It is evident that the nerve cells contain a ribonucleic acid which, with respect to nucleotide composition, is similar to that obtained from other organs of the body.

JAN-ERIK EDSTRÖM
HOLGER HYDÉN

Department of Histology,
Medical Faculty,
University of Göteborg.
March 30.

[1] Hydén, H., *Acta Physiol. Scand.*, Supp. 17 (1943).
[2] Edström J.-E., *Biochim. et Biophys. Acta*, **12**, 361 (1953).
[3] Smith, J. D., and Markham, R., *Biochem. J.*, **46**, 509 (1950).
[4] Davidson, J. N., and Smellie, R. M. S., *Biochem. J.*, **52**, 594 (1952).
[5] de Fonbrune, P., "Technique de Micromanipulation" (*Mon. Inst. Pasteur* 1949, Masson, Paris).
[6] Edström, J.-E., *Nature*, **172**, 809 (1953).

A Possible Function of Intracellular Ribonucleases

MANY theories have been put forward concerning the mechanism of protein synthesis, and most of them have suggested that ribonucleic acid acts as a template upon, or alongside which, peptide chains are synthesized. The arrangement of the amino-acids in the peptide chain is supposedly regulated by the highly specific arrangement of the nucleotides which, it has been suggested[1,2], may contain high-energy phosphate at the proper intervals to effect peptide bond synthesis. A recent detailed account of this theory and some evidence for the phosphorylation of ribonucleic acid has been offered by Dounce[1,3].

It is not clear how the peptide chains, once formed, would be separated from the nucleic acid, since there would be strong electrovalent forces holding them together, particularly between highly positive basic amino-acids and strongly negative nucleotide residues, as well as secondary hydrogen bonding and van der Waals's forces. It is possible that the release of the protein may be accomplished by partial or complete degradation of the polynucleotide chain by intracellular ribonucleases. It should not be difficult to devise experimental procedures to determine whether these enzymes are able to break down the ribonucleic acid portion of ribonucleoprotein complexes, thereby releasing active enzymes. If a system could be obtained in which complexes of enzymes with ribonucleic acid tended to accumulate, then the addition of a ribonuclease to such a system should result in an increase in enzyme activity.

Attempts were made to demonstrate this using relatively old (7–10 days) cultures of *Tetrahymena pyriformis* S. The methods of preparation of the cultures, isolation of the organisms and preparation of the homogenates, as well as the enzyme assays have been previously described[4,5]. Assays were carried out for deoxyribonuclease and the oxidation of succinate. The results of a typical experiment with deoxyribonuclease are shown in Fig. 1. The addition of 2·5 mgm. of protease-free ribonuclease (Worthington Biochemical Sales Co.) approximately doubled the deoxyribonuclease activity, so that the hydrolysis of the substrate was essentially complete after 30 min., whereas in the control this required 60 min. Similar results were obtained with 8–10 day old cultures of the *W* strain.

In the assays for the oxidation of succinate the results were more variable. Increase in activity on addition of ribonuclease (0·1–0·5 mgm. per Warburg flask) ranged from 0 to 35 per cent. The succinate oxidizing system does not appear to be well suited to these experiments, as in older cultures the activity was quite low and small changes were thus likely to be magnified.

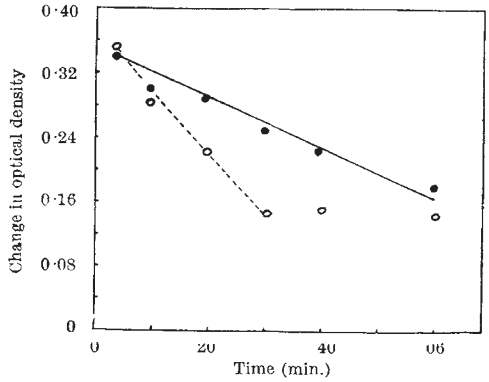

Fig. 1. The deoxyribonuclease activity of a homogenate of an eight-day old culture of *Tetrahymena pyriformis* S. with and without added crystalline pancreatic ribonuclease. Closed circles, control; open circles, control plus 2·5 mgm. ribonuclease. The system contained 10·0 ml. of 0·1 *M* veronal-acetate buffer, *p*H 5·2, 10·0 ml. of 0·2 per cent NaDNA and 5·0 ml. of homogenate. The activity is expressed in terms of the decrease in optical density with time of aliquots precipitated with an equal volume of 1·0 *N* HCl. The values above have been corrected for the action of crystalline pancreatic ribonuclease on the RNA in the homogenate. The sample of pancreatic ribonuclease used had no action on NaDNA under identical conditions

The above results are admittedly only suggestive, but it may be possible to obtain a better demonstration of the release of protein enzymes by ribonuclease in some other biological system, possibly one that has been inhibited by ribonuclease inhibitors. Recently, Lundblad and Hultin[6] demonstrated the liberation of proteolytic enzymes of the sea urchin egg by ribonuclease. A clearer proof would be to show an increase in enzyme activity or the liberation of enzyme activity on treatment of purified isolated ribonucleoprotein with ribonuclease.

The rather rapid turnover of ribonucleic acid in both the cytoplasm and nucleus might be due to the action of intracellular ribonucleases, and the occurrence of these enzymes in the nucleus, as well as the cytoplasm, in certain tissues seems probable[7].

JAY S. ROTH*
William Goldman Isotope Laboratory,
Division of Biological Chemistry,
Hahnemann Medical College and Hospital,
Philadelphia 2, Pennsylvania.

* Present address: Strangeways Research Laboratory, Cambridge. (British–American Cancer Research Exchange Fellow.)

[1] Dounce, A. L., *Enzymologia*, **15**, 251 (1952).
[2] Pollister, A. W., "Chemistry and Physiology of the Nucleus", 159 (Academic Press, N.Y., 1952).
[3] Dounce, A. L., and Kay, E. R. M., *Proc. Soc. Exp. Biol. Med.*, **83**, 321 (1953).
[4] Eichel, H. J., and Roth, J. S., *Biol. Bull.*, **104**, 351 (1953).
[5] Eichel, H. J., *J. Biol. Chem.*, **206**, 159 (1954).
[6] Lundblad, G., and Hultin, E., *Exp. Cell. Res.*, **6**, 249 (1954).
[7] Roth, J. S., *J. Biol. Chem.*, [**208**, 181 (1954)].

Solubility and Electrophoretic Behaviour of Steroid-Detergent Mixtures in Aqueous Buffers

WE have tried to overcome the well-known difficulty of preparing aqueous solutions of steroids by the use of detergents. We have been interested further in the study of the behaviour of the detergents themselves and of steroid-detergent mixtures in the electric field and in the practicability of separating