NUCLEOLUS

European Workshop

from a Correspondent

THERE was a week of intensive discussion on many aspects of nuclear structure and function when the second European Nucleolar Workshop, organized by the European Cell Biology Organization (ECBO) and the Hungarian Acadamy of Sciences, was held at Balatonszéplak (Lake Balaton) from September 27 to October 1. The eleven sessions included about fifty short communications and twelve extended round-table discussions on the principal issues raised.

The opening session concerned the structure and amplification of the ribosomal genes, including direct visualization in the electron microscope (Dr O. L. Miller, Oak Ridge), *in situ* hybridization (Dr S. Gerbi, Tübingen), localization on the *Y* chromosome in *Drosophila* (E. Boncinelli) and synthesis in the mitotic cycle of *Physarum* (U. Ryser). The present state of knowledge in this field is well defined, but the mechanisms of amplification and maintenance of gene identity remain obscure.

The session on ribosomal RNA synthesis and processing led to much discussion. That three very different models for the structure and cleavage of the precursor could be given, by Drs H. Busch (Houston), U. E. Loening (Edinburgh) and R. J. Planta (Amsterdam), all reasonably well substantiated, shows that no simple universal scheme for eukaryotes can yet be envisaged. At least it was clear that even the dinoflagellates, discussed by Dr P. Rae (Tübingen), synthesize a high molecular weight precursor to rRNA and *E. coli* does not; but Dr Miller showed, by using short pulses of rifampicin, that even in *E. coli* the polymerase travels on from the 16S to 23S region without reinitiation. It was also clear that the ribosomal precursor is a complex mixture of molecules; Dr P. Tiollais (Paris) showed that three components could be distinguished in mammalian cells, while Dr Loening showed that the molecule was heterogeneous in many species and differed between leaves and roots. Drs M. E. Mirault (Lausanne) and J. P. Zalta (Toulouse) described the isolation of nucleolar particles. There is now a very reasonable expectation that the cleavage of the precursor can be followed *in vitro*.

There was a shorter but detailed discussion on RNA polymerases, many of which can now be purified, and some promising stimulatory factors have been isolated (Dr P. Chambon, Strasbourg). While the resistance of the nucleolar polymerase to α-amanitin was generally confirmed, the enzyme can leak into the cytoplasm and is sensitive to high concentrations of the drug.

There was a discussion of the properties of nuclear heterogeneous RNA which curiously omitted any consideration of messenger RNA. But the isolation of homogeneous large RNA from a Balbiani ring, described by Dr Bo. Lambert (Stockholm), provided a new aspect to the transcription of a single genetic locus. Dr Scherrer (Lausanne) suggested that the structure of the giant nuclear RNA is different from that of the cytoplasmic messenger in its physical-chemical behaviour because sedimentation and electrophoresis give distinctly different conclusions.

That the nucleolus may have more functions than the synthesis of ribosomes was elegantly demonstrated by Dr E. Sidebottom (Oxford). When chick erythrocytes are fused with mouse cells, the heterokaryon can synthesize new chicken proteins only when the nucleolus is intact; microbeam ultraviolet irradiation of the nucleolus results in a loss of ability to form chicken surface antigens or of sensitivity to diphtheria toxin. These experiments again raise the problem of the transport of messenger to the cytoplasm. It was made quite clear, for example by Dr M. Jakob (Strasbourg), that particles containing DNA-like RNA from nucleus and cytoplasm contain very different protein fractions.

There was a lively discussion on the methods of isolation of nuclei and nucleoli and a useful exchange of technical details. Perhaps the important conclusion is to choose your organism: Dr Quetier (Orsay) suggested the use of a small coconut species (*Acroconia armentalis*) which is essentially a vessel containing three million active nuclei in free suspension per millilitre.

The number of low molecular weight RNA molecules in the nucleus and nucleolus seems now to be fairly clearly defined, and was described in several contributions. Dr H. Busch (Houston) presented complete and partial nucleotide sequences of some of these.

Many electron micrographs of nucleolar fine structure were presented, after the action of inhibitors (Drs K. Lapis, Budapest, U. Heine, Bethesda, and others) or in various differentiated cells (Dr K. Smetana, Prague, and others). Nucleolar segregation of the fibrillar and granular regions is associated with a block in rRNA synthesis in either case, but the RNA intermediates which accumulate may vary with the type of inhibitor or state of the cell.

CORRESPONDENCE

Arabinose Operon

SIR,—Appreciative as we are of the encapsulations written by *Nature*'s correspondents, we are troubled to find that the broad perspectives scanned by these individuals are sometimes diminished by myopia. Take for example "The Arabinose Operon *in vitro*" (*Nature New Biology*, **233**, 189; 1971). This comment reviewed positive control in the arabinose operon without any reference to the predominant role played by Ellis Englesberg and his colleagues from the initial apprehension through the steps of genetic proof. The reviewer regrets the continued absence of chemically isolated *ara* regulator protein, apparently unaware of the publication of the purification of that protein (*Proc. US Nat. Acad. Sci.*, **68**, 2145; 1971) by, you guessed it, Wilcox, Clemetson, Santi and Englesberg.

Yours faithfully,

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The September issue of the *Proceedings* which contained Englesberg's article did not arrive in London until after publication of our editorial. ED., *Nature New Biology*.

Bacterial Division

SIR,—I would like to correct the report (*Nature New Biology*, **233**, 254; 1971) of the talk which I gave to the British Society for Cell Biology symposium, "Entry into Discussion", on September 15 in Bristol.

The short paragraph which includes discussion of my talk says that anucleate bacterial cells can divide, which is, so far as I know, quite untrue. Neither I nor anyone else has reported such a phenomenon. For a full statement of our experiments and speculations on cell division in bacteria, any interested readers are referred to two recent publications in this journal (W. D. Donachie and K. J. Begg, *Nature*, **227**, 1220; 1970; and W. D. Donachie, D. T. M. Martin and K. J. Begg, *Nature New Biology*, **231**, 274; 1971).

Yours faithfully,

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Our correspondent regrets the error, which resulted from the speed of Dr Donachie's talk.