

## Research Workshop on Diagnostics and Therapeutic Immunology: Report

Immunodiagnosics is a diagnostic methodology that uses an antigen-antibody reaction as their primary means of detection. It is well-suited for the detection of even the smallest of amounts of biochemical substances. Immunologic methods are used in the treatment and prevention of infectious diseases and in the large number of immune-mediated diseases. Towards these objective Department of Biochemistry, College of Medicine & JNM Hospital, WBUHS, Kalyani, Nadia 741235, West Bengal organized “*Research Workshop on Diagnostics and Therapeutic Immunology*” on September 19-20, 2014. In key note address, Prof. D N Rao from AIIMS, New Delhi explained antibody response (IgM, IgG, IgG3) to Chikungunya virus using a panel of peptides, as well as MAP derived from envelope protein for serodiagnosis.

Regulatory T cells (Treg) are likely to play a critical role in the immunopathogenesis of disseminated tuberculosis (TB) by suppression of effector immune response against *M. tuberculosis* at the pathologic site(s). Prof. D K Mitra (AIIMS, New Delhi) elaborated the defense dynamics of human tuberculosis. T-regulatory cells of the intestine are pivotal to maintain intestinal homeostasis and breakdown of homeostasis due to inappropriate immune response to the resident microflora leads to inflammatory bowel diseases (IBDs) as well as obesity and obesity-associated metabolic disorders, such as diabetes mellitus and atherosclerosis, and cancer. Dr. Santasabuj Das from National Institute of Cholera and Enteric Diseases (ICMR) found that stimulation of intestinal epithelial cells (ECs) and dendritic cells (DCs) with commensal *Escherichia coli* flagellin activates Toll-like receptor 5 (TLR5) and thus regulates the induction of transforming growth factor  $\beta$  (TGF- $\beta$ ) and retinoic acid (RA), which serve as instructive signals for the generation of T-regulatory response. Dr. Biswadev Bishayi from Calcutta University explained the involvement of macrophage cell surface TLR-2 in the intracellular survival of *S. aureus*.

Complement system is established as a major effector system of the innate immunity that bridges

with adaptive immunity. The system consists of about forty humoral and cell surface proteins that include zymogens, receptors and regulators. Complement plays a role in antigen presentation, immunological memory and tolerance. It provides the first line of defense against the invading pathogens, but its aberrant uncontrolled activation causes extensive self tissue injury. Prof Nibhriti Das (AIIMS, New Delhi) discussed complement and complement regulatory proteins as biomarkers and therapeutic targets for autoimmune-inflammatory disorders. The inflammatory response constitutes the major arm of the innate immune system in mammals. Translation regulation of pro-inflammatory genes plays an important role in the inflammatory response and disruption of such regulatory mechanisms leads to chronic inflammatory conditions, such as Crohn’s disease, Alzheimer’s disease, arthritis, atherosclerosis and cancer.

Dr. Partho Sarothi Ray from Indian Institute of Science Education and Research (IISER), Kolkata discussed on translation regulation of pro-inflammatory tumor suppressor gene programmed cell death 4 by micro-RNA and RNA-binding protein. Both in physiological and philosophical contexts, the immune system provides a principle of exclusion, whereby one can define what is ‘self’ and what is ‘non-self’. Dr. Dipyaman Ganguly (CSIR-Indian Institute of Chemical Biology, Kolkata analyzed) the existing experimental data and conceptual thoughts point to a key role of the immune mechanisms as the determinant of biological individuality.

HIV-1 accessory proteins (Nef, Vpu, Vif, Vpr) have profound effects on HIV-1 pathogenesis. While Nef degrades p53, Vpu stabilizes p53 in a B-TrCP dependent manner. Dr Akhil C Banerjea (National Institute of Immunology, New Delhi) explained HIV-1 pathogenesis by its accessory proteins, and role of small RNA in HIV-1 infection

Mammalian bone marrow provides a framework of microenvironmental domains or niches that supports the function of hematopoietic stem cells/ progenitors (HSC/P) and immune cells. The circulation of HSC/P in peripheral blood is crucial as a system of

immunosurveillance to monitor peripheral organs and foster the local production of tissue-resident innate immune cells. Dr. Amitava Sengupta (CSIR-Indian Institute of Chemical Biology, Kolkata) elucidated the hematopoietic stem cell-niche at the crossroad of blood and immunity.

Aeroallergens play a major role in the pathogenesis of respiratory allergic diseases, such as bronchial asthma, allergic rhinitis and atopic dermatitis. Dr. B Jayakumar Singh (K L University, Guntur Dist, A.P) explained allergen epitope mapping and *in vivo* screening of pro-inflammatory cytokines.

Multiple sclerosis (MS), a demyelinating disorder of the central nervous system (CNS), is believed to be autoimmune in nature. Dr. Jayasri Das Sarma from Indian Institute of Science Education and Research (IISER), Kolkata discussed on immunopathogenesis of viral-induced chronic inflammatory demyelination in an experimental animal model. Dr. Mitali Chatterjee (Institute of Post-Graduate Medical Education and Research, Kolkata) suggested that monitoring of oxidative stress could serve as a marker of disease severity in rheumatoid arthritis. Dr. B S Dwarakanath (Institute of Nuclear Medicine and Allied Sciences, Delhi) elucidated the immunomodulatory potential of 2-deoxy-D-glucose, besides the known inhibition of glycolysis that should facilitate the use of this glucose analog as an adjuvant to other therapies (including immune therapy), besides optimizing protocols for enhancing the efficacy of radiotherapy.

Visceral leishmaniasis (VL) or kala-azar caused by *Leishmania donovani* is a life-threatening disease involving uncontrolled parasitization of liver, spleen, and bone marrow. Most available drugs are toxic. Moreover, relapse after seemingly successful therapy remains a persistent problem. VL is known to be associated with a mixed Th1-Th2 response, and effective host defense requires the induction of IFN- $\gamma$

and IL-12. Dr. Nahid Ali (CSIR-Indian Institute of Chemical Biology, Kolkata) addressed that the cationic liposomal drugs as immunostimulatory treatment option for VL. Dr. Tapati Chakraborty (Kalyani University) exhibited potent *in vitro* antileishmanial and immunomodulatory effects of *Coccinia grandis* (L.) Voigt leaf extract.

T-Cell signaling when channeled in the positive direction leads to T-cell activation, survival and proliferation and serves to eliminate the antigenic challenge. Dr. Swapna Chaudhuri (School of Tropical Medicine, Kolkata) re-established the role of anti-neoplastic immunotherapeutic molecule T11-target structure (T11TS) as an important therapeutic molecule holding promise in the treatment of glioma.

Differentiation antigens present on macrophages, such as CD14 orchestrate the first line of defense against infections. But, the basal/homeostatic signaling that keeps macrophages thus groomed for innate immune functions remains uncharacterized. Dr. Malini Sen from CSIR-Indian Institute of Chemical Biology, Kolkata evaluated Wnt signaling in immune response.

Students from different parts of West Bengal participated and also presented their work in this workshop. Hands on training on PCR was organized, where several technical knowhow were discussed. Two day research workshop ended with vote of thanks from the Secretary of Indian Immunology Society. It was resolved to stress on immunological aspects for diagnosis and therapy among Scientists. Supports from funding agencies of Govt of India were acknowledged.

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