growth and was obtained by introducing a mutated XMP aminase gene into strain AB-1325. Strain AG-1 is thus unable to convert adenine nucleotides into guanine nucleotides and vice versa. Guanosine gave faster growth than guanine and so it was used in the following experiments.

Synthesis of nucleic acids in strain AG-1 as measured by the incorporation of [^{14}C]uracil or [^3H]thymine is negligible on transfer to a medium lacking guanosine whether adenine is present or not. However, addition of guanosine without adenine promotes synthesis of both DNA and RNA for a short period at a rate comparable with that in complete medium. Hypoxanthine and xanthine have no effect. On transfer from complete medium to one deficient in both adenine and guanosine, the contents of ATP and ADP fell after the first 10 min. A greater and much more rapid fall occurred when guanosine alone was supplied, probably as a direct consequence of the removal of adenine nucleotides for net synthesis of nucleic acid.

In strain AB-1325, there is a similar stimulation of nucleic acid synthesis and a similar behaviour of the ATP and ADP pools on supplying guanosine. Only a very small increase in the GTP content was detected during the period in which most RNA was synthesized and there was no increase in GDP or GMP. It is suggested that the rate of synthesis of RNA may be sensitive to very small changes in the intracellular content of GTP.

Measurements of the incorporation of [^{14}C]phenylalanine into protein and of the formation of β -galactosidase indicate that synthesis of messenger RNA occurs in the presence of guanosine alone. RNA-DNA-hybridization experiments show that in the first minute after the addition of guanosine there is an unusually high ratio of the rate of incorporation of [$5\text{-}^3\text{H}$]uracil into messenger RNA to the rate of its incorporation into ribosomal RNA.

The Distribution of Deoxyribonucleic Acid-Like Ribonucleic Acid in Rat Liver Cells

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Fractionation of total cellular RNA on columns of kieselguhr coated with methylated albumin has proved a useful method of separating DNA-like RNA from ribosomal and transfer RNA (Ellem, 1966; Ellem & Rhodes, 1969). DNA-like RNA can be subdivided into two groups: one that is eluted towards the end of a sodium chloride concentration gradient (called Q_2 -RNA), and the other that is tenaciously bound to the column after salt elution (called TD-RNA). The latter can be eluted with a

solution of sodium dodecyl sulphate at 35° and then at 70° . The function and relationship to one another of these species of DNA-like RNA is not known. The sedimentation coefficients of Q_2 - and TD-RNA are 50s (Yoshikawa-Fukada, Fukada & Kawada, 1965) and 16–18s (Ellem, 1966) respectively.

In this series of experiments, rat liver RNA was labelled by injecting $5\text{ }\mu\text{C}$ of [^3H]orotic acid 0.5, 2 or 18 hr. before death, and cytoplasmic RNA was isolated and fractionated on columns of methylated albumin. No TD-RNA was detected in the cytoplasmic fraction after any of these periods of labelling and no Q_2 -RNA was found in the cytoplasmic fraction after a 2 hr. labelling period, the only time when Q_2 -RNA was investigated.

The percentage of labelled TD-RNA in total or nuclear RNA from liver declines with length of labelling time, suggesting that TD-RNA has a rapid turnover.

These results may be interpreted as indicating that (1) DNA-like RNA is restricted to the nucleus, or (2) DNA-like RNA combines with ribosomal RNA and is eluted from the column with another fraction, or (3) there are two different species of DNA-like RNA, one behaving as in (1) above and the other as in (2) above. Two possible functions for these species of RNA are (1) repressors that are restricted to the nucleus and (2) precursors of messenger RNA.

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The Mechanism of Action of Interferon: a Comparison of Ribosomes from Interferon-Treated and Control Cells

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Recent work on the mechanism of action of interferon has been concerned with the hypothesis that interferon induces the cell to produce anti-viral protein(s) that inhibits viral replication by preventing the translation of viral, but not host-cell, messenger RNA. The work of Marcus & Salb (1966) clearly indicated the ribosome as the site of action of this translation-inhibitory protein. Accordingly, a study has been made of ribosomes from interferon-treated and control chick-embryo fibroblasts. If new protein(s) is synthesized in response to interferon and is associated with either the ribosome or the cell-sap fractions, we have been unable to obtain unequivocal evidence for it, despite extensive