

# Abstract

J Immunol. 2004 Sep 1;173(5):3186-92.

## Folate deficiency inhibits the proliferation of primary human CD8+ T lymphocytes in vitro.

Courtemanche C, Elson-Schwab I, Mashiyama ST, Kerry N, Ames BN.

University of California, Berkeley, and Children's Hospital Oakland Research Institute, Oakland, CA 94609, USA.

**BACKGROUND:** Folate is required for one-carbon transfer reactions and the formation of purines and pyrimidines for DNA and RNA synthesis. Deficiency of folate can lead to many clinical abnormalities, including macrocytic anemia, cardiovascular diseases, birth defects, and carcinogenesis.

**OBJECTIVE:** The nucleotide imbalance due to folate deficiency causes cell cycle arrest in the S phase and uracil misincorporation into DNA, which may result in DNA double-strand breaks during repair. The role of folate in the immune system has not been fully characterized.

**METHODS:** We cultured PHA-activated human T lymphocytes in varying concentrations of folate, and measured proliferation, cell cycle, apoptosis, uracil misincorporation, and proportions of Th cells (CD4(+)) and cytotoxic T (CD8(+)) cells.

**RESULTS:** Folate deficiency reduced proliferation of T lymphocytes, induced cell cycle arrest in the S phase, induced apoptosis, and increased the level of uracil in DNA. Folate deficiency also increased the CD4(+) to CD8(+) ratio due to a marked reduction of CD8(+) cell proliferation. Folate or nucleoside repletion of folate-deficient cells rapidly restored T lymphocyte proliferation and normal cell cycle, reduced the DNA uracil content, and lowered the CD4(+) to CD8(+) ratio.

**CONCLUSIONS:** These data suggest that folate status may affect the immune system by reducing the capacity of CD8(+) cells to proliferate in response to activation.

PMID: 15322179

FREE FULL TEXT