some population into polyribosomes (Marcus & Feeley, 1965). The conversion takes place in the absence of transcription (Dure & Waters, 1964; Marcus & Feeley, 1966; Chen, Sarid & Katchalski, 1968), suggesting that the process involves 'activation' of preformed messenger. In support of this idea, a messenger-containing subcellular fraction (fraction MF) has been isolated from dry wheat embryo. By comparison of the characteristics of fraction-MF-directed amino acid incorporation with the reactions catalysed by tobacco-mosaic-virus RNA on one hand and by preformed polyribosomes on the other, it could be shown that a messenger-ribosome attachment reaction is a prerequisite for fraction-MF activity. In addition, direct demonstration of such a reaction is provided by experiments in which fraction MF is allowed to react *in vitro* with messenger-free ribosomes. Sucrose-density-gradient analyses of this reaction shows a progressive conversion of monoribosomes into functional polyribosomes.

When fraction MF is stored at 0°C its activity decays with a half-life of 12–13h. The loss of activity is not due to ribonuclease, as shown by the complete stability of tobacco-mosaic-virus RNA stored in the presence of fraction MF. These findings, as well as experiments demonstrating the sensitivity of fraction MF to low concentrations of pronase and *N*-ethylmaleimide, suggest that a component other than RNA is necessary for fraction-MF activity and that the functional form of fraction MF may be a ribonucleoprotein. The low template activity of purified fraction-MF RNA is consistent with this conclusion.

Studies *in vivo* show a rapid decrease in messenger fraction concomitant with polyribosome formation during early germination. Cumulatively these findings suggest an important physiological role for fraction MF in the initiation of the protein synthesis that occurs at the outset of germination.

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Protein Synthesis and Viability in Rye

By DAPHNE J. OSBORNE, BRYAN E. ROBERTS and N. D. HALLAM. (*Agricultural Research Council Unit of Developmental Botany, 181A Huntingdon Road, Cambridge CB3 0DY, U.K.*)

Embryos of non-viable rye grains do not make protein, but protein synthesis can be demonstrated in viable embryos within 60 min of imbibition (see Marcus & Feeley, 1965). Ribosomes and soluble components have been isolated from the embryos of both types of grain, and incorporation of amino acids into trichloroacetic acid-precipitable proteins determined in the presence of either endogenous or synthetic message [poly(U)]. Comparisons of homologous and heterologous ribosomal and soluble constituents from the viable and non-viable embryos indicate a functional lesion in the non-viable ribosomes. Although the two kinds of ribosomes show no visible differences with the electron microscope either in sectioned material or when isolated and negatively stained, sucrose-density-gradient analysis shows that the non-viable ribosomes are lighter with a greater heterogeneity of density. The possibility is considered that loss of protein-synthetic activity in non-viable grains is associated with loss of long-life stored mRNA.

A second modification in the non-viable embryo is associated with the DNA. Although spectrophotometric determinations of total Feulgen-staining nuclear DNA indicates no difference between viable and non-viable embryos before or after imbibition, less DNA can be recovered by extraction (Marmur, 1961) from non-viable embryos. Electron microscopy of comparable tissue of viable and non-viable embryos shows differences in fine structure in the dry grain before imbibition and dramatic and progressive changes during the early hours of imbibition.

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COMMUNICATIONS

Formation and Utilization of Ketone Bodies during Development of the Male Rat

By E. BAILEY and ELIZABETH A. LOCKWOOD. (*Department of Biochemistry, University of Sheffield, Sheffield S10 2TN, U.K.*)

It is now clear that hepatic lipogenesis and gluconeogenesis in the rat adapt to the nutritional changes that occur during development. However,

little is known about changes in lipid breakdown during development despite the fact that the neonatal rat derives most of its energy from the fat content of milk (Drahota, Hahn & Honova, 1966). The results of Drahota *et al.* (1966), Lockwood & Bailey (1970) and Augenfeld & Fritz (1970) suggest that during the suckling period rat liver has an increased capacity for fatty acid degradation and ketone-body formation. The present paper is concerned with developmental changes in blood