Copy of a printed diagram referenced as "DNA Synthesis"

Contributors

Pelc, Stephen Richard

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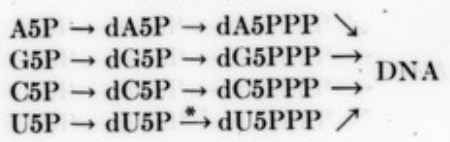
Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
https://wellcomecollection.org

SCHEME A



SCHEME B

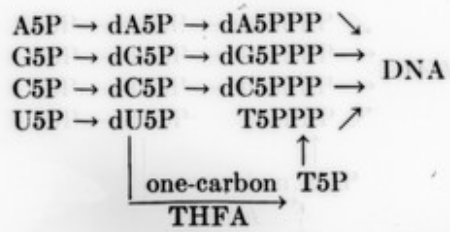


FIG. 1.—Known and hypothetical pathways of DNA synthesis starting with ribonucleotides, with special emphasis on the "methyl shunt" concept. The abbreviations used are: 5′-phosphates of adenosine, guanosine, cytidine, uridine (A5P, G5P, C5P, U5P); 5′-phosphates of deoxyadenosine, deoxyguanosine, deoxycytidine, deoxyuridine, thymidine (dA5P, dG5P, dC5P, dU5P, T5P); 5′-triphosphates of deoxyadenosine, deoxyguanosine, deoxycytidine, deoxyuridine, thymidine (dA5PPP, dG5PPP, dC5PPP, dU5PPP, T5PPP); deoxyribonucleic acid (DNA); THFA (tetrahydrofolic acid).

ponent of RNA—why not of DNA? How does the emergence of such a "methyl shunt" in biochemical evolution (if indeed it occurred this way!) provide a cell with more survival value?

The main thesis of this paper is that the "methyl shunt," by operating only a step or two removed from the final polymerization of deoxynucleoside triphosphates into DNA, could provide the cell with a very sensitive means of controlling DNA synthesis.

Kornberg's group has clearly shown that four deoxynucleoside triphosphates must be present for DNA synthesis to occur.[2] If any one of the deoxynucleotides be omitted, DNA synthesis does not occur. The "methyl shunt" appears to be especially sensitive to chemical insult. A block here effectively leads to a halt in DNA synthesis by depriving the DNA polymerase of an essential nucleotide. [illegible] the earliest inhibitory effects of antifolic agents[17] and of fluorodeoxyuridi[illegible]