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FETAL OVALBUMIN EXPOSURE RESULTING IN MURINE HYPER-IMMUNE RESPONSIVENESS

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Allergen exposure during prenatal or postnatal period may alter immune programming and affect the fate of infant's allergic disease. However, the relationship and mechanism between prenatal allergen exposure and the development of allergic disease is still unclear. We aimed to investigate whether prenatal allergen exposure induces immune tolerance or sensitization to allergen. The peritoneal cavity of each FVB/N fetus was directly injected with different doses of adjuvant-free ovalbumin (OVA) or normal saline (NS) on day 14 of gestation. Eight weeks after the birth, *in utero* NS- and OVA-injected mice were challenged by inhaling OVA aerosols. *In utero* OVA-injected adult mice with OVA challenge manifested significant induction of airway hyperresponsiveness, lung eosinophilia, serum levels of OVA-specific antibodies and Th2 cytokines of OVA-stimulated splenocytes. These mice also developed serious anaphylactic reactions following intraperitoneal injection of OVA. To further understand the mechanisms of OVA-induced hyper-immune responsiveness, we analyzed the OVA-specific immunity and gene expression of lungs and spleens in prenatal OVA-exposed neonates. *In utero* OVA-injected neonates already had dominant OVA-specific humoral and cell-mediated immunity. Cytokine expression pattern in the lungs of *in utero* OVA-injected neonates evidently favoured Th2-biased immune responses. Furthermore, splenocytes of *in utero* OVA-injected neonates expressed higher RNA levels of Notch ligands (Jagged1 and Jagged2). Inhibition of notch signalling by γ -secretase inhibitor significantly reduced OVA-induced Th2 cytokine production and proliferative responses *in vitro*. The results suggested that intervention of allergen exposure or notch signalling during pregnancy may be beneficial for modulating the development of allergic asthma.

Biography

Cheng-Chi Chan has accomplished his PhD degree in 2016 from Graduate Institute of Biomedical Sciences, Chang Gung University. Postdoctoral training is being performed in the Department of Microbiology and Immunology, Chang Gung University. His studies focus on the mechanisms among prenatal or postnatal allergen exposure and allergic asthma development. He has a good training in the field of Immunology and Molecular Biology and a great skill in the asthmatic animal model and related experiments. Simultaneously, He is familiar with the operation of intra-utero injection and the investigation of the development and differentiation of various immune cells. The related experimental results had been published in reputed journals.

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