activated DNA in the presence of 5 mM Mg^{2+}, 50% inhibition was found at (ddTTP)/(dTTP) = 6×10^{-2} while in the presence of poly (rA)·oligo(dT) as template-primer and 0.5 mM Mn^{2+}, the preferred test conditions for DNA polymerase γ, the enzyme was inhibited even more markedly by the nucleoside analogue. A similar result was obtained with ddATP as inhibitor in the presence of activated DNA.

In view of the large difference in sensitivity between DNA polymerases α and γ and the specific inhibition of adenovirus DNA synthesis by ddTTP and ddATP, our results can be best explained by assuming that DNA polymerase γ is required for chain elongation of adenovirus replicative intermediates. The concentrations of ddTTP giving 50% inhibition of both adenovirus DNA synthesis and DNA polymerase γ activity are of the same order of magnitude and ddTTP behaves as a competitive inhibitor in both situations. Caution is required, however, when extending results obtained with purified enzymes to the more complicated situation that exists in the replication fork. A function of DNA polymerase β in viral DNA chain growth is less likely since only α and γ enzymes are found in replication complexes capable of elongation[5,6] and since adenovirus DNA synthesis is sensitive to low concentrations of *N*-ethylmaleimide, which do not inhibit DNA polymerase β activity.

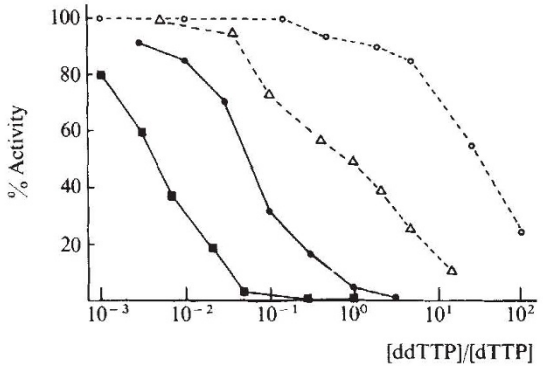

Fig. 3 Effect of ddTTP on DNA polymerase α, β and γ. DNA polymerases α and β from KB cells were purified by DEAE cellulose and DNA cellulose chromatography[2]. DNA polymerase α was characterised by sedimentation (8.8S) and its sensitivity to *N*-ethylmaleimide (95% inhibition by 1 mM NEM). DNA polymerase β sedimented at 3.4S and was completely resistant to 5 mM NEM. DNA polymerase γ was isolated according to Knopf *et al.*[19] and purified by DEAE-cellulose, phosphocellulose, hydroxylapatite and DNA cellulose chromatography. The enzyme preferred poly (rA)·oligo(dT) as template-primer to activated DNA, was 85% inhibited by 5 mM NEM and was essentially free of contaminating DNA polymerase α of β, as indicated by the absence of remaining enzyme activity at a (ddTTP) to (dTTP) ratio >1. The DNA polymerases were tested[19] with 5 mM NEM present in the β-polymerase incubation mixture. ○, DNA polymerase α; △, DNA polymerase β; ■, DNA polymerase γ with poly (rA)−dT_{12-18} as primer-template; ●, DNA polymerase γ with activated DNA as primer-template.

The function of DNA polymerase γ in the cell is unknown. Recently, several laboratories[12–14] have described the identical properties of nuclear DNA polymerase γ and mitochondrial DNA polymerase. Interestingly, both mitochondrial DNA[15] and adenovirus DNA replicate unidirectionally according to a strand-displacement mechanism, in contrast to nuclear DNA synthesis or papovavirus DNA replication. Another significant difference is the absence of histones in intracellular adenovirus DNA[16]. The above differences, together with our results, indicate the presence of at least two enzymatically distinguishable replication mechanisms in the mammalian cell.

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Errata

In the article 'Nucleotide sequence of bacteriophage G4 DNA' by G. N. Godson, B. G. Barrell, R. Staden and J. C. Fiddes, *Nature* **276,** 236–247, the two sentences starting on line 2 of page 242 should read: 'The amino acid differences between the proteins of the two phages is shown in Table 1. Gene *D* is the most highly conserved protein between the two phages, with only 17.8% of the amino acids changed, but this may be partly due to the presence of the overlapping *E* gene within the gene *D* coding region (see below).'

In the letter 'Are receptor-activated ciliary motor responses mediated through voltage or current?' by J. de Peyer and H. Machemer, *Nature* **276,** page 285, the last sentence in paragraph 1 should read: 'This is the first report of intracellularly recorded receptor currents in ciliates.'

In the letter 'Site of 1,25$(OH)_2$-vitamin D_3 synthesis in the kidney' by M. G. Brunette *et al.*, *Nature* **276,** page 287, line 16 in paragraph 3 should read: 'were less readily digested by collagenase, and could *not* be dissected'

In the letter 'An ultraviolet subdwarf companion to HD17576' by J. Darius and P. A. Whitelock, *Nature* **275,** page 428, Fig. 2 was printed without the diamond symbol representing the position of HD17576. The figure is shown correctly below.