

## 3<sup>rd</sup> International Conference and Exhibition on Clinical & Cellular Immunology

September 29-October 01, 2014 DoubleTree by Hilton Baltimore-BWI Airport, USA

## Assessment of peripheral blood immunoglobulins (IgG, IgM & IgA), lymphocyte subsets (T & B cells) and natural killer cells in children with Down syndrome

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own syndrome (DS) is the most frequent cause of mental retardation with an incidence of approximately 1 in 800 live births. Individuals with DS are cognitively impaired, although severity is highly variable. Characteristic facial features and hypotonia are present in almost all patients. Abnormalities of the cardiovascular system, gastrointestinal tract, eye and ear abnormalities occur with increased frequency compared with non-Down syndrome patients (NDS). It has been known that subjects with DS have an increased susceptibility to bacterial and viral infections, a high risk of malignancies, and autoimmune disorders in comparison to healthy population. Autoimmune phenomenon such as acquired hypothyroidism, celiac disease and diabetes mellitus also occur at higher frequency compared with NDS. Leukemia and pneumonia are still the major causes of mortality and morbidity in these children. The increased susceptibility to infection, malignancies and autoimmune disease, suggest that immunodeficiency is an integral part of DS. However, a majority of them do not show clear features of immunological disease. Multiple immunologic disturbances are commonly observed in individuals with DS including abnormal proportions of peripheral lymphoid subsets, cellular dysfunction and autoimmune phenomena. The abnormalities of the immune system associated with DS include: Mild to moderate T and B cell lymphopenia, with marked decrease of naive lymphocytes, impaired mitogen-induced T cell proliferation, reduced specific antibody responses to immunizations and defects of neutrophil chemotaxis. The clinical relevance of these immunological disturbances is also unclear. Although a high incidence of infectious diseases, particularly viral hepatitis and upper-tract respiratory infections in DS, is currently reported in the literature, the existence of an immunodeficiency associated to DS is not firmly established. There is no clear evidence of enhanced susceptibility to infection, suggestive of serious immunodeficiency, in both adults and children with DS, in spite of the existence of compelling evidence of immune derangement. Life expectancy in DS is significantly poorer than that for the general population, but over half of DS individuals can be expected to survive into their 50's. Deaths from infection have shown the largest decline because of improvements in the health care provision. There is lack of data regarding the immunologic status of children with DS in India. At present there are no recommendations or guidelines to routinely investigate these children for immunological abnormalities, thus increasing the morbidity due to recurrent infection and also autoimmune disorders. The study is designed with an aim to determine the relationship between abnormalities in immune system with relation to peripheral blood lymphocytes and their subsets and immunoglobulin levels in children with DS, thus giving us an opportunity to identify those groups of patients with severe abnormalities and instituting improved care.

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## An insight review on immunopathogenesis of bovine and human Mycobacteria infections

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Mycobacterium is one of the first infectious agents to spring to mind in connection with chronic or persistent infections. The causative organism of bovine tuberculosis is Mycobacterium bovis (*M. bovis*), a member of the Mycobacterium tuberculosis complex (MTBC), which includes Mycobacterium tuberculosis (*M. tuberculosis*), M. bovis, Mycobacterium africanum (*M. africanum*), Mycobacterium microti (M. microti), Mycobacterium canetti (*M. canetti*), Mycobacterium caprae (*M. caprae*) and Mycobacterium pinnipedii (*M. pinnipedii*), and many of the species and subspecies of MTBC show specific host association. Immunity against mycobacteria is multifactorial and it is believed that the host innate immunity provides initial resistance to *mycobacteria* before the adaptive cell-mediated immunity fully develops. There are still many unsolved problems associated with the pathogenesis and immune response to tuberculosis. Therefore multi-disciplinary approach to develop more complete understanding of the pathogenic strategies is mandatory. Special consideration to bovine tuberculosis might help scientists to devise proper mechanisms to prevent human tuberculosis as they are closely related.

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