



## Jonathan S. Duke-Cohan

Is Principal Associate in Medicine at Harvard Medical School, Principal research Scientist at Dana-Farber Cancer Institute, and Visiting Professor at Charles University. His research focuses on protein interactions which lead to the development, maturation, differentiation and activation of T-lymphocytes in health and disease.

### 8.45 Registration for students

### 9.00 – 9.45 Immunology is not immune to dogma

One arm of cell-mediated immunity is dependent upon the development of a library of T cells, each expressing a unique receptor (TCR), that can recognize peptide epitopes presented by MHC on antigen-presenting cells. Several aspects of the development of this library of cell-expressed TCR have become enshrined as dogma in the textbooks. In some instances, however, the conclusions drawn were based on techniques not as refined as those available to us today, permitting a re-examination in particular of a) the role of the preTCR, b) the nature of selective pressures upon the TCR repertoire, c) the serial engagement mechanism for TCR signaling, and d) the nature of TCR biomechanics during signaling.

### 10.00 – 10.45 Molecular approaches to novel concepts in immunity

Here will be discussed how newer techniques, including Next Generation Sequencing (NGS), CRISPR/Cas9 gene-modifying technology and assay at the single molecule level of bond properties and receptor/ligand properties may add extra insight and information to established techniques in delineating the molecular mechanics of T cell development and selection.



## Dominik Filipp

Is head of the Laboratory of Immunobiology, Institute of Molecular Genetics, Academy of Sciences CR, Prague. His research focuses on the cellular, molekular, and signalling mechanisms guiding the process of central and peripheral T cell tolerance and autoimmunity, initiation of T cell activation and the role of immune system in embryonic hematopoiesis.

### 11.00 – 11.45 AIRE: the master regulator of immune tolerance and autoimmunity

Central immune tolerance is based on negative selection which occurs during T-cell development in the thymic medulla. The key molecule of this process is the autoimmune regulator (Aire), a transcription regulator that promotes the “promiscuous” expression of otherwise strictly tissue-restricted self-antigens (TRAs). The presentation of TRAs on medullary thymic epithelial cells (mTECs) plays a key role in the removal of self-reactive T-cells. In addition, our recent data, on the the phenotypic, molecular, and functional characterization of Aire protein-expressing lymph node cells (AireP-LNCs) will be presented.

Přednáškové odpoledne je součástí kurzu „Novinky v biomedicínském výzkumu“, který je jeden z doporučených povinně volitelných kurzů pro Ph.D. studenty oboru Biochemie a patobiochemie (Oborová rada 04) a Fyziologie a patofyziologie člověka (Oborová rada 05). Účastníci na konci kurzu získají zápočet. Kurz je sestaven z přednášek zahraničních a domácích světově uznávaných odborníků zabývajících se molekulovými mechanismy etiologie, patogeneze a terapie chorob. Vítáni jsou i studenti jiných oborů a záměci z řad vědeckých pracovníků a lékařů.

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