BIOGRAPHICAL SKETCH

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NAME: Ilya Trakht

eRA COMMONS USER NAME (credential, e.g., agency login): TRAKHTI

POSITION TITLE: Associate Research Scientist

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Moscow State University, Russia Biology Faculty, Department of Virology	M.S.	1976	Virology, Biochemistry, Immunology
Institute of Molecular Biology, Moscow, Russia Studies on Cell Cycle Regulation (Mentor – Academician E.S. Severin, Advisor – Academician V.A.Engelhardt	Ph.D.	1981	Biochemistry
USSR Cardiology Research Center, Moscow, Russia (Academician – E.I. Chazov)	Post Doc.	1983	Immunology and Cell Biology

A. Personal Statement

My background is in Immunology, Biochemistry and Cell Biology and my primary interests have been and remain in these fields specifically the mechanism of immune response in cancer and infectious diseases. My lab at Columbia University pursued two activities: First, I continued with these primary research interests, and, second, I organized an informal core facility, which helped other researchers establish highly customized monoclonal antibodies (both mouse and human). The latter activity has been very important for isolating all kind of unique sets of monoclonal antibodies, which could not be done through commercial entities.

As one of my main independent efforts at Columbia University, I have been exploring the role and relevance of humoral immune response in cancer, specifically the biological role of anti-cancer antibodies which emerge in cancer patients as a part of overall immune response to the tumor. I led the team that developed a method to generate fully human monoclonal antibodies (fhMAB) using patients' own immune cells. This is a platform technology which can be applied in different fields such as cancer, infectious disease, autoimmune disease etc., where the immune system plays the dominating role. There are strong arguments that our original cell line used for is still the best one available.

While the potential use of fhMAB as immunotherapeutics represent passive immunotherapy, my interests lately expanded into the area of active immunotherapy, such cancer vaccines. I am interested in Antigen-Presenting Cells (APC), particular in Dendritic Cell (DC) and Macrophage-based vaccines. Using a DC-based vaccination of mice carrying pancreatic tumors we have shown that it can be beneficial in terms of tumor elimination in both therapeutic and preventive mode. Recently we generated the personalized human therapeutic vaccine for cancer (DUVAC) based on DC and Macrophages loaded with cancer cells. This vaccine showed very promising results in pre-clinical studies and in several compassionate use cases in cancer patients.

Another area of my interest is related to development of vaccines against small molecules, such as drugs of abuse or organophosphorus compounds (including nerve gases). We proposed and experimentally proved the feasibility of using self-proteins (such as serum albumin) as carriers for small molecules (haptens). Using serum albumin/cocaine conjugates for the proof of concept we demonstrated the strong protection from lethal overdose and decrease in craving in mice and rats. Recently, we are exploring the utility of bioorthogonal ("click") chemistry for the immunization and developing monoclonal antibodies recognizing complex epitopes,

with activity against small molecules, peptides and oligonucleotides by direct loading of MHC-II complexes with the antigens of interest. Currently, my work is focused on the development of “click” immunization for peptide hormones and certain aptamers and generation of fully human monoclonal antibodies against Paraflu (HPIV-3 virus), Measles virus and Nipah virus.

B. Positions and Employment

1979-1982 Post-Doctoral Fellow, Laboratory of Enzymatic Regulation of Cellular Activity, Institute of Molecular Biology, Moscow Russia
1982-1986 Research Scientist, Laboratory of Immunology, USSR Cardiology Research Center, Moscow, Russia
1986-1990 Senior Research Scientist, Director of the Laboratory of Cell Engineering, USSR Cardiology Research Center, Moscow, Russia
1987 Visiting Scientist, Upjohn Pharmaceutical Inc., Kalamazoo, MI
1990-1996 Senior Staff Associate, Irving Center for Clinical Research, Columbia University, New York
1996-1998 Associate Research Scientist, Director, Cell Culture and Hybridoma Core Laboratory, Department of Medicine, Columbia University, New York
1998-2006 Assistant Professor of Medical Sciences, Department of Medicine, Columbia University, New York
2001-2006 Chief Scientific Officer, Acceptys, Ltd. (Human Antibody Company)
2006-present Associate Research Scientist, Immunology Lab Director, Monoclonal Antibody Core Facility within the Division of Experimental Therapeutics, Department of Medicine, Columbia University

C. Contribution to Science

1. Using methods of cell engineering I have developed a human hybridoma fusion partner cell line which allows for the generation and development of stable hybridomas producing high levels of fully human monoclonal antibodies. This turned out to be a platform technology which was deployed for exploring the repertoire of human antibodies in cancer and infectious disease. Utilizing an approach which I called **“immunoprospecting**” my lab was able to generate antibodies against cancer associated antigens some of which were identified for the first time. We have also developed a number of specific human antibodies against infectious agents, such as WNV, Nipha HCV, and others. We also used these antibodies to develop sensors to monitor autoimmunity.
    a. Kirman I, Kalantarov G, Lobel, L, Hibshoosh H, Estabrook A, Canfield R, Trakht I. Development of fully human monoclonal antibodies to breast cancer. Hybridoma and Hybridomics, 2002, 21,
    b. Kalantarov G, Rudchenko S, Trakht I. Development of fusion partner cell line for making fully human monoclonal antibodies. Human Antibodies, 11, 3, 2002, pp. 85-96.
    Sergei Rudchenko, Matthew Scanlan, Gavreel Kalantarov, Yijie Shi, Victoria Yavelsky, Alison Estabrook, Lloyd Old, Robert Canfield, Leslie Lobel and Ilya Trakht (2008) A human monoclonal autoantibody to breast cancer identifies the PDZ domain containing protein GIPC/TIP-2, as a novel breast cancer- associated antigen. BMC Cancer, 8:248
    c. Victoria Yavelsky, Alina Tzikinovsky, Ruthy Shaco-Levy, Sarit Rohkin, Tamar Amir, Hila Kohn, Berta Delgado, Alex Rabinovich, Benjamin Piura, Gerald Chan, Gavreel Kalantarov, Ilya Trakht, Leslie Lobel (2008) Native Human Autoantibodies Targeting GIPC1 Identify Differential Expression in Malignant Tumors of the Breast and Ovary BMC Cancer, 8:257
    Calvert AE, Kalantarov GF, Chang GJ, Trakht I, Blair CD, Roehrig JT. Human monoclonal antibodies to West Nile virus identify epitopes on the prM protein. Virology. 2011 Feb 5;410(1):30-37.
    d. Orly Salama, Sebastien Herrmann, Alina Tziknovsky, Benjamin Piura, Michael Meirovich, Ilya Trakht, Brent Reed, Leslie I. Lobel, Robert S. Marks. Chemiluminescent optical fiber immunosensor for detection of autoantibodies to ovarian and breast cancer-associated antigens. Biosensors and Bioelectronics 2007, 22(7), 1508-1516

2. My long-lasting interest in Angiotensin Converting Enzyme (ACE) goes back to 1990-ies when we developed a broad range of mouse monoclonal antibodies specific to different regions of ACE. This antibody panel allowed for a fine mapping of ACE and helped to develop a method of conformational fingerprinting of this enzyme. Currently these new antibodies are developed for tissue specific ACE testing and exploring their utility in early diagnostic of ovarian and prostate cancer.

a. Danilov SM, Balyasnikova IV, Danilova AS, Naperova IA, Arablinskaya NE, Borisov SE, Metzger RP, Franke FE, Schwartz DE, Gachok IV, Trakht IN, Kost OA, Garcia JG. Conformational Fingerprinting of the Angiotensin I-Converting Enzyme (ACE). 1. Application in Sarcoidosis. J Proteome Res. 2010
b. Kryukova OV, Tikhomirova VE, Golukhova EZ, Evdokimov VV, Kalantarov GF, Trakht IN, Schwartz DE, Dull RO, Gusakov AV, Uporov IV, Kost OA, Danilov SM5. Tissue Specificity of Human Angiotensin I-Converting Enzyme. PLoS One. 2015;10(11):e0143455. doi: 10.1371/journal.pone.0143455. eCollection 2015.

3. Developing several anti-nerve gas compounds with a significant protection against organophosphorus poisoning. Currently, we are working on publishing our work on monoclonal antibodies against AChE aging caused by OPC.
    a. Katz, F.S.; Pecic, S.; Tran, T.H.; Trakht, I.; Schneider, L; Zhu, Z.; Ton-That, L.; Luzac, M.; Zlatanic, V.; Damera, S.; Macdonald, J.; Landry, D. W.; Tong, L.; Stojanovic, M.N. ChemBioChem 16(15): 2205-2215, 2015, PMID: 26350723.

4. The results of my work and the work of my colleagues constituted several patents some of which were licensed by Pharmaceutical and Biotechnology companies in the US, Canada, Israel and Australia.
    a. Trakht I, Kalantarov G, Rudchenko S, Canfield R. Novel tumor-associated marker whose expression is associated with the malignant transformation of breast epithelial cells, prostate epithelia and testicular epithelia as well as with adenocarcinoma of certain organs and tissues. Patent Application (issued, U.S. Patent # 7,060,802)
    b. Trakht, I. Development of human monoclonal antibodies and uses thereof. Patent Application (issued, U.S. patent 7,220,559)
    c. S-X.Deng, Donald W. Landry, Gavreel Kalantarov and Ilya Trakht. Anti-Drug Vaccines (issued, U.S. Patent # 9,981,025)
    d. G.Kalantarov, I.Trakht. Development of Dual Whole-Cell based vaccine Against Pancreatic cancer (issues, U.S. Patent # 11,020,465)

Complete list of patents and patent Applications can be found here:

https://patents.justia.com/inventor/ilya-trakht

Complete List of Published Work in My Bibliography:

http://www.ncbi.nlm.nih.gov/pubmed/?term=trakht or here

https://www.researchgate.net/profile/Ilya-Trakht