

## **Practical immunoregulation: Neonatal anti-allergic prophylaxis in a pig model of food allergy**

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Immune response (IR) is a complex phenotype with heritability of about 20% hence there is a large environmental effect on variation. Increasing prevalence of immunodysregulatory diseases including allergy and autoimmunity, are epidemiologically and functionally associated with environments which provide reduced neonatal exposure to evolutionarily anticipated, microbially-derived ligands required to regulate balanced ontogeny and function of the immune system. Aspects of this hypothesis can be tested by quantifying immunological traits associated with antibody and immunoglobulin isotype or cell-mediated immune response to type 1 or type 2 antigens. Repeated immunophenotyping in a single location has indicated significant differences in type 1/type 2 IR bias over time likely due to unidentified environmental variables. A useful indicator is experimental allergy, a type 2-biased phenotype, induced in outbred pigs using the major egg allergen ovomucoid (Ovm). Intramuscular injections of heat-killed *Escherichia coli* with or without recombinant pig IFN- $\gamma$  on each of days 1-7 of life significantly reduced Ovm-specific food allergy. Similar results were obtained after pretreatment with oral probiotic *Lactococcus lactis*. Immunomodulatory effects of defined microbial components are being investigated. Reduced allergy as manifest by clinical tolerance correlates with induced type 1 IR bias. Classical criteria for sensitization, namely skin test positivity and IgE-related anti-allergen, are unreliable predictors of allergic reactivity to oral challenge. Possible contributions of T-regulatory cells are under examination.