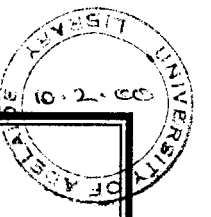

Lymphocyte expression of costimulator molecules in early life

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SUMMARY

Infectious diseases are a major cause of morbidity and mortality in young children, particularly in developing countries. This has been attributed to the young child's relative lack of previous antigen exposure, and immaturity of the immune system.

In T-dependent antibody responses, costimulator molecules provide contact-mediated signals during interactions between T cells and B cells that regulate lymphocyte activation. This study investigated the hypothesis that costimulator molecules are differentially expressed on lymphocytes from neonates and young children compared with adults, contributing to limitations of T-dependent antibody responses in early life.

Flow cytometry was used to examine the expression of two groups of costimulator molecules (CD80, CD86, CD28, CD152 and CD40, CD154) on peripheral blood lymphocytes from adults and young children (2-20 months of age), and umbilical cord blood lymphocytes. The expression of these molecules was studied on adult and cord blood lymphocytes activated *in vitro* with PMA and ionomycin or plate-bound CD3 mAb. A method was also developed for removing contaminating erythroid cells from cord blood mononuclear cells required for functional studies.

The expression of CD80 and CD86 was similar on adult and cord blood B cells. Higher levels of CD28 expression and reduced surface expression of CD152 on cord blood T cells compared with adult T cells, suggested that neonatal T cells may be more responsive to activation than adult T cells. This difference in the relative expression of CD28 and CD152 may also influence cytokine secretion by neonatal T cells.

CD40 expression was equivalent or higher on B cells from cord blood and young children compared with adults. The kinetics of CD154 expression differed between adult and cord blood T cells activated with PMA and ionomycin or CD3 mAb, and were

affected by the presence of B cells. Cord blood T cells were capable of expressing adult levels of CD154 at certain time-points in both activation systems.

These results suggest that lymphocytes from young children should be able to deliver and respond to costimulatory signals. The differences in lymphocyte expression of these costimulator molecules in young children are unlikely to fully account for limitations in humoral immunity in early life, and may even represent a specialised adaptation for this stage of immune development.