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Shoshana Levy

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CONTACT INFORMATION

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ACADEMIC APPOINTMENTS

- Professor (Research), Medicine - Oncology
- Member, Bio-X
- Member, Stanford Cancer Institute

LINKS

- Personal Web site: http://med.stanford.edu/labs/shoshana_levy/
- http://med.stanford.edu/labs/shoshana_levy/: http://med.stanford.edu/labs/shoshana_levy/

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Each cell of our bodies and of all multicellular organisms contains several members of the tetraspanin family. Tetraspanins provide a network that facilitates membranal interactions, hence their involvement in multiple physiological interactions. Our studies focus on CD81, which is required for cell fusion and cell-cell interactions, functions that have been subverted by major human pathogens, including hepatitis C virus and Plasmodium. Current research is aimed at understanding the role of CD81 in metastasis.

CLINICAL TRIALS

- Clinical and Pathologic Studies in Non-Hodgkin's Lymphoma and Hodgkin's Disease, Recruiting

Teaching

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Niroz Abu Saleh

Postdoctoral Research Mentor

Niroz Abu Saleh

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Cancer Biology (Phd Program)
- Immunology (Phd Program)

Publications

PUBLICATIONS

- **CD81 is a novel immunotherapeutic target for B cell lymphoma.** *The Journal of experimental medicine*
  Vences-Catalan, F., Kuo, C., Rajapaksa, R., Duault, C., Andor, N., Czerwinski, D. K., Levy, R., Levy, S.
  2019
- **EspH Suppresses Erk by Spatial Segregation from CD81 Tetraspanin Microdomains** *INFECTION AND IMMUNITY*
  Ramachandran, R., Vences-Catalan, F., Wiseman, D., Ziotkin-Rivkin, E., Shteyer, E., Melamed-Book, N., Rosenshine, I., Levy, S., Aroeti, B.
  2018; 86 (10)
- **Immune Targeting of Tetraspanins Involved in Cell Invasion and Metastasis** *FRONTIERS IN IMMUNOLOGY*
  Vences-Catalan, F., Levy, S.
  2018; 9: 1277
- **Eradication of spontaneous malignancy by local immunotherapy.** *SCIENCE TRANSLATIONAL MEDICINE*
  Sagiv-Barfi, I., Czerwinski, D., Levy, S., Alam, I. S., Mayer, A. T., Gambhir, S. S., Levy, R.
  2018; 10 (426)
- **Eradication of spontaneous malignancy by local immunotherapy.** *Science translational medicine*
  Sagiv-Barfi, I., Czerwinski, D. K., Levy, S., Alam, I. S., Mayer, A. T., Gambhir, S. S., Levy, R.
  2018; 10 (426)
- **CD81 association with SAMHD1 enhances HIV-1 reverse transcription by increasing dNTP levels** *NATURE MICROBIOLOGY*
  Rocha-Perugini, V., Suarez, H., Alvarez, S., Lopez-Martin, S., Lenzi, G. M., Vences-Catalan, F., Levy, S., Kim, B., Munoz-Fernandez, M. A., Sanchez-Madrid, F., Yanez-Mo, M.
  2017; 2 (11): 1513–22
- **CD81 as a tumor target.** *Biochemical Society transactions*
  Vences-Catalán, F., Duault, C., Kuo, C., Rajapaksa, R., Levy, R., Levy, S.
  2017; 45 (2): 531-535
- **Tetraspanin CD81, a modulator of immune suppression in cancer and metastasis** *ONCOIMMUNOLOGY*
  Vences-Catalan, F., Rajapaksa, R., Srivastava, M. K., Marabelle, A., Kuo, C., Levy, R., Levy, S.
  2016; 5 (5): e1120399
- **Tetraspanin CD81 Promotes Tumor Growth and Metastasis by Modulating the Functions of T Regulatory and Myeloid-Derived Suppressor Cells** *CANCER RESEARCH*
  Vences-Catalan, F., Rajapaksa, R., Srivastava, M. K., Marabelle, A., Kuo, C., Levy, R., Levy, S.
  2015; 75 (21): 4517-4526
- **Role of an arginine-lysine rich motif in maturation and trafficking of CD19.** *Biochemical and biophysical research communications*
  Vences-Catalán, F., Kuo, C., Levy, S.
  2015; 465 (3): 319-323
- **CD81 Controls Immunity to Listeria Infection through Rac-Dependent Inhibition of Proinflammatory Mediator Release and Activation of Cytotoxic T Cells** *JOURNAL OF IMMUNOLOGY*
  Martinez del Hoyo, G., Ramirez-Huesca, M., Levy, S., Boucheix, C., Rubinstein, E., Minguito de la Escalera, M., Gonzalez-Cintado, L., Ardavin, C., Veiga, E., Yanez-Mo, M., Sanchez-Madrid, F.
  2015; 194 (12): 6090-6101

- **A mutation in the human tetraspanin CD81 gene is expressed as a truncated protein but does not enable CD19 maturation and cell surface expression** *JOURNAL OF CLINICAL IMMUNOLOGY*
  Vences-Catalan, F., Kuo, C., Sagi, Y., Chen, H., Kela-Madar, N., van Zelm, M. C., van Dongen, J. J., Levy, S.
  2015; 35 (3): 254-263

- **Identification of a Novel Drug Lead That Inhibits HCV Infection and Cell-to-Cell Transmission by Targeting the HCV E2 Glycoprotein** *PLOS ONE*
  Al Olaby, R. R., Cocquerel, L., Zemla, A., Saas, L., Dubuisson, J., Vielmetter, J., Marcotrigiano, J., Khan, A. G., Catalan, F. V., Perryman, A. L., Freundlich, J. S., Forli, S., Levy, et al
  2014; 9 (10)

- **Function of the tetraspanin molecule CD81 in B and T cells** *IMMUNOLOGIC RESEARCH*
  Levy, S.
  2014; 58 (2-3): 179-185

- **B-cell receptors expressed by lymphomas of hepatitis C virus (HCV)-infected patients rarely react with the viral proteins.** *Blood*
  Ng, P. P., Kuo, C., Wang, S., Einav, S., Arcaini, L., Paulli, M., Portlock, C. S., Marcotrigiano, J., Tarr, A., Ball, J., Levy, R., Levy, S.
  2014; 123 (10): 1512-1515

- **CD81 and hepatitis C virus (HCV) infection.** *Viruses*
  Fénéant, L., Levy, S., Cocquerel, L.
  2014; 6 (2): 535-572

- **Identification of a novel drug lead that inhibits HCV infection and cell-to-cell transmission by targeting the HCV E2 glycoprotein.** *PloS one*
  Al Olaby, R. R., Cocquerel, L., Zemla, A., Saas, L., Dubuisson, J., Vielmetter, J., Marcotrigiano, J., Khan, A. G., Vences Catalan, F., Perryman, A. L., Freundlich, J. S., Forli, S., Levy, et al
  2014; 9 (10)

- **CD81-Dependent Trafficking of CD19: Restoration of CD19 Surface Expression in Human B Cells Harboring A CD81 Mutation** *54th Annual Meeting and Exposition of the American-Society-of-Hematology (ASH)*
  Levy, S., Kuo, C., Sagi, Y., Chen, H., Kela-Madar, N., van Zelm, M., van Dongen, J. J.
  AMER SOC HEMATOLOGY.2012

- **Self-antigen recognition by follicular lymphoma B-cell receptors** *BLOOD*
  Sachen, K. L., Strohman, M. J., Singletary, J., Alizadeh, A. A., Kattah, N. H., Lossos, C., Mellins, E. D., Levy, S., Levy, R.
  2012; 120 (20): 4182-4190

- **A vaccine directed to B cells and produced by cell-free protein synthesis generates potent antilymphoma immunity** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Ng, P. P., Jia, M., Patel, K. G., Brody, J. D., Swartz, J. R., Levy, S., Levy, R.
  2012; 109 (36): 14526-14531

- **The CD19/CD81 complex physically interacts with CD38 but is not required to induce proliferation in mouse B lymphocytes** *IMMUNOLOGY*
  Vences-Catalan, F., Rajapaksa, R., Levy, S., Santos-Argumedo, L.
  2012; 137 (1): 48-55

- **Complementary costimulation of human T-cell subpopulations by cluster of differentiation 28 (CD28) and CD81** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Sagi, Y., Landrigan, A., Levy, R., Levy, S.
  2012; 109 (5): 1613-1618

- **A CpG-loaded tumor cell vaccine induces antitumor CD4(+) T cells that are effective in adoptive therapy for large and established tumors** *51st Annual Meeting and Exposition of the American-Society-of-Hematology*
  Goldstein, M. J., Varghese, B., Brody, J. D., Rajapaksa, R., Kohrt, H., Czerwinski, D. K., Levy, S., Levy, R.
  AMER SOC HEMATOLOGY.2011: 118–27

- **Escherichia coli-based production of a tumor idiotype antibody fragment - tetanus toxin fragment C fusion protein vaccine for B cell lymphoma** *PROTEIN EXPRESSION AND PURIFICATION*
  Patel, K. G., Ng, P. P., Levy, S., Levy, R., Swartz, J. R.
  2011; 75 (1): 15-20

- **Self-Antigen Recognition by the B Cell Receptors of Follicular Lymphoma** *52nd Annual Meeting and Exposition of the American-Society-of-Hematology (ASH)*
  Layn, K., Alizadeh, A. A., Kattah, N., Levy, S., Levy, R.
  AMER SOC HEMATOLOGY.2010: 1678–79

- **CD81 gene defect in humans disrupts CD19 complex formation and leads to antibody deficiency** *JOURNAL OF CLINICAL INVESTIGATION*
  van Zelm, M. C., Smet, J., Adams, B., Mascart, F., Schandene, L., Janssen, F., Ferster, A., Kuo, C., Levy, S., van Dongen, J. J., van der Burg, M.
  2010; 120 (4): 1265-1274

- **CD81 protein is expressed at high levels in normal germinal center B cells and in subtypes of human lymphomas** *HUMAN PATHOLOGY*
  Luo, R. F., Zhao, S., Tibshirani, R., Myklebust, J. H., Sanyal, M., Fernandez, R., Gratzinger, D., Marinelli, R. J., Lu, Z. S., Wong, A., Levy, R., Levy, S., Natkunam, et al
  2010; 41 (2): 271-280

- **Cell-free production of Gaussia princeps luciferase - antibody fragment bioconjugates for ex vivo detection of tumor cells** *BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS*
  Patel, K. G., Ng, P. P., Kuo, C., Levy, S., Levy, R., Swartz, J. R.
  2009; 390 (3): 971-976

- **Novel Anti-CD19/Idiotype Bispecific Diabody Vaccine for B-Cell Lymphoma** *51st Annual Meeting and Exposition of the American-Society-of-Hematology*
  Ng, P. P., Jia, M., Virrueta, A., Patel, K., Swartz, J. R., Levy, S., Levy, R.
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- **Adoptive Cell Therapy for Lymphoma: Use of CpG-Loaded Tumor Celts to Generate Potent Anti-Tumor CD4 T Cell Immunity** *51st Annual Meeting and Exposition of the American-Society-of-Hematology*
  Gold-Stein, M. J., Varghese, B., Rajapaksa, R., Brody, J., Levy, S., Levy, R.
  AMER SOC HEMATOLOGY.2009: 383–83

- **Generation of CD8(+) T cell-mediated immunity against idiotype-negative lymphoma escapees** *BLOOD*
  Varghese, B., Widman, A., Do, J., Taidi, B., Czerwinski, D. K., Timmerman, J., Levy, S., Levy, R.
  2009; 114 (20): 4477-4485

- **Enhanced B cell activation in the absence of CD81** *INTERNATIONAL IMMUNOLOGY*
  Sanyal, M., Fernandez, R., Levy, S.
  2009; 21 (11): 1225-1237

- **Wiskott-Aldrich syndrome protein is an effector of Kit signaling** *BLOOD*
  Mani, M., Venkatasubrahmanyam, S., Sanyal, M., Levy, S., Butte, A., Weinberg, K., Jahn, T.
  2009; 114 (14): 2900-2908

- **Engagement of CD81 induces ezrin tyrosine phosphorylation and its cellular redistribution with filamentous actin** *JOURNAL OF CELL SCIENCE*
  Coffey, G. P., Rajapaksa, R., Liu, R., Sharpe, O., Kuo, C., Krauss, S. W., Sagi, Y., Davis, R. E., Staudt, L. M., Sharman, J. P., Robinson, W. H., Levy, S.
  2009; 122 (17): 3137-3144

- **CD81 Protein Is Expressed in Normal Germinal Center B-Cells and in Subtypes of Human Non-Hodgkin Lymphomas** *98th Annual Meeting of the United-States-and-Canadian-Academy-of-Pathology*
  Luo, R. F., Zhao, S., Tibshirani, R., Lossos, I. S., Advani, R., Gratzinger, D., Wong, A., Talrega, N., Levy, R., Levy, S., Natkunam, Y.
  NATURE PUBLISHING GROUP.2009: 275A–275A

- **Wiskott-Aldrich Syndrome Protein (WASP) Is An Effector of Kit Signaling.** *50th Annual Meeting of the American-Society-of-Hematology/ASH/ASCO Joint Symposium*
  Mani, M., Venkatasubrahmanyam, S., Sanyal, M., Yang, Y., Huang, J., Levy, S., Butte, A., Weinberg, K. I., Jahn, T.
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- **The CD81 Partner EWI-2wint Inhibits Hepatitis C Virus Entry** *PLOS ONE*
  Rocha-Perugini, V., Montpellier, C., Delgrange, D., Wychowski, C., Helle, F., Pillez, A., Drobecq, H., Le Naour, F., Charrin, S., Levy, S., Rubinstein, E., Dubuisson, J., Cocquerel, et al
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- **Cell-free production of scFv fusion proteins: an efficient approach for personalized lymphoma vaccines** *BLOOD*
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  Silvie, O., Greco, C., Franetich, J., Dubart-Kupperschmitt, A., Hannoun, L., van Gemert, G., Sauerwein, R. W., Levy, S., Boucheix, C., Rubinstein, E., Mazier, D., Rubinstein, E., Mazier, et al
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  Rubinstein, E., Ziyyat, A., Prenant, M., Wrobel, E., Wolf, J. P., Levy, S., Le Naour, F., Boucheix, C.
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- **Building of the tetraspanin web: Distinct structural domains of CD81 function in different cellular compartments** *MOLECULAR AND CELLULAR BIOLOGY*
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- **Protein-protein interactions in the tetraspanin web** *PHYSIOLOGY*
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- **Expression of the human germinal center-associated lymphoma (HGAL) protein, a new marker of germinal center B-cell derivation** *BLOOD*
  Natkunam, Y., Lossos, L. S., Taidi, B., Zhao, S. C., Lu, X. Q., Ding, F. Y., Hammer, A. S., Marafioti, T., Byrne, G. E., Levy, S., Warnke, R. A., Levy, R.
  2005; 105 (10): 3979-3986

- **Kinetics of HCV envelope proteins' interaction with CD81 large extracellular loop** *BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS*
  Nakajima, H., Cocquerel, L., Kiyokawa, N., Fujimoto, J., Levy, S.
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- **Distinct CD81 domains control CD19 maturation in B cells** *Experimental Biology 2005 Meeting/35th International Congress of Physiological Sciences*
  Shoham, T., Rajapaksa, R., Kuo, C. C., Haimovich, J., Levy, S.
  FEDERATION AMER SOC EXP BIOL.2005: A881–A881

- **The tetraspanin web modulates immune-signalling complexes** *NATURE REVIEWS IMMUNOLOGY*
  Levy, S., Shoham, T.
  2005; 5 (2): 136-148

- **Expression of the human germinal center-associated lymphoma (HGAL) protein, a new marker of germinal center B cell derivation.** *46th Annual Meeting of the American-Society-of-Hematology*
  Natkunam, Y., Lossos, I. S., Taidi, B., Zhao, S. C., Lu, X. Q., Ding, F. Y., Hammer, A. S., Marafioti, T., Byrne, G. E., Levy, S., Warnke, R. A., Levy, R.
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- **The tetraspanin CD81 is necessary for partitioning of coligated CD19/CD21-B cell antigen receptor complexes into signaling-active lipid rafts** *JOURNAL OF IMMUNOLOGY*
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- **CD81-dependent binding of hepatitis C virus E1E2 heterodimers** *JOURNAL OF VIROLOGY*
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- **The B-cell receptor of a hepatitis C virus (HCV)-associated non-Hodgkin lymphoma binds the viral E2 envelope protein, implicating HCV in lymphomagenesis** *BLOOD*
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  Flint, M., Quinn, E. R., Levy, S.
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- **Impaired dendritic cell maturation in patients with chronic, but not resolved, hepatitis C virus infection** *BLOOD*
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  Deng, J., DeKruyff, R. H., Umetsu, D. T., Levy, S.
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- **Allergen-induced airway hyperreactivity is diminished in CD81-deficient mice** *JOURNAL OF IMMUNOLOGY*
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- **Binding of hepatitis C virus E2 glycoprotein to CD81 does not correlate with species permissiveness to infection** *JOURNAL OF VIROLOGY*
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- **Sequences and expression of six new members of the tetraspanin/TM4SF family** *BIOCHIMICA ET BIOPHYSICA ACTA-GENE STRUCTURE AND EXPRESSION*
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