Department of Clinical Microbiology and Immunology Newsletter

Editor
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1.1.2015

Prof. Keisaris group at our Ashkelon Retreat 2014

Dear All,

It gives me great pleasure to send you our second departmental newsletter. It covers the events in our department for the entire year of 2014.

In it, you will find several **new sections**– an interview with Dr. Motti Gerlic, who joined our department this year as an immunologist. Another new section features an interview with one of the faculty describing a prominent article that was published by their group. Kicking off this year is Prof. Udi Qimron on their recent paper in PNAS.

What new things happened this year? Our department has been extremely productive scientifically, publishing over 40 papers in excellent journals.

Our department has grown-Dr. **Motti Gerlic** (Immunology) joined our department and is now building a new lab on floor 8. Dr. **Udi Qimron** and Dr. **Ariel Munitz** got tenure and were both promoted to Associate Professors-congratulations on the rapid advancement! Dr. **Ohad Gal-Mor** officially joined our department as Senior Lecturer. Dr. **Michal Besser** was promoted to Senior Lecturer. Congratulations Ohad and Michal!

We had a great departmental retreat in Ashkelon, which was also attended by outgoing Dean Yosef Mekori who also participated. Our departmental website has been updated (see http://med.tau.ac.il/Microbiology-Immunology-3) and the number of courses open to our students has been expanded (see courses on http://med.tau.ac.il/Midrasha-Clinical-Immunology-Microbiology).

As department head I wish you all a happy new 2015 and good luck in your academic work and personal accomplishments!

Please send me by email any comments, suggestions and ideas for things that you want to initiate and I will help.

Yours

Nir Osherov

Head of Department

Inside this issue:

Outgoing Dean Prof. Yossi Mekori at our 2014 Ashkelon retreat.

Principle Investigators-Promotions and Postings

Motti Gerlic has joined our department faculty as immunologist.

Ohad Gal-Mor has received the academic posting of Senior Lecturer in our department.

Ariel Munitz – Nominated as Editorial Board Member - Am J Respir Cell Mol Biol (The "Red" Journal).

Ariel Munitz- TAU Faculty of 100- chosen 100 faculty members (out of more than 1000) that displayed consistent excellence in teaching.

Dr. **Michal Besser** was promoted to Senior Lecturer.

Ariel Munitz and **Udi Qimron** received tenure and were promoted to Associate Professors.

Gal Markel has received the Ziegler Award for Medical Research by the Technion (11/2014) and gave a talk at TED MED 2014 (09/2014)

New team members, prizes, conferences attended

Ph.D student Netali Morgenstern (Munitz Lab) giving her talk at our 2014 Ashkelon retreat.

Kobiler Lab- Marina Bednarchik has left our lab and has submitted her MSc. Thesis

Sherman Lab-
Sophia_Sominsky attended the 17th annual meeting of ESCV Conference in Prague and presented a poster
Beny Shapiro and **Dariya Heyman** finished their M. Sc. thesis cum laude

Segal Lab.- Yaron Yunik will join the lab for his MSc. Thesis. Moshe Nahmias has left the lab and has completed his MSc. Thesis

Gal Mor Lab
Hanan Tawil has joined our lab for her MSc. Thesis. **Katya Tyba** finished her MSc thesis and **Alex Marzel** finished his MSc thesis Cum Laude. **Dana Elhadad, Alina Goren, Gili Aviv** and **Shalhevet Azriel** have attended the annual ISM meeting in Haifa and presented posters of their work

Dana Elhadad, Alina Goren and **Shalhevet Azriel** have attended the ISM Fall Workshop on Bacterial Phathogenesis and Interactions with Host in Ein Gedi and presented posters of their work.

Osherov Lab
Zohar Meir and **Adi Perevitski** joined our lab for their MSc. Thesis.
Yakir Vaknin and **Tal Maya** presented their findings at the Molecular Mycology (MMM) meeting.
Anna Rivkin finished her MSc thesis Cum Laude
Tal Chover awarded outstanding "Avodat Gmar" for Medical Students for 2014 performed in our lab.

Qimron Lab
Ruthie Kiro was awarded the 2014 Wolf Foundation Scholarship for Excellence and the Trotsky Scholarship for Excellence and a 2014 Travel Scholarship from Gordon and Betty Moore Foundation

Moran Goren was awarded the 2014 Trotsky Scholarship for Excellence and 2014 Eliezer Flescher Departmental award.

Munitz Lab
Itay Moshkovits- Best Abstract Award, European Society of Clinical Investigation, The Phagocyte Workshop, Utrecht, Netherlands and presented at the European Society of Clinical Investigation, The Phagocyte Workshop, Utrecht, Netherlands

Danielle Karo-Atar– Presented at "Autoinflammation Breaks Barriers", Munster, Germany

Keisari Lab
Ilan Hochman submitted his PhD. Thesis.

Ilan also attended the Sixth Annual meeting of the Israeli Society for Cancer Research Conference in Haifa, Israel, and presented a poster.

Hila Confino attended the Sixth Annual meeting of the Israeli Society for Cancer Research Conference in Haifa, Israel, and presented a poster and attended the 23rd Biennial Congress of the European Association for Cancer in Munich, Germany, and presented a poster.

Jenny Tikotsky attended the Sixth Annual meeting of the Israeli Society for Cancer Research Conference in Haifa, Israel, and

New team members, prizes, conferences attended

Iraqi Lab-

Mr. **Mahmoud Aghbariah** has joined our lab for his PhD. Thesis

Ms. **Hanifa Abu-Toamih-Atamni**, PhD student attended the Sackler Faculty of Medicine Science fair, Tel-Aviv University, Tel-Aviv, Israel, April 9th, 2014, and presented a poster and the Complex Trait Consortium Meeting (CTC) in Berlin May 19-22, 2014, and presented a poster.

Ms. **Alexandra Dorman**, MSc. student attended the Sackler Faculty of Medicine Science fair, Tel-Aviv University, Tel-Aviv, Israel, April 9th, 2014, and presented a poster and the Complex Trait Consortium Meeting (CTC) in Berlin May 19-22 and presented a poster.

Ms. **Roa'a Hamed**, MSc. student attended the Sackler Faculty of Medicine Science fair, Tel-Aviv University, Tel-Aviv, Israel, April 9th, 2014, and presented a poster.

Mr. **Aysar Nashef**, PhD student attended the Sackler Faculty of Medicine Science fair, Tel-Aviv University, Tel-Aviv, Israel, April 9th, 2014, and presented a poster and the International Association of Dental Research congress on Periodontitis (IADR/PER). Dubrovnik, Croatia. September 10-13, 2014 and presented a talk.

Mr. **Ariel Shusterman**, PhD student attended the Sackler Faculty of Medicine Science fair, Tel-Aviv University, Tel-Aviv, Israel, April 9th, 2014, and presented a poster

Markel Lab-

Eyal Greenberg was awarded PhD degree and he joined our lab as a senior scientist

Rona Ortenberg was awarded PhD degree and he joined our lab as a senior scientist

Yael Nemlich was awarded PhD degree and he joined our lab as a senior scientist

Ella Bar-Or has joined our lab as a lab technician

Bella Zamlin moved to PhD direct track and her PhD research proposal was approved

Ronit Cohen has submitted her MSc. Thesis and left our lab

Stav Kozlovski has submitted her MSc. Thesis and left our lab

Gilli Galore-Haskel has submitted her PhD. Thesis

-**Dr Yael Nemlich** presented her work as a short talk at the International RNA Editing Workshop (Ein Gedi 2014)

Academic announcements- new publications, grants (last 12 months)

Munitz lab-grants and publications

The Munitz lab was awarded 4 grants this year-2015-2018 - The Israel Cancer Research Fund, **2014-2016** - The Varda and Boaz Dotan Research Center in Hemato-Oncology, TAU,**2014-2015** - The Israel Cancer Association, **2014-2017** - The Israel Ministry of Health.

Karo-Atar D, Itan M, Pasmanik-Chor M, **Munitz A**. MicroRNA profiling reveals opposing expression patterns for miR-511 in alternatively and classically activated macrophages. *J Asthma*. 2014;18:1-25.

Shik D, Moshkovits I, Karo-Atar D, Reichman H, Munitz A. Interleukin-33 requires CMRF35-like molecule-1 expression for induction of myeloid cell activation. *Allergy*. 2014;69:719-29.

Ben Baruch-Morgenstern N, Shik D, Moshkovits I, Itan M, Karo-Atar D, Bouffi C, Fulkerson PC, Rashkovan D, Jung S, Rothenberg ME, **Munitz A**. Paired immunoglobulin-like receptor A is an intrinsic, self-limiting suppressor of IL-5-induced eosinophil development. Nat Immunol. 2014 Jan;15(1):36-44. :

Osherov Lab was awarded the ISF Grant together with Dr. Ronen Ben Ami (Sourasky) 2014-2018

Osherov Lab-**Publications**

Kroll K, Pähtz V, Hillmann F, **Vaknin Y**, Schmidt-Heck W, Roth M, Jacobsen ID, **Osherov N**, Brakhage AA, Kniemeyer O. Identification of hypoxia-inducible target genes of Aspergillus fumigatus by transcriptome analysis reveals cellular respiration as an important contributor to hypoxic survival. Eukaryot Cell. 2014 13(9):1241-53.

Vaknin Y, Shadkchan Y, Levdansky E, Morozov M, Romano J, **Osherov N**. The three Aspergillus fumigatus CFEM-domain GPI-anchored proteins (CfmA-C) affect cell-wall stability but do not play a role in fungal virulence. Fungal Genet Biol. 2014 63:55-64.

The Qimron Lab was awarded the MOH grant (2014-16) and the ISF grant (2014-19)

Qimron Lab Publications

Molshanski-Mor S, Yosef I, Kiro R, Edgar R, Manor M, Gershovits M, Laserson M, Pupko T, and **Qimron U**. Revealing Bacterial Targets of Growth Inhibitors Encoded by Bacteriophage T7.Proc Natl Acad Sci USA, in press.

Yosef I, Kiro R, Molshanski-Mor S, Edgar R, **Qimron U**. Different approaches for using bacteriophages against antibiotic-resistant bacteria. Bacteriophage. 2014 Jan 1;4(1):e28491.

Kiro R, Shitrit D, **Qimron U**. Efficient engineering of a bacteriophage genome using the type I-E CRISPR-Cas system. RNA Biol. 2014 Jan;11(1):42-4.

Some figures from our most recent publications:

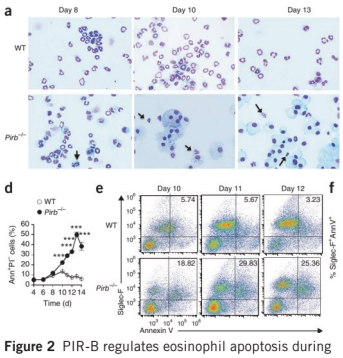


Figure 2 PIR-B regulates eosinophil apoptosis during differentiation of LBDM eosinophils. (**a**,**b**) Micrographs

From Munitz Nature Immunology

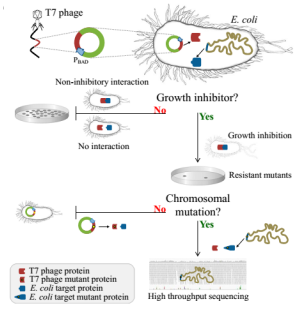


Fig. 1. Schematic representation of the approach used to identify novel targets of bacteriophage growth inhibitors. *E. coli* bacteria are transformed with plasmids cloned with genes derived from T7 bacteriophage downstream of an inducible promoter (P_{BAD}). Expression of noninhibitory genes results in viable bacteria, and these genes are excluded from further analysis. Expression of inhibitory genes results in resistant mutants. These resistant mutants are isolated and then tested for plasmid growth inhibition. Plasmids are extracted from these clones, and their growth inhibition is validated by retransformation into *E. coli* bacteria, as described in *SI Materials and Methods*. Mutants whose plasmids have lost growth inhibition are excluded from further analysis. Mutants whose plasmids are inhibitory are suspected of having mutations in the genome that confer resistance. Genomes of these mutants are extracted, sequenced, and analyzed.

From Qimron PNAS 2014

Academic announcements- new publications, grants (last 12 months)

Arbesfeld Lab-Publications

Franke WW, Rickelt S, Zimbelmann R, Dörflinger Y, Kuhn C, Frey N, Heid H, Rosin-Arbesfeld R. Striatins as plaque molecules of zonulae adhaerentes in simple epithelia, of tessellate junctions in stratified epithelia, of cardiac composite junctions and of various size classes of lateral adherens junctions in cultures of epithelia- and carcinoma-derived cells. Cell Tissue Res. 2014 Dec 12.

Sominsky S, Kuslansky Y, Shapiro B, Jackman A, Haupt Y, Rosin-Arbesfeld R, Sherman L. HPV16 E6 and E6AP differentially cooperate to stimulate or augment Wnt signaling. Virology. 2014 Nov;468-470:510-23. .

Oz S, Kapitansky O, Ivashco-Pachima Y, Malishkevich A, Giladi E, Skalka N, Rosin-Arbesfeld R, Mittelman L, Segev O, Hirsch JA, Gozes I. The NAP motif of activity-dependent neuroprotective protein (ADNP) regulates dendritic spines through microtubule end binding proteins. Mol Psychiatry. 2014 Oct;19(10):1115-24.

Caspi M, Perry G, Skalka N, Meisel S, Firsow A, Amit M, Rosin-Arbesfeld R. Aldolase positively regulates of the canonical Wnt signaling pathway. Mol Cancer. 2014 Jul 4;13:164.

Domke LM, Rickelt S, Dörflinger Y, Kuhn C, Winter-Simanowski S, Zimbelmann R, Rosin-Arbesfeld R, Heid H, Franke WW. The cell-cell junctions of mammalian testes: I. The adhering junctions of the seminiferous epithelium represent special differentiation structures. Cell Tissue Res. 2014 Sep;357(3):645-65.

Raviv S, Bharti K, Rencus-Lazar S, Cohen-Tayar Y, Schyr R, Evantal N, Meshorer E, Zilberberg A, Idelson M, Reubinoff B, Grebe R, Rosin-Arbesfeld R, Lauderdale J, Lutty G, Arnheiter H, Ashery-Padan R. PAX6 regulates melanogenesis in the retinal pigmented epithelium through feed-forward regulatory interactions with MITF. PLoS Genet. 2014 May 29;10(5):e1004360.

Dovrat S, Caspi M, Zilberberg A, Lahav L, Firsow A, Gur H, Rosin-Arbesfeld R. 14-3-3 and β-catenin are secreted on extracellular vesicles to activate the oncogenic Wnt pathway. Mol Oncol. 2014 Jul;8(5):894-911. 8: Naumov I, Zilberberg A, Shapira S, Avivi D, Kazanov D, Rosin-Arbesfeld R,

Gal-Mor lab Publications

Elhadad D, McClelland M, Rahav G, Gal-Mor O. Fever-Like Temperature is a Virulence Regulatory Cue Controlling the Motility and Host Cell Entry of Typhoidal Salmonella. J Infect Dis. 2014 Dec 9.

Marzel A, Desai PT, Nissan I, Schorr YI, Suez J, Valinsky L, Reisfeld A, Agmon V, Guard J, McClelland M, Rahav G, Gal-Mor O. Integrative analysis of Salmonellosis in Israel reveals association of Salmonella enterica Serovar 9,12:l,v:- with extraintestinal infections, dissemination of endemic S. enterica Serovar Typhimurium DT104 biotypes, and severe underreporting of outbreaks. J Clin Microbiol. 2014 Jun;52(6):2078-88.

Aviv G, Tsyba K, Steck N, Salmon-Divon M, Cornelius A, Rahav G, Grassl GA,Gal-Mor O. A unique megaplasmid contributes to stress tolerance and pathogenicity of an emergent Salmonella enterica serovar Infantis strain. Environ Microbiol. 2014 16(4):977-94.

Ohad Gal-Mor, Erin C. Boyle, Guntram A. Grassl. (2014). Same species, different diseases: how and why typhoidal and non-typhoidal Salmonella enterica serovars differ. Frontiers in Microbiology. 5:391 doi: 10.3389/fmicb.2014.00391.

Keisari Lab Publications

Confino H, Hochman I, Efrati M, Schmidt M, Umansky V, Kelson I, Keisari Y. Tumor ablation by intratumoral Ra-224-loaded wires induces anti-tumor immunity against experimental metastatic tumors. Cancer Immunol Immunother. 2014

Keisari Y, Hochman I, Confino H, Korenstein R, Kelson I. Activation of local and systemic anti-tumor immune responses by ablation of solid tumors with intratumoral electrochemical or alpha radiation treatments. Cancer Immunol Im-

Tsarfaty Lab Publications

Huang B, Lu M, Jolly MK, Tsarfaty I, Onuchic J, Ben-Jacob E. The three-way switch operation of Rac1/RhoA GTPase-based circuit controlling amoeboid-hybrid-mesenchymal transition. Sci Rep. 2014 Sep 23;4:6449.

Rivlin M, Tsarfaty I, Navon G. Functional molecular imaging of tumors by chemical exchange saturation transfer MRI of 3-O-Methyl-D-glucose. Magn Reson Med. 2014 Nov;72(5):1375-80.

Zaritsky A, Kaplan D, Hecht I, Natan S, Wolf L, Gov NS, Ben-Jacob E, Tsarfaty I. Propagating waves of directionality and coordination orchestrate collective cell migration. PLoS Comput Biol. 2014 Jul 24;10(7):e1003747.

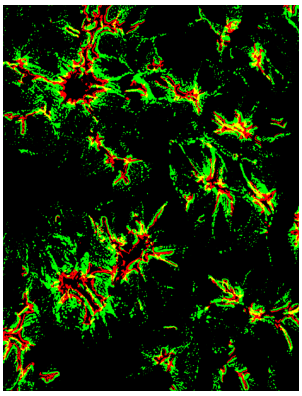
Sherman Lab-Publications

Shterzer N, Heyman D, Shapiro B, Yaniv A, Jackman A, Serour F, Chaouat M, Gonen P, Tommasino M, Sherman L. Human papillomavirus types detected in skin warts and cancer differ in their transforming properties but commonly counteract UVB induced protective responses in human keratinocytes. Virology. 2014

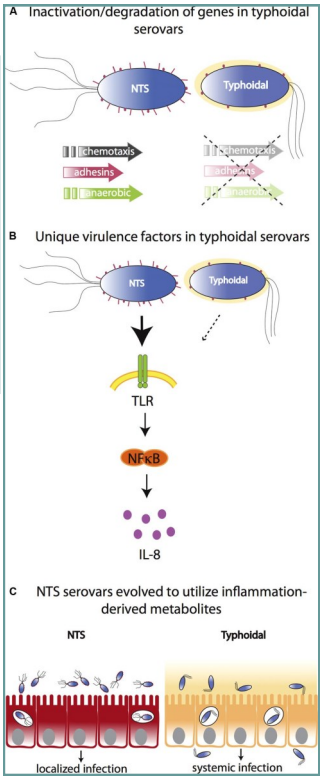
Sominsky S, Kuslansky Y, Shapiro B, Jackman A, Haupt Y, Rosin-Arbesfeld R, Sherman L. HPV16 E6 and E6AP differentially cooperate to stimulate or augment Wnt signaling. Virology. 2014 468-470:510-23.

The **Kobiler Lab** was awarded the ISF grant for 5 years

Some figures from our most recent publications:



Franke et al.2014-Bovine muzzle epidermis-double labeled confocal. Red-striatin Green-desmosomes



Molecular bases for differences between typhoidal and NTS serovars.

From Gal-Mor et al. Frontiers in Microbiology

Iraqi Lab-The Lab of Fuad Iraqi was awarded the Bela and Zeigmond Altar and Semha Torkeltov Fund for cancer research, 1/1/2014-30/12/2014. the Israel Cancer Research Foundation (ICRF), 1/9/2014-30/08/2015. and the Italian Cystic Fibrosis Foundation (ICFF), 1/9/2014-30/08/2016, and the DFG-TRIO, 1/9/2014-30/08/2019.

Iraqi Lab- Publications

Iraqi AF, Athamni H, Dorman A, Salymah Y, Tomlinson I, Nashif A, Shusterman A, Weiss E, Houri-Haddad Y, Mott R and Soller M (2014) Heritability and coefficient of genetic variation analyses of phenotypic traits provided strong basis for high-resolution QTL mapping in the Collaborative Cross mouse reference population. Mammalian Genome. **25(3): 109-119.**

Soller M and **Fuad Iraqi** FA (2014) The Collaborative Cross – a next generation mouse genetic resource population for high resolution genomic analysis of complex traits. Livestock Sciences Journal **166: 19-25.**

Chalfin L, Dayan M, Levy D.R, Austad A.N, Miller R.A, **Iraqi FA,** Dulac C and Kimchi T (2014) Gene knockout in wild mice: a powerful tool for genetic mapping of ecologically-relevant social behaviors. **Nature Communications** 5:4569 **(**Aug 5). doi: 10.1038/ncomms5569.PMID: 25090970.

De Simone M, Spagnuolo L, Ivan Lorè N, Rossi G, De Fino I, Cigana C, **Iraqi FA**^{CO} and Bragonzi A (2014) Host genetic background influences the response to the opportunistic Pseudomonas aeruginosa infection altering cell-mediated immunity and bacterial replication. PLOS One 9(9), e106873, 1-10.

Vered K, Durrant C, Mott R and **Iraqi FA** (2014) Susceptibility to *Klebsiella pneumonaie* Infection in Collaborative Cross Mice is a Complex Trait Controlled by At Least Three Loci Acting at Different Time Points. BMC Genomics 15:865 DOI: 10.1186/1471-2164-15-865

Maria Hernandez-Valladares, Pascal Rihet and **Fuad A. Iraqi** (2014) Genetic Resistance to Malaria: Two Compatible Approaches in Humans and Mice to Identify Potential Resistant Genes. **Physiological Genomics 46: 1-16.**

The Lab of Gal Markel was awarded the prestigious Melanoma Research Alliance Team Sciences grant of $450,000 for 2 years

Publications-

Ortenberg R, Galore-Haskel G, Greenberg I, Zamlin B, Sapoznik S, Greenberg E, Barshack I, Avivi C, Feiler Y, Zan-Bar I, Besser MJ, Azizi E, Eitan F, Schachter J, Markel G. CEACAM1 promotes melanoma cell growth through Sox-2. Neoplasia. 2014 May;16(5):451-60.

Greenberg E, Hajdu S, Nemlich Y, Cohen R, Itzhaki O, Jacob-Hirsch J, Besser MJ, Schachter J, Markel G. Differential regulation of aggressive features in melanoma cells by members of the miR-17-92 complex. Open Biol. 2014 Jun;4(6):140030.

Current Pharmaceutical Designs the review titled "MicroRNAs in cancer: lessons from melanoma." (PMID 24479804)

Besser Lab-Publications

Ortenberg R, Galore-Haskel G, Greenberg I, Zamlin B, Sapoznik S, Greenberg E, Barshack I, Avivi C, Feiler Y, Zan-Bar I, **Besser MJ**, Azizi E, Eitan F, Schachter J, Markel G. CEACAM1 promotes melanoma cell growth through Sox-2. Neoplasia. 16(5):451-60, 2014.

Greenberg E, Hajdu S, Nemlich Y, Cohen R, Itzhaki O, Jacob-Hirsch J, **Besser MJ**, Schachter J, Markel G. Differential regulation of aggressive features in melanoma cells by members of the miR-17-92 complex. Open Biol. 4(6):140030, 2014.

Shrot S, Schachter J, Shapira-Frommer R, **Besser MJ,** Apter S. CT halo sign as an imaging marker for response to adoptive cell therapy in metastatic melanoma with pulmonary metastases. Eur Radiol. 24(6):1251-6, 2014.

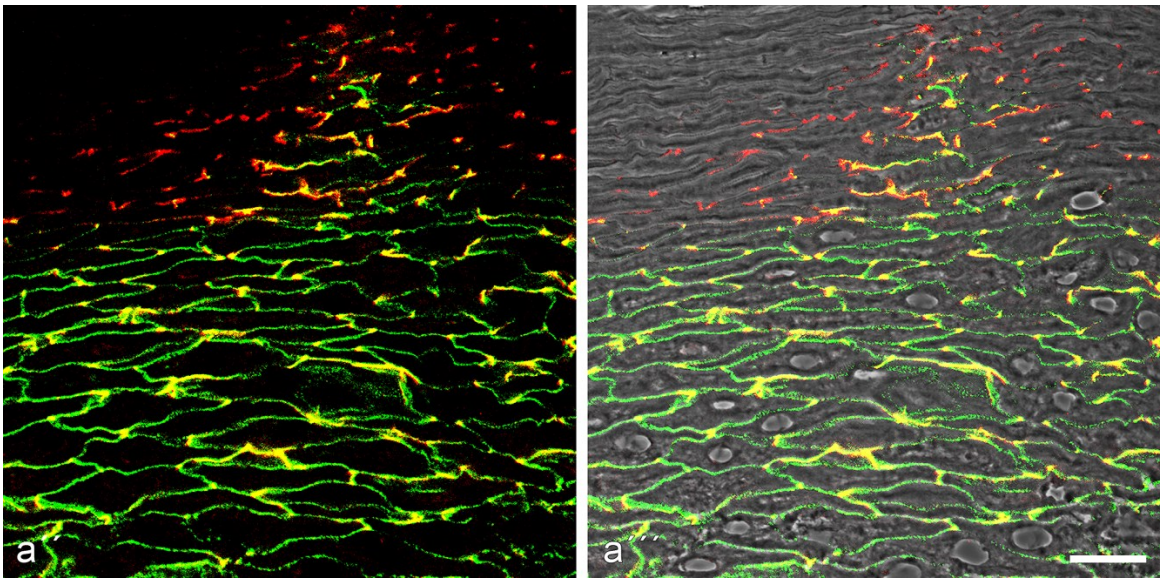


Fig. 5 Double-label confocal laser scanning immunofluorescence microscopy showing one of the subforms of cell-cell tessellate junctions in a multistratified epithelium, namely the ventral part of bovine tongue mucosa. **a–a'''** Striatin (*red*; mAb m) demonstration in regional substructures, including polar or *fascia*-like tessellate junctions; the β-catenin-positive portion (*green*; pAb gp) of the tessellate junctions extends over much larger cell-cell contact areas. *Bar* 20 μm

From Franke et al.2014 (Rozin-Arbesfeld Lab)

An interview with Dr. Motti Gerlic, our new immunologist...

Can you give us some personal details if possible- where do you live, your family, kids etc? what activities do you enjoy outside of work? Do you have hobbies?

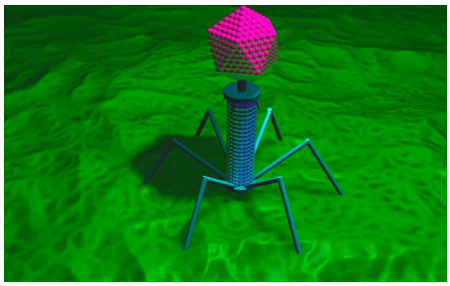
I grew up in Kibbutz Nahal-Oz, where I was working on the farm and playing basketball and the violin in my spare time. After serving four years in the air force rescue unit I moved back to Nahal-Oz and got married. Today, after being "around the world in 8 years" (San Diego, CA and Melbourne, Australia), I live in Meitar with my wife and three kids (age 13,10 and 6). In my spare time I still enjoyi hiking, basketball, mountain and road bike and rock-climbing.

Tell us a bit about your academic journey- where did you study as an undergraduate, your Ph.D-with whom and on what? Your post doc with whom and on what?

I graduated from the Ben Gurion University in Beer Sheva, in the laboratory medical research school. I continue my PhD studies in The Department of Microbiology and Immunology, the Faculty of health science, BGU, under the supervision of Prof. Shulamith Horowitz where I studied the immune response to bacterial infections. I demonstrated that Mycoplasma fermentans (Mf) inhibits tumor necrosis factor alpha (TNF)-induced apoptosis in cell lines and rheumatoid arthritis (RA) synovial cells, and that this effect resides in the Mf membrane lipoproteins.
As a postdoc at Sanford|Burnhm, San Diego, CA, under the mentoring of Prof. John C. Reed, I focused on understanding the inflammatory response, with particular emphasis on novel NLRs (Nucleotide-binding domain and Leucine-rich repeat containing Receptors) and on apoptotic cell death during viral infection. After five years in San Diego, I moved to Melbourne, Australia to join the Dr. Ben Croker laboratory at the Walter and Eliza Institute as a senior research officer where I continued to work on the NLRs and the non-apoptotic forms of cell death, pyroptosis and necroptosis during infection, autoimmunity, chemotherapy and tumorigenesis.

What will be the focus of your research in your new lab at Sackler? What do you find most interesting in your field? In biology?

The coevolution of pathogens and their host always fascinated me. How did our innate immune response evolve to detect pathogens and on the other hand how have pathogens coevolved to target these same pathways. One specific mechanism that was always on my mind was cell death, a mechanism that touches every aspect in a multicellular organism, including the innate immune response. In my new lab I will continue my research in the following three areas: (1) Understanding the physiological role of the *Nlrp* gene family in innate immunity, autoimmune disease and tumorigenesis; (2) Investigating the molecular mechanisms of necroptosis and pyroptosis and how they induce inflammation; and (3) Investigating the physiological relevance of necroptosis and pyroptosis during infection.



How my paper was born- an interview with Prof. Qimron about his recent paper in the Proceedings of the National Academy of Sciences USA

Title of paper- Revealing Bacterial Targets of Growth Inhibitors Encoded by Bacteriophage T7

Authors- Shahar Molshanski-Mor, Ido Yosef, Ruth Kiro, Rotem Edgar, Miriam Manor, Michael Gershovits, Mia Laserson, Tal Pupko, and Udi Qimron

Published in- PNAS

Question-Tell us about the most important findings in your paper? What are the implications?

The study focused on finding new antibacterial agents that are urgently required in light of the increasing threat of antibiotic-resistant bacteria. To do this, we systematically studied how proteins of bacterial viruses (aka bacteriophages) kill bacteria. Learning from bacteriophages how to kill bacteria has many advantages, the main one is the fact that bacteria and bacteriophages have co-evolved for billions of years together, and thus effective weapons isolated from bacteriophages is optimally designed. We identified five new proteins that kill bacteria. More importantly, we identified the mechanism by which three of these proteins kill the cells. We managed to do this by a relatively new technology (high-throughput DNA sequencing) and this new approach can be used to similarly identify more antibacterials and their molecular targets in bacteria. Specifically, we found a new small protein that targets and inhibits the activity of an essential protein of the bacterial cell – a protein that maintains the bacterial cell structure. Malfunction of this bacterial protein results in rupturing of the bacterial cell and consequent death.

Question- How was the idea for this study born?

To finish up a previous study, we were asked by the editor of the submitted manuscript to use a technology that we haven't used before – high-throughput DNA sequencing. We were initially reluctant to do this due to both lack of expertise and lack of funds to finance the technology. We unsuccessfully tried to address the problematic issues using alternative strategies. However, eventually we were forced to use this new and "frightening" technology. We therefore initiated close collaboration with a bioinformatics expert in Tel Aviv University, Tal Pupko, and managed to address the request of the editor and to publish the paper. The true benefit was not the published paper, but rather the exposure to the new technology and to the new collaboration. Once we were familiar with the technology, a research fellow in my lab, Ido Yosef, came to me with this idea of using this high-throughput sequencing to identify targets of antibacterials. Soon after, we wrote a grant request on this subject, secured the funds for the research and started working on this project that was just ended just a few days ago. The take home message for me was never to avoid a new promising technology in the future, because it might promote your science much more than you can anticipate.

Question- Who was involved in doing all the hard research work?

All authors were involved in the work, which lasted approximately two and a half years since conceiving the idea, but Shahar Molshanski-Mor led the research from start to finish, doing the majority of the work.

Question- What were the hardest and the happiest moments during the research itself?

The hardest –rejected from a top journal. The happiest – accepted to PNAS.

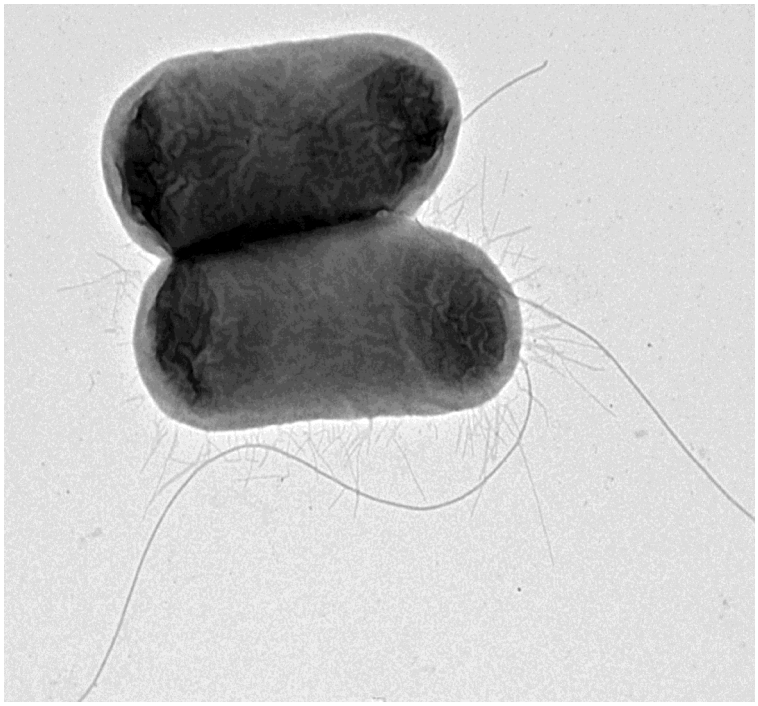
Question- Did everything go according to plan or were there unexpected results?

Unlike most other studies we had in the lab, this one actually was straightforward, and proceeded, more or less, according to the original plan.

Question- What are you planning to do next in this exciting project?

We continue to characterize novel phage proteins. We strive to fully characterize the entire components of a single model phage and to be able to know exactly how a viral infection of bacteria takes place. We believe that such basic studies of bacterial viruses may eventually lead to identifying compounds/processes/ insights that will enable better treatment of antibiotic-resistant bacteria.

Picture of the year– from Ohad Gal-Mors Lab...



One of the topics we are studying in my lab is how different serovars of the pathogen *Salmonella enterica* cause different diseases in humans. Typhoidal serovars (e.g. *S.* Typhi and *S.* Paratyphi A) and non-typhoidal serovars (e.g. *S.* Typhimurium and *S.* Enteritidis) induce in human gastroenteritis and enteric fever, respectively. Although these serovars are very similar on the genetic level, the diseases they provoke are very different. In a recent paper by Elhadad *et al.* entitled "Fever-Like Temperature is a Virulence Regulatory Cue Controlling the Motility and Host Cell Entry of Typhoidal *Salmonella*" (The Journal of Infectious Diseases, in press) we show that major virulence programs including motility and host cell invasion are dramatically repressed by *S.* Paratyphi A, but not by *S.* Typhimurium at physiological temperatures equivalent to the human fever (39-42°C). We propose that a different virulent response to fever plays a key role in the distinct disease manifestation of typhoidal vs. non-typhoidal serovars. In the photo above we used a transmission electron microscopy (TEM) to characterize *S.* Typhimurium expressing flagella and fimbria, while studding its motility and flagella expression under different temperature cues.

Some highlights from our Department Facebook page…

Bacterial drawing

פטריית הכמהין הגדולה בעולם. שיא גינס

You know you've worked too long in a lab when:

1. You use the word "aliquot" in regular sentences.
2. Sometime you momentarily vanish from social activities because of a timepoint.
3. You've never worn a clean lab coat.
4. You don't fear rodents, rodents fear you.
5. You say "orders of magnitude" in regular sentences.
6. You flinch when you hear the word "significant".
7. You've used Kimwipes as Kleenex.
8. You're very good at diluting things.
9. You're also very good at transferring small amounts of liquid between containers.
10. No one in your family has any idea what you do.
11. You can make a short film in Powerpoint.
12. You own Invitrogen t-shirts and actually wear them.
13. You refer to your children as the F1.
14. You've suffered carpal tunnel from the pipetman.
15. A timer clipped to the hip is not only practical but dead sexy.
16. You've played Battleship using tip boxes.
17. You think the following is a quality insult: "I've seen cells more competent than you!"
18. The scent of latex reminds you of work, not play.
19. You wonder what absolute alcohol tastes like with orange juice.
20. You can't watch CSI without cursing at least one scientific inaccuracy.
21. You use acronyms for everything and never stop to elaborate.
22. You can't stand deity-like physicians while secretly wishing you had their job.
23. You always seem to use the microscope after the person with the impossible close together eyes.
24. Accident reports are a badge of honor.
25. You've wondered why you can't drink distilled water in the lab- shouldn't it be clean?
26. You give the lab equipment motivational pep talks" Work for me today or I'll reprogram you with a fire axe" is my favorite.
27. You've worked out that a trained chimp could probably do 90% of your job.
28. When a non-scientist asks you what you do for a living you roll your eyes and talk science at them until they've lost the will to live (mainly for fun).
29. You have to check the web to find out what the weather is outside.
30. You realize that almost anything can be classed as background reading.
31. People wearing shorts under a lab coat disturb you slightly as they look as though they might be naked underneath.
32. Safety equipment is optional unless it makes you look cool.
33. Warning labels invoke curiosity rather than caution.
34. The holiday night out reveals scientists can't dance, although a formula for the movement of hands and feet combined with beats per min is found scrawled on a napkin by a waiter the next day.
35. You know which part of the lab you can chill out undisturbed on Friday afternoon.
36. You decide the courses and conference you want to go on by the quality of the food served.
37. You are strangely proud of the collection of junk you've stolen from vendors at trade shows.
38. You've used dry ice to cool beer down.
39. No matter what the timings in the experiment protocol there is always time for lunch in the middle.
40. As has been pointed out on several occasions, you can no longer spell normal words but have no trouble with spelling things like immunohistochemistry or deoxyribonucleic acid.
41. Burning eyes, nose and throat indicate that you haven't actually turned on the fumehood/ downdraft bench.
42. Your slightly too fond of the smell of (pick one or many) Xylene/Agar/Ethanol/Undergraduates/ Alcoholic handwash.
43. You've left the lab wearing a piece of PPE (personal protective equipment) because you forgot you had it on.
44. You ___ about not being able to pipette by mouth any more (Not me but I've worked with people who do!)
45. You still get amusement out of "freezing" things in liquid nitrogen.
46. You've bent down to pick something up off the floor only to scatter the contents of your top pocket under the largest machine in the lab.
47. You rejoice when grabbing a handful of eppendorfs/bijous/anything and it turns outs to be the exact number you needed.
48. When you start making patterns in your pipette tip box as you take the tips out.
49. When you wonder how much it will hurt if I pour just a smidgen of this phenol/chloroform/ trichloroacetic acid/ any random chemical on myself.
50. You can identify organs on roadkills.
51. The fire alarm ceases to bug you. You only evacuate when you see the fire. (Hand on the floor to check for heat is a good indicator).
52. When you've got that callus on the side of your thumb from opening PCR tubes.
53. You open the toothpaste with one hand.
54. You want to have parafilm at home too.