Cord blood CD4+CD25+ regulatory T cells fail to inhibit cord blood NK cell functions due to insufficient production and expression of TGF-beta 1.

Although CD4+CD25+ Treg (Treg) cells are known to modulate NK cell functions, the modulation mechanism of these cells in cord blood has not been fully clarified. The purpose of this study was to clarify the mechanism whereby cord blood Treg cells modulate cord NK cells. By performing various cultures of purified NK cells with or without autologous Treg cells, diminished inhibitory effects of cord Treg cells towards cord NK cell functions, including activation, cytokine production, and cytotoxicity, were observed. We also observed lower secretion of sTGF-beta1 and lower expression of mTGF-beta1 by cord Treg cells than by adult Treg cells. These data revealed the capability of adult Treg cells to suppress rhIL-2-stimulated NK cell function by TGF-beta1, both membrane-bound and soluble types. The reduced inhibitory capabilities of cord Treg cells compared with adult Treg cells is thought to be due to insufficient expression of TGF-beta1.

Newborn neonate's infection defense is an important natural immunity in adult. NK cells in adult compare to regulatory T cells are strongly suppressed, and the causative factor is that the general regulatory T cells in newborn cord blood have the expression of TGF-beta1. The expression deficiency affects the development of neonatal immune system and results in a deficiency of natural immunity. To clarify the mechanism, it is important to study the suppression function of cord blood Treg cells towards cord NK cell functions. By performing various cultures of purified NK cells with or without autologous Treg cells, we observed diminished inhibitory effects of cord Treg cells towards cord NK cell functions, including activation, cytokine production, and cytotoxicity. We also observed lower secretion of sTGF-beta1 and lower expression of mTGF-beta1 by cord Treg cells than by adult Treg cells. These data revealed the capability of adult Treg cells to suppress rhIL-2-stimulated NK cell function by TGF-beta1, both membrane-bound and soluble types. The reduced inhibitory capabilities of cord Treg cells compared with adult Treg cells is thought to be due to insufficient expression of TGF-beta1.

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Liqing Xu, Shigeki Tanaka, Motoki Bonno, Masaru Ido, Masatoshi Kawai, Hatsumi Yamamoto, Yoshihiro Komada