



Seminari



Speaker

Şefik Şanal Alkan

*Adjunct Prof. Alkan Consulting
LLC, Basel, Switzerland*

Host

**R. Rappuoli
E. De Gregorio**

Presents

Designing intelligent vaccines

28 febbraio 2012, ore 12.00

Auditorium Centro Ricerche Novartis
Via Fiorentina, 1 - Siena



Dr. Şefik Alkan is a scientific executive with 30 years of drug discovery accomplishments in both academia and the pharmaceutical industry. He has diverse experience across therapeutic areas such as Inflammation, Autoimmune Diseases, Allergy/Asthma, Oncology, and Vaccination. He received his PhD in the 1970's in Microbiology/Immunology at the Hacettepe University, Ankara, and studied immunochemistry (APC-T and T-B cell interactions using well defined synthetic antigens) at the University of California, San Francisco Medical center.

After becoming Professor of Immunology, in 1976 he joined the renowned Basel Institute of Immunology and worked with Nobel Laureates G. Kohler and N. Jerne, where he continued to study the molecular mechanisms of the interactions between antigen presenting cells, T-helper cells and B cells, and generation of antibody diversity.

In the 1980's he started his career in the pharmaceutical industry. He spent 18 years at Ciba-Geigy, in Switzerland, which became Novartis later. His research and drug discovery efforts focused on type I and II interferons, monoclonal antibodies and transcriptional regulation of Th1/Th2 cytokines. Some of the molecules discovered by his teams reached to Phase I/II clinical trials, for the treatment of immune disorders and cancer.

Dr. Alkan then moved to US in 1998 to head the Department of Biochemistry and Immunology at HMR in New Jersey, which became Aventis later. His team developed novel compounds for the treatment of allergy asthma. In 2003 he joined 3M's Pharmaceuticals Division in Minnesota, as head of the Immunology Department to work on TLR agonists as immune modulators and vaccine adjuvants. In 2007, he joined biotech Alba Therapeutics as Executive Vice President to work on the regulation of epithelial tight junctions. Dr. Alkan moved back to Switzerland in 2009 and founded Alkan Consulting.

Dr. Alkan is currently an adjunct professor at the UMDNJ, RWJ Medical School, Department of Molecular Genetics and Microbiology in New Jersey. He is the author of 165 publications and the inventor/co-inventor of 60 issued patents.

ORIGINAL (PEER REVIEWED) ARTICLES (selected from 81)

- Alkan, S.S.: Antigen-induced proliferation assay for mouse T lymphocytes. Response to monovalent antigen. *Eur. J. Immunol.* 8; 112, 1978.
- Alkan, S.S., Trefts, P.E. and El-Khateeb, M.: Induction of T cell response to haptens coupled to mycobacteria. *J. Immunol. Methods* 10; 197, 1976.
- Alkan S.S.: The effects of haptenic presentation on B and T cell responses. *Mikrobiyol. Bul.* Feb;10(2):239-54, 1976.
- Alkan, S.S and El-Khateeb, M.: Comparison of specificities of humoral and cellular immune responses to haptens. *Eur. J. Immunol.* 5; 766, 1975.
- Bellone, C., Byers, V., Der Ballian, G., Alkan, S.S., Nitecki, D.E. and Goodman, J.W.: Dissociation of the proliferative response and migration inhibition factor production by sensitized guinea pig lymphocytes in vitro. *Clin. Exp. Immunol.* 20; 555, 1975.
- Bush, M., Alkan, S.S., Nitecki, D.E. and Goodman, J.W.: Antigen recognition and the immune response: "Selfhelp" with symmetrical bifunctional antigen molecules. *J. Exp. Med.* 136; 1478, 1972.
- Alkan, S.S., Bush, M., Nitecki, D. and Goodman, J.W.: Antigen recognition and the immune response: Structural requirements in the side chain tyrosine for immunogenicity of L-tyrosine-azobenzene arsonate. *J. Exp. Med.* 136; 387, 1972.
- Alkan, S.S., Williams, E.B., Nitecki, D.E. and Goodman J.W.: Antigen recognition and the immune response: Humoral and cellular immune responses to small mono- and bifunctional antigen molecules. *J. Exp. Med.* 135; 387, 1972.
- Alkan, S.S., Nitecki, D. and Goodman, W.J.: Antigen recognition and the immune response. The capacity of L-tyrosine azo- benzenearsonate to serve as a carrier for a macromolecular hapten. *J. Immunol.* 107; 353, 1971.

REVIEW ARTICLES AND BOOK chapters (Selected from 18)

1. Alkan, Şefik Şenal: The immunological fundamentals. (Book chapter) in "Development of Novel Vaccines" edited by Alexander von Gabain and Christoph Klade. Springer Verlag GmbH, 2012.
 2. Alkan, S.S. Monoclonal Antibodies: The story of a discovery that revolutionized science and medicine (Review) *Nature Reviews Immunology*, 4: 153-156, 2004.
 3. Meek, K., Jeske, B., Alkan, S., Urbain, J. and Capra, J.D.: Structural characterization of syngeneic and allogeneic anti-idiotypic antibodies in the anti-arsenate system. (Book chapter) In: "Monogr. Allergy", Eds.: P. Dukor et al., Karger, Basel, Vol. 22: 109-119 1987.
 4. Alkan, S.S.: Epitope analysis of six human IFN-alpha subtypes by monoclonal antibodies. (Book chapter) In: "The interferon system". Eds: F. Dianzoni and G.B. Rossi. Serono Symp. Publ. Raven press. Vol. 24, 237-242, 1985.
 5. Alkan, S.S.: Antigen recognition by T and B cells: Studies with the azobenzene-arsenate-L-tyrosine system. (Book chapter) In "The Immune System" Vol. 2, C.M. Steinberg and I. Lefkowitz, Eds., S. Karger, Basel. 329-335, 1981.
- Alkan S.S. Cell cooperation in the immune response: Function of B, T and M cells. *Mikrobiyol. Bul.* 1975;9(2):123-45.

Abstract

Can we really rationally design vaccines? Molecular engineering may get us close. Today, we can synthesize subunits of vaccines, use novel synthetic adjuvants, and modern delivery methods to manipulate and enhance the desired immune responses to some vaccines.

In this seminar, I will focus on *antigen engineering*, which allows the induction of T cell and/or B cell responses to diverse chemical structures. I will summarize the 5 rules that we have established in the past, using chemically well-defined *mono* and *bi-functional* antigens. We will then discuss the relevance of these rules for the design of glycoconjugate vaccines. Finally, I will touch upon recent *systems biology* approaches to obtain a global picture of the human immune response to vaccinations. Finally, I will try to marry *antigen engineering*, with the *systems biology* approach to provide novel ways to improve the human vaccination design.