Cytokine Status and Susceptibility to Specified Pathogens in Human Neonates and in Recipients of Marrow Grafts

1990 Fiscal Year Final Research Report Summary

Cytokine Status and Susceptibility to Specified Pathogens in Human Neonates and in Recipients of Marrow Grafts

Research Project

Project/Area Number

01480257

Research Category

Grant-in-Aid for General Scientific Research (B)

Allocation Type

Single-year Grants

Research Field

Pediatrics

Research Institution

Kanazawa University

Principal Investigator

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1989 – 1990

Keywords

Cord blood / Cytokines / Very low birth weight infants / Bone marrow transplant / CD45 antigens / Naive T cells / Memory T cells / CD2-mediated proliferation

Research Abstract

Several kinds of cytokines were identified in blood plasma when heparinized whole blood was stimulated directly with various stimuli, such as bacteria, bacterial products, and lectins. Immunohistologic and in situ hybridization studies confirmed that IL-1, IL-6, and EFN-gamma were produced almost exclusively by stimulated monocytes in this whole blood system. IL-6 producing ability of cord blood from neonates with over 1,800 gm of birth weight was comparable to adult controls, while very low birth weight infants born at less than 30 weeks of gestation weighing less than 1,500 gm showed poor ability to produce IL-6.
It has been claimed that isoform expression patterns of CD45 antigen family denote mutually exclusive two T cell subsets : "naive" T cells expressing CD45RA^+, RO^- and "memory T cells with CD45RO^-, RO^+ phenotype. Almost all T cells in cord blood expressed naive phenotype. Relative proportions of circulating memory T cells increased with advancing age and reached adult leve ls around 12 years of age.
By using reverse transcriptase/PCR technology, it was confirmed that CD4^+CD45RO^- naive T cells could not express mRNAs for IL-4, IL-5, and IFN-gamma on stimulation. CD4^+, CD45RO^+ memory T cells had the ability to produce these lymphokines. In addition, CD4^+ naive T cells as well as whole cord CD4^+ T cells exerted no significant help for B cell differentiation, while CD4^+ memory T cells acted as an efficient helper in PWM- stimulated

coculture system. In vitro stimulation of CD4^+ naive T cells and whole cord CD4^+ T cells with PHA in the presence of exogenous IL-2 caused phenotypic conversion from CD45RO^- to CD45RO^+. Following phenotype conversion, originally naive CD4^+ T cells acquired some memory T cell—like function. FACS-purified CD4^+ naive T cells could not respond to a combination of anti-CD2 antigens in the absence of monocytes, whereas CD4^+ memory T cells showed vigorous proliferation. CD4^+ memory T cells, but not CD4^+ naive T cells, could produce IL-6 in response to anti-CD2. Whether IL-6 was produced or not seems to be crucial for anti-CD-2mediated cellular proliferation.▲ Less

Research Products (12 results)

All | Other

All | Publications (12 results)

[Publications] Kato,K.: "Detection by in situ hybridization and phenotypic characterization of cells expressing IL—6 mRNA in human stimulated blood." JournaL of Immunology. 144. 1317-1322 (1990)

[Publications] Yachie,A.: "The capability of neonatal leukocytes to produce IL 6 on stimulation assessed by whole blood culture." Pediatric Reserch. 27. 227-233 (1990)

[Publications] Miyawaki,T.: "Differential expression of CD45RO(UCHL 1) and its functional relevance in two subpopulations of circulating TCR-S/8^+ lymphocytes." Journal of Experimental Medicine. 171. 1833-1838 (1990)

[Publications] Yokoi,T.: "Epstein—Barr virus—immortalized B cells produce IL—6 as an autocrine growth factor." Immunology. 70. 100-105 (1990)

[Publications] Kasahara,Y.: "Role of interleukin 6 for differential responsiveness of naive and memory CD4^+ T cells in CD2—mediated activation." Journal of Experimental Medicine. 172. 1419-1424 (1990)

[Publications] Taga,K.: "Preferential expression of IL—2 receptor subunits on memory populations within CD4^+ and CD8^+ T cells." Immunology. 72. 15-19 (1991)

[Publications] Kato, K. et al.: "Detection by in situ hybridization and phenotypic characterization of cells expressing IL-6 mRNA in human stimulated blood." Journal of Immunology. 144. 1317-1322 (1990)

[Publications] Yachie, A. et al.: "The capability of neonatal leukocytes to produce IL-6 on stimulation assessed by whole blood culture" Pediatric Research. 27. 227-133 (1990)

[Publications] Miyawaki, T. et al.: "Differential expression of CD45RO (UCHL I) and its functional relevance in two subpopulations of circulating TCR gamma/delta^+lymphocytes." Journal of Experimental Medicine. 171. 1833-1838 (1990)

[Publications] Yokoi, T. et al: "Epsein—Barr virus—immortalized B cells produce IL-6 as an autocrine growth factor." Immunology. 70. 100-105 (1990)

[Publications] Kasahara, Y. et al: "Role of interleukin 6 for differential responsiveness of naive and memory CD4^+ T cells in CD2-mediated activation." Journal of Experimental Medicine. 172. 1419-1424 (1990)

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