as a result of pseudorabies-virus infection. Finally, the DNA preparation was passed through DEAE-cellulose paper pulp: again no significant breakdown of cell DNA occurred. Once more, however, prior incubation of cell homogenates resulted in DNA breakdown: this assay indicated an increase in exonuclease activity after infection (Morrison, 1967).

Pseudorabies-virus DNA has been shown to incorporate thymine from pre-labelled host cells (Low, Mechie, & Hay, 1971). The present results indicate that, if this thymine is derived directly from cellular DNA and not from pools within the cell, it must arise from extremely limited, probably predominantly exonucleolytic, digestion.

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Induction of Deoxyribonucleic Acid Polymerase and Deoxyribonuclease Activities in Cells Infected with Herpes Simplex Virus Type II

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Herpes simplex viruses form one serologic group, but minor antigenic differences have resulted in a classification into two types (Plummer, Waner, Phuangsab & Goodheart, 1970): type I is associated with non-genital and type II with genital infections.

It has been shown that infection of exponentially growing BHK21/C13 cells‡ by herpes simplex virus type I leads to a rise in both DNA polymerase and deoxyribonuclease activities (Keir & Gold, 1963). The infected-cell DNA polymerase is considerably more heat stable than is the host-cell enzyme and is stimulated at salt concentrations that inhibit the host-cell enzyme (Keir, Hay, Morrison & Subak-Sharpe, 1966a). In addition, both DNA polymerase and deoxyribonuclease activities after type I virus infection have been shown to be immunologically distinct from the enzymes of the uninfected cell (Keir, Subak-Sharpe, Shedden, Watson & Wildy, 1966b; Morrison & Keir, 1968).

BHK21/C13 cells in exponential phase were infected with herpes simplex virus type I (strains

MP17 and McDonald) or type II (strains HG52 and MS) at a multiplicity of infection of about 10 plaque-forming units/cell. After 9h the cells were washed and harvested and soluble extracts were prepared by centrifuging at 105 000g.

DNA polymerase activity from both type I- and type II-infected cells was stimulated five- to six-fold over the cellular value and the 400% stimulation of type I activity by about 150mM-K⁺ or -NH₄⁺ (Keir *et al.* 1966b) was confirmed. Type II-infected cell activity was maximally increased at about 100mM-salt by about 50%. Host-cell activity was inhibited at these concentrations. Preincubation of these extracts at 50°C indicated that type II activity was considerably more heat-stable than was the cell enzyme but less so than was type I activity.

Type I and type II herpes simplex viruses induced a similar rise in alkaline deoxyribonuclease activity, but no increase of acid deoxyribonuclease activity was observed.

The results indicate: (1) that infection with herpes simplex type II leads to considerable increases in DNA polymerase and deoxyribonuclease activities; (2) that the DNA polymerase activity after type II virus infection has properties distinct from that of the host cell and, apparently, from that of the type I-infected cell.

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An Unusual Deoxyribonucleic Acid Species of Mammalian Cells

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During use of the technique described by Marmur (1961) for the extraction of ³H-labelled DNA from mammalian cells previously exposed to [³H]-thymidine, a problem encountered was the incomplete recovery of acid-insoluble radioactivity. It now appears, at least in mouse fibroblasts (strain L929), mouse ascites-tumour cells (Krebs 2), HeLa cells and horse lymphocytes, that 30–40% of the total nuclear DNA is difficult to recover because of its size and the fact that it is complexed to a carbohydrate-containing moiety. After lysis of the labelled cells with sodium dodecyl sulphate followed by emulsification with chloroform–3-

‡ Abbreviation: BHK cells, baby-hamster kidney cells.