

Abstract

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Requirement for biotin and the function of biotin in cells in culture.

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BACKGROUND: The requirement of biotin in the culture medium has been established for HeLa cells, human fibroblasts, baby hamster kidney cells (BHK) as well as polyoma-transformed BHK cells.

METHODS: Growth, viability, biotin content and the activities of biotin-dependent enzymes were used as criteria.

RESULTS: Cells in culture appear to bind and internalized avidin as well as the avidin-biotin complex. Avidin seems to mimic a natural ligand that could be the biotin-binding protein of serum. Additions of serum fatty acids, aspartate or asparagine to the culture medium do not supplant the biotin requirement. Nuclear fractions of cells contain significant biotin without the ability to fix carbon dioxide. A biotin-containing protein has been isolated from rat liver nuclei. The incorporation of amino acids into cellular protein is decreased in biotin-deficient HeLa cells. The proportion of active ribosomes is also decreased in these cells.

CONCLUSIONS: Supplementation of the medium of deficient cells with biotin results in stimulation of protein synthesis. It is suggested that biotin might subserve a function in cells in addition to its role as the prosthetic group of biotin-enzymes.

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