PHARM TECH CONFERENCE '82

PART 1

Pharm Tech Conference '82

SHERATON CENTRE HOTEL
NEW YORK CITY

SEPTEMBER 21-23, 1982

Printed in the United States of America
10 9 8 7 6 5 4 3 2 1

Library of Congress Catalog Card Number: 82-61410
ISBN: 0-943330-01-7

Published by Pharmaceutical Technology Publications
320 North A Street, P.O. Box 50, Springfield, Oregon 97477
(503) 726–1200

Pharm Tech Conference '82

New York City

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About Pharm Tech Conference '82

Pharm Tech Conference, the premier international conference for the pharmaceutical industry, is produced annually by *Pharmaceutical Technology* magazine in conjunction with Interphex USA, the premier international exhibition for the industry.

Pharm Tech Conference '82 featured 128 speakers, panelists, and chairmen, drawn from 56 major pharmaceutical firms, 10 colleges of pharmacy, 5 law firms, the Food and Drug Administration, the Pharmaceutical Manufacturers Association, and the Health Industry Manufacturers Association. More than 1500 of the world's foremost pharmaceutical manufacturers, researchers, academicians, and regulators attended Pharm Tech Conference '82, representing the total spectrum of pharmaceutical manufacturing.

This official proceedings includes the texts of 77 papers presented at the conference and is a unique reference source for the state-of-the-art in pharmaceutical research, manufacturing, and regulation. The papers published within this volume emphasize the analysis of new technologies and methods for production, quality control, packaging, and research and development as well as the rules and regulations governing their use.

Pharm Tech Conference '82 represents the efforts not only of the staff of *Pharmaceutical Technology* but the efforts of many within the industry itself. *Pharmaceutical Technology* is particularly indebted to its conference chairmen, whose guidance has provided the strength and scope that characterize these proceedings:

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Technical & Regulatory Aspects of Drug Manufacture Using Recombinant DNA

Chairmen: Kenneth C. Olson, Process Development, Genentech, Inc., and Christopher T. Rhodes, PhD, Professor & Chairman, Dept. of Pharmacy, University of Rhode Island.

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Fermentation in the Application of Recombinant DNA Technology to the Production of Pharmaceuticals

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Fermentation is an ancient technology. Its evolution encompasses six periods, each contributing different products for the well-being of human beings.

1. Prehistorical: Alcoholic drinks and aged/preserved meat

2. Pre-Pasteur: Cheese, yogurt, sour milk, bread, beer and soy sauce. It was not until 1857 that Pasteur proved that fermentation was brought about by living microorganisms.

3. Pre-WW I (1857-1914): Production of bakers' yeast in deep aerated tanks

4. WW I to WW II (1914-1939): Acetone, butanol, citric acid and other organic acids

5. Post-WW II (1939-1973): Antibiotics, vitamins, steroids, enzymes and amino acids

6. rDNA (1973-): Insulin, growth hormones, interferons and vaccines.

Genetic information is stored in living cells in the double helix of DNA. Each "structural gene" encodes a specific protein. There are several thousand structural genes in a bacterium. The encoding or the "expression" of a structural gene into a protein involves the following processes:

1. Transcription of DNA into mRNA,
   -A promoter region where RNA polymerases bind to the DNA
   -An initiation region for initiation of mRNA formation
   -An operator region for regulatory controls, and
   -A termination region for termination of DNA transcription.

2. Translation of mRNA on ribosomes into protein
   -A ribosome binding site where ribosomes bind to the mRNA
   -A start codon for initiation of protein synthesis, and
   -A stop codon for termination of mRNA translation.

Recombinant DNA technology makes possible the production of any protein, such as human protein, by a microorganism through the introduction of the gene which codes for that protein into the "host" microorganism.

Recombinant DNA technology is expected to have major economic and social impacts in the production of pharmaceuticals. Some estimates put