaptic vesicles: Identification, purification and characterization of its specific transport system (*summa cum laude*)

• **Professional history**

2004-2009: Postdoctoral training, Departments of Physiology and Cellular Biophysics, Columbia University, New York City, USA.
Principal investigator: Dr. Andrew R Marks.

2009-2015: Associate Research Scientist, Departments of Physiology and Cellular Biophysics, Columbia University, New York City, USA.

Principal investigator: Dr. Andrew R Marks.

2015-present: Associate Research Scientist, Head of the Cryo-EM unit, National Institute for Biotechnology in the Negev, Ben-Gurion University of the Negev, Beer-Sheva, Israel.

* ***Professional functions in outside universities/institutions***

## 2017 - Present – Working group chair, EU COST action CM1306, Imaging and in situ structure determination.

• **Awards, Citations, Honors, Fellowships**

1. ***Honors and awards***

2004 - Doris and Bertie Black Ph.D Student Excellence Award.

***b) Fellowships***

2003 - Zlotowski Center Fellowships for Excellence.

2006 - American Heart Association Heritage Affiliate Postdoctoral Fellowship.

2016 - Marie Curie Individual Fellowship-European Fellowship (IF-EF).

• **List of publications**

***Refereed articles***

1. Ran Zalk and Varda Shoshan-Barmatz. ATP-binding sites in brain p97/VCP (valosin-containing protein), a multifunctional AAA ATPase. Biochem J. 2003, 374(Pt 2):473-80.
2. Varda Shoshan-Barmatz, Ran Zalk, Dan Gincel, and Noga Vardi. Subcellular localization of VDAC in mitochondria and ER in the cerebellum. Biochim Biophys Acta. 2004, 1657(2-3):105-14.
3. Ran Zalk, Adrian Israelson, Erez Garty, Heftsi Azulay-Zohar and Varda Shoshan-Barmatz. Oligomeric states of the voltage-dependent anion channel and cytochrome c release from mitochondria. Biochem J. 2005 386(Pt 1):78-83.
4. Ran Zalk and Varda Shoshan-Barmatz. Characterization of DIDS-sensitive ATP accumulation in brain synaptic vesicles. FEBS Lett. 2006, 580(25):5894-8.
5. Ran Zalk, Stephan E. Lehnart, Andrew R. Marks. Modulation of the Ryanodine Receptor and Intracellular Calcium. Annual Review of Biochemistry. 2007, 76:367-85.
6. Andersson DC, Betzenhauser MJ, Reiken S, Meli AC, Umanskaya A, Xie W, Shiomi T, Zalk R, Lacampagne A, Marks AR. Ryanodine receptor oxidation causes intracellular calcium leak and muscle weakness in aging. Cell Metab 2011, 14 (2):196-207.
7. Ran Zalk\*, Oliver B. Clarke\*, Amédée des Georges\*, Robert A. Grassucci, Steven Reiken, Filippo Mancia, Wayne A. Hendrickson, Joachim Frank, Andrew R. Marks. Structure of a mammalian ryanodine receptor. Nature. 2015, 517(7532):44-9.
8. Oliver B. Clarke\*, Amédée des Georges\*, Ran Zalk\*, Qi Yuan, Kandell J Kondon, Robert A. Grassucci, Wayne A. Hendrickson, Andrew R. Marks, Joachim Frank. Structural basis for gating and activation of RyR1. 2016, Cell 167, 145–157.
9. Ran Zalk, Andrew R. Marks. 2017, Trends Biochem Sci, Accepted for publication.

\* These authors contributed equally to this work

• **Lectures and presentations**

***a) Invited lectures at conferences/meetings***

1. Ran Zalk, Structure of a mammalian ryanodine receptor. Gordon research conference: muscle: excitation-contraction coupling. 2015, **Invited** **Talk**.

***b) Presentation of papers at conferences***

1. Ran Zalk, Structure of a mammalian ryanodine receptor. Single Particle Cryo-EM Structure of Type 1 Ryanodine Receptor. Workshop on the resolution revolution in 3D Cryo electron microscopy, Weizmann institute, 2016, **Talk.**
2. Ran Zalk, Structure of a mammalian ryanodine receptor. EMBO Young Investigator, 3rd meeting on Structural Biology. 2015, **Talk**.
3. Ran Zalk, Cryo-EM – A rapidly evolving tool: Insights from heterogeneous RyR1 samples. COST action, 3rd international Scientific Meeting and 4th Molecular Machinery meeting. **Talk.**

***c) Seminar presentations at universities*** ***and institutions***

1. Cryo-EM – A rapidly evolving tool: Insights from heterogeneous RyR1 samples. 2016, Department of biochemistry and molecular biology, Tel Aviv University.
2. Cryo-EM – A rapidly evolving tool: Insights from heterogeneous RyR1 samples. 2016, Department of Biochemistry and molecular biology, Hebrew University.
3. Cryo-EM – A rapidly evolving tool: Insights from heterogeneous RyR1 samples. 2016, Department of Biological Chemistry, Hebrew University.

• **Research Statement**

Single-particle cryo-electron microscopy is a powerful tool for the study of large macromolecular complexes and is at a crucial period in its development. Thanks to recent hardware, software and sample preparation developments, one can now obtain high-resolution structures at near-atomic resolution where *de-novo* model building becomes feasible. At the same time, multiple conformational states co-existing within a sample can be separated and used to solve multiple structures making sample heterogeneity an advantage that can reveal valuable structure-function mechanisms. My plan is to continue developing my structural biology expertise, combine X-ray crystallography and cryo-EM techniques and working with challenging and dynamic macromolecular complexes.

My goals are to use cryo-EM to study regulatory and dynamic processes at near-atomic resolution levels. Essentially, I am planning experiments just like biochemistry experiments and obtaining results that can be quantitatively measured. This way I aim to obtain important insight into the molecular-level regulatory processes such as the control of RyRs channel activity by kinases and phosphatases, which are major regulatory modulators of skeletal and cardiac muscle contraction.

This has also therapeutic implications. Under conditions of chronic stress, including heart failure and muscular dystrophy, ryanodine receptor/calcium release channels become “leaky” as a result of post-translational modifications such as phosphorylation, oxidation and nitrosylation. This intracellular calcium leak can drive progressive heart failure, trigger fatal cardiac arrhythmias, and promote muscle damage and decrease exercise capacity in muscular dystrophy animal models. Thus, gaining new understandings on how the RyR/calcium release channels are regulated, and how drugs that fix the calcium leak bind to the channels have important implications for developing novel therapies for heart and skeletal muscle diseases.