**Letter to the Editor**    **Open Access**

# Notes for the Immune Responses in Neonates: Commonly Expected Dampening of the Type-1 Associated Immunity during BCG Vaccination

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## Letter to the Editor

We have read with great interest the review paper by Marchant and Goldman [1] which describes the remarkable developmental and functional mechanisms of the human neonatal immune system. Several aspects of the comparison between adult and neonate characteristics have been described, with significant attention paid to the rapid maturity of the neonatal immunity. In one comparison, the authors emphasize the newborn's characteristic of exhibiting increased susceptibility to infectious agents. This may be related to the natural dampening of the Th-1 associated immune response. Following from that, neonatal T cells exhibit similar or even stronger Th-1 immune responses to certain vaccines, such as the BCG vaccination, compared to adult responses [2]. It has been speculated that the expected drop in the polarized type-1 immune responses reflects the generalized hypofunction of inflammatory and immune mechanisms in a number of protective systems, which significantly increases the risk of infection in this exposed population. However, during development the neonatal immune system is constantly maturing, since it is a continuous process where both accelerated and retarded development is deleterious [2].

Regarding the BCG vaccine, we would like to comment on our recent published data that is both important and relevant [3,4]. The ELISPOT assays performed in our studies showed that the in vitro Th-1-immune response of the umbilical cord blood (UV) was deficient related to the healthy donor adults (HD) group when cells were placed in contact with one BCG-recombinant antigen with immunodominant property, as well as a potent mitogen [3]. Thus, our previous findings support the hypothesis that BCG induces distinct cell-death patterns involving maturation of the immune system and that these patterns might set the stage for a subsequent antimycobacterial immune response. The reasons behind this result are merely speculative; perhaps due to a higher amount of circulating immature immune cells or to a lack of exposure to mycobacterial antigens. Our ELISPOT data adds another level of information regarding the immune response against mycobacteria in a population prone to receive the BCG vaccination after birth. One could further assay cord blood cells in groups of children, using the model proposed here, both before and after the BCG vaccination for comparison purposes. Therefore, in terms of assays to detect cellular immune responses, the IFN-gamma release assays (IGRA), such as Quantiferon-Gold and T-SPOT.TB, are quite more appropriate in detecting tuberculosis-specific responses, and are now clinically available. The identification of specific antigens that elicit immune responses, as well as the new assays to detect CD4+ and CD8+ T-cell responses, provide the framework for new assays to assess cellular immunogenicity, and those subjects have been revisited very recently [5]. The triggering of innate and adaptive immune responses by vaccines in neonates is an important topic and deserves further attention. New studies that compare primary cells from newborns and from adults, focused on a particular cell type and specific mechanisms, are required to further scrutinize immune deficiencies. Therefore, follow up trials are warranted to better clarify this central issue.

## Acknowledgements

## References

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