

Messenger RNA and Ribosomes in Protein Synthesis

Edited by C. F. PHELPS
and H. R. V. ARNSTEIN

The Biochemical Society's Forty-Seventh Symposium, held in London in December 1981, assembled some of the leading workers in this area of biochemistry. The subjects for discussion were chosen for their timeliness and distinctiveness, and included accounts of ribosome and messenger RNA structure and function, initiation factors, caps and ribonucleoproteins, as well as consideration of the processes leading to the distribution of newly synthesized proteins within the cell. The papers presented are now published in this volume.

List of contents and authors:

Preface. Prokaryotic Ribosome Structure: a Kinetic View by C. G. Kurland. *Structural Aspects of Eukaryotic Ribosomes* by R. A. Cox & J. M. Kelly. *The Secondary Structure of Ribosomal RNA, and its Organization within the Ribosomal Subunits* by R. Brimacombe. *Secondary Structure of Eukaryotic Messenger RNA* by C. P. H. Vary & J. N. Vournakis. *Studies on the Structure and Biogenesis of Yeast Ribosomes* by M. Cannon. *Translation Mechanism in Prokaryotes: Structure and Expression of Escherichia coli Initiation Factor IF3 Gene* by M. Grunberg-Manago, M. Springer, J. A. Plumbridge, S. Blanquet, G. Fayat & C. Sacerdot. *How do Eukaryotic Ribosomes Recognize the Unique AUG Initiator Codon in Messenger RNA?* by M. Kozak. *5'-Terminal Caps, Cap-Binding Proteins and Eukaryotic mRNA Function* by A. J. Shatkin, E. Darzynkiewicz, Y. Furuichi, H. Kroath, M. A. Morgan, S. M. Tahara & M. Yamakawa. *Association of an M₁ 50000 Cap Binding Protein with the Cytoskeleton in BHK Cells* by H. Trachsel, A. Zumbé, C. Stähli, M. Hümbelin & N. Sonenberg. *Messenger Ribonucleoprotein Complexes in Gene Expression* by H. R. V. Arnstein. *Mechanism of Protein Translocation Across the Endoplasmic Reticulum* by P. Walter & G. Blobel. *Synthesis and Maturation of the Erythrocyte Anion Transport Protein — an Internal Sequence for Membrane Insertion* by H. F. Lodish & W. A. Braell. *Subject Index.*

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BIOTECHNOLOGY

Edited by C. F. PHELPS
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The fourteen contributions forming this volume were presented at a London meeting of the Biochemical Society including the Society's Forty-Eighth Symposium 'Biotechnology', in December 1982. With today's increasing pressures to develop latest laboratory findings into practical industrial processes as quickly as possible the chosen theme of this Symposium was a timely one. The papers represent up-to-date reports from international biochemists whose work is of direct relevance to the wide areas of interests concerned with biotechnology, together with glimpses of the early development of its techniques and a look at its exciting future.

List of contents and authors:

Preface. How Biotechnology Developed at University College London by **E. M. Crook**. *The Future of Biotechnology* by **P. Dunnill**. *Carbohydrate Transformations by Immobilized Cells* by **C. Bucke**. *Biological Halogenation and Epoxidation* by **S. L. Neidleman & J. Geigert**. *High-Productivity Alcohol Fermentations using Zymomonas mobilis* by **M. L. Skotnicki, R. G. Warr, A. E. Goodman, K. J. Lee & P. L. Rogers**. *The Problem of Lignin Biodegradation* by **L. Wallace, A. Paterson, A. McCarthy, U. Raeder, L. Ramsey, M. MacDonald, R. Haylock & P. Broda**. *Special Bacterial Polysaccharides and Polysaccharases* by **T. Harada**. *A New Era of Exploitation of Microbial Metabolites* by **A. L. Demain**. *Industrial Prospects for Thermophiles and Thermophilic Enzymes* by **B. S. Hartley & M. A. Payton**. *Anaerobic Fermentations – Some New Possibilities* by **J. G. Morris**. *Xenobiotic Degradation in Industrial Sewage: Haloaromatics as Target Substrates* by **H. J. Knackmuss**. *Genetic Analysis and Manipulation of Catabolic Pathways in Pseudomonas* by **P. R. Lehrbach & K. N. Timmis**. *Plant Cell Cloning and Culture Products* by **L. H. Jones**. *A Hybrid Promoter and Portable Shine-Dalgarno Regions of Escherichia coli* by **H. A. De Boer, L. J. Comstock, A. Hui, E. Wong & M. Vasser**. *Subject Index*.

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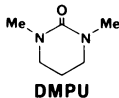
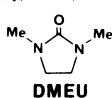


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Dipolar, Aprotic Solvents

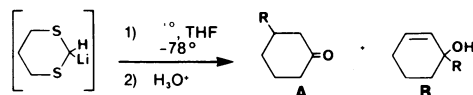
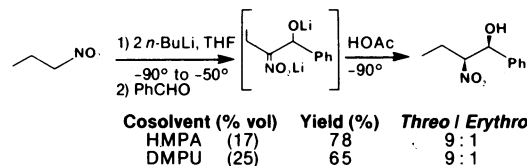
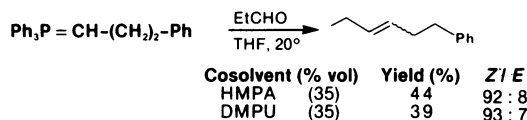
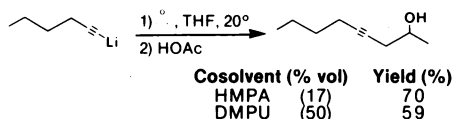
1,3-Dimethyl-2-imidazolidinone (DMEU) and 1,3-dimethyl-3,4,5,6-tetrahydro-2(1*H*)-pyrimidinone (DMPU) are dipolar, aprotic, cyclic ureas that have recently been used as substitute solvents for the carcinogenic hexamethylphosphoramide (HMPA), [(Me₆N).PO].¹



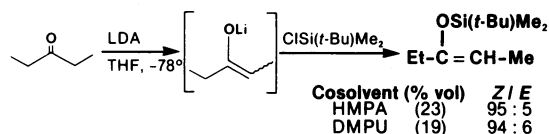
Both **DMEU** and **DMPU** are hygroscopic and miscible with water. They can be removed from solutions in hydrocarbons or ether by washing with water. Solvents such as chloroform and methylene chloride, however, retain **DMEU** and **DMPU** in the organic phase. **DMEU** and **DMPU** have high dielectric constants as well as high dipole moments which make them very good dissociating media.²

Professor D. Seebach has recently reported that, "For a carbonyl compound **DMPU** is remarkably unreactive: although a vigorous, exothermic reaction takes place when a hexane solution of butyllithium is added to a THF/**DMPU** mixture at -78°, only a slow reaction is noticed at -90°. If a more reactive substrate is present in solution, the **DMPU** cosolvent does not interfere: thus, at about -35° or below, butyllithium deprotonates diisopropylamine quantitatively in a (2:1) THF/**DMPU** mixture, and the LDA formed is stable in this medium at temperatures between -78° and -35° for at least two to three hours. Of course, **DMPU** can also be added to the THF solution of a reagent generated under conventional metallation conditions, just prior to the reaction with an electrophile."³

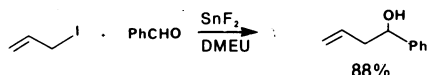
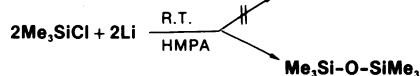
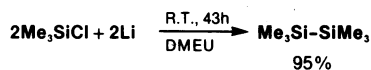
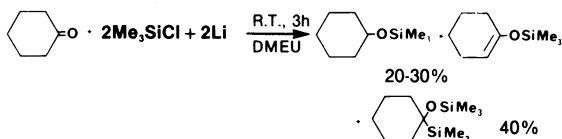
DMPU has been shown to exhibit the same effects as **HMPA** in oxirane openings with lithium acetylides, Wittig olefinations, double deprotonation of nitroalkanes, Michael additions of lithiodithiane to cyclohexenone, and selective generations of certain enolates.⁴



R = 1,3-dithian-2-yl	Cosolvent (% vol)	Yield (%)	A/B
HMPA (50)	50-80	95:5	
DMPU (50)	70	92:8	



Lastly, except for **HMPA**, common dipolar aprotic solvents such as DMF,⁵ DMSO,⁶ and tetramethylurea⁷ are rather reactive towards strong bases and alkali metals. Being stable towards alkali metals, **DMEU** is a useful solvent in a variety of organometallic reactions.⁸⁻⁹



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