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D R A F T

IDENTIFICATION OF CHEMICAL INTERMEDIATES
AND RAW MATERIALS USED IN THE
MANUFACTURE OF SOME ESSENTIAL PHARMACEUTICAL CHEMICALS

BY

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PREFACE

A list of 76 raw materials and chemical intermediates used in the manufacture of 36 pharmaceutical chemicals has been prepared. In each case, one specific route of synthesis has been selected for this study, though the actual process of manufacture has varied from company to company.

During the preparation of this document, it was noted that for certain pharmaceutical chemicals, the chemical intermediates and raw materials are already identified in literature, though not in one single publication. The commercial sources of supply of such materials have been identified. However, in case of a number of pharmaceutical chemicals, some of the intermediates and raw materials were not found to be available from known producers and suppliers. Such intermediates are not included in this document. Efforts have been made to identify raw materials for the production of the intermediates. Therefore, only intermediates and raw materials with a recognized source of supply have been included in this list. The list of raw materials does not include solvents and chemicals in common use.

This document should be read in combination with the UNIDO Directory of Sources of Supply of Pharmaceutical Chemicals, their Intermediates and some Raw Materials, ID/WG.393/2/Rev.1 of 5 November 1984, particularly in reference to addresses of producers and suppliers. A list of addresses in addition to those given in the Directory is provided.

The source of information has been the study of pharmaceutical processes and consultation with numerous directories and catalogues of chemicals. Reference was also made in certain cases to actual patent literature.

S E C T I O N I

PRODUCTS WITH RAW MATERIALS/CHEMICAL INTERMEDIATES
AND NAMES OF PRODUCERS AND SUPPLIERS.

THE PRODUCERS ARE MARKED **.

Product: Allopurinol
Raw Material/ 3-Amino-4-carbethoxypyrazole
Chemical Intermediate:

Manufacturers/Suppliers:

**Aceto Chemicals, USA
Aldrich Chemicals, USA
EGA Chemie, F.R. Germany
**Isochim, France
Siegfried AG, Switzerland

Product: Allopurinol
Raw Material/ Formamide
Chemical Intermediate:
Manufacturers/Suppliers:

Aldrich Chemicals, USA
** BASF, F.R. Germany
** CTC Organics, USA
Fluka AG, Switzerland
** Genzyme, USA
Kepec GmbH, F.R. Germany
Lancaster Synthesis, UK
** Mallinkrodt, USA
E. Merck, F.R. Germany
Schuchardt, F.R. Germany

Product: Amitriptyline

Raw Material/
Chemical Intermediate: Dibenzosuberone

Manufacturers/Suppliers:

- ** Aldrich Chemicals, USA
- ** Dynamit NobelAG, F.R.Germany
EGA Chemie, F.R.Germany
- ** Medimpex, Hungary
- ** Sandoz AG, Switzerland
Schuchardt, F.R.Germany
Siegfried AG, Switzerland

Product: Amitriptyline

Raw Material/
Chemical Intermediate: Dimethylaminopropyl chloride

Manufacturers/Suppliers:

- Aldrich Chemicals, USA
- B.D.H. Chemicals, UK
- Fluka AG, Switzerland
- Koch Light, UK
- May and Baker, UK
- ** E. Merck, F.R.Germany
- ** Sandoz AG, Switzerland
- ** U.C.B., Belgium

Product: Amodiaquine
Raw Material/
Chemical Intermediate: 4-7 Dichloroquinoline

Manufacturers/Suppliers:

Aldrich Chemicals, USA
Austin Chemicals, USA
Bec Chemicals, India
** Chemical Dynamics, USA
Harbottle, UK
** Hopkins and Williams
** ICI, UK
Interchem, USA
** Medimpex, Hungary
** Pfister Chemicals, USA
Ranbaxy Laboratories, India
** Rhone Poulenc, France
** Sanofi, France
** Southland Corpn, USA
** Sterling Organics, UK
** Suneeta Laboratories, India
Transmedica, F.R.Germany
** UCB, Belgium

Product: Amodiaquine
Raw Material/
Chemical Intermediate: 4-Acetamidophenol

Manufacturers/Suppliers:

Aceto Chemicals, USA
Aldrich Chemicals, USA
** Bayer AG, F.R.Germany
** Ciech, Poland
** Chimimportexport, Rumania
** China National Chemical
Fluka AG, Switzerland
** Genzyme, USA
** Hoechst, F.R.Germany
** IDPL, India
** Kenwell, India
** Mallinkrodt, USA
** Mitsui, Japan
** Monsanto, USA
** Polychemicals, USA
** Quimica Farmaceutica Platense, Argentina
** Rhone Poulenc, France
** Sterling Organics, UK

Product Betamethasone

Raw Material/
Chemical Intermediate: Diosgenin

Manufacturers/Suppliers:

B.D.H. Chemicals, UK
** China National Chemicals, China
** CIPLA, India
Ferak, F.R.Germany
Koch Light, UK
** Kurram Chemicals, Pakistan
C. Roth, F.R.Germany

Product: Betamethasone

Raw Material/
Chemical Intermediate: 16-Dehydropregnenolone

Manufacturers/Suppliers:

B.D.H. Chemicals, UK
** CIPLA, India
** CSIR, India
** ICN Life Sciences, USA
Koch Light, UK

Product Chloramphenicol
Raw Material/
Chemical Intermediate: Methyl dichloroacetate

Manufacturers/Suppliers:

- ** Aceto Chemicals, USA
Aldrich Chemicals, USA
- ** Atul Products, India
Fluka AG, Switzerland
- ** Granata, Italy
- ** Hoechst, F.R.Germany
KNK/ICN, USA
Koch Light, UK
- ** Rhone Poulenc, France
Schhardt, F.R. Germany

Product: Chloramphenicol
Raw Material/
Chemical Intermediate: p-Nitro-acetophenone

Manufacturers/Suppliers:

- ** Aceto Chemicals, USA
Aldrich Chemicals, USA
EGA Chemie, F.R.Germany
Ferak, F.R.Germany
- ** Genzyme, USA
KNK/ICN, USA
Koch Light, UK
Schhardt, F.R.Germany

Product: Chlorhexidine

Raw Material/
Chemical Intermediate: Chloraniline

Manufacturers/Suppliers:

- Aldrich Chemicals, USA
- ** Bayer AG, F.R.Germany
- BDH Chemicals, UK
- Chemical Dynamics, USA
- Chemical Service, USA
- ** Dupont de Nemours, USA
- ** Fisons, UK
- Fluka AG, Switzerland
- ** Hoechst AG, F.R.Germany
- Hopkins & Williams, UK
- ** ICI, UK
- ** Kepec, F.R.Germany
- ** E. Merck, F.R. Germany
- Schuchardt, F.R.Germany
- ** Sumimoto, Japan

Product: Chlorhexidine

Raw Material/
Chemical Intermediate: Hexamethylenediamine

Manufacturers/Suppliers:

- ** Ames Laboratories, USA
- ** Asahi, Japan
- ** BASF, F.R.Germany
- ** Chemical Organics, USA
- ** Dupont de Nemours, USA
- ** Mitsui Chemicals, Japan
- ** Monsanto, USA
- ** Montedison, Italy
- ** Rnodia SA, Brazil
- ** Rhone Poulenc, France
- ** Schuchardt, F.R.Germany

Product Chlorphenamine
Raw Material/
Chemical Intermediate: Pheniramine

Manufacturers/Suppliers:

Aldrich Chemicals, USA
** Hexagon, USA
** Hoechst, F.R. Germany
** Interchem, USA
** Polychemicals, USA
** Roussel-Uclaf, France
** Sankyo, Japan
** Schering-Plough, USA

Product Chlorphenamine
Raw Material/
Chemical Intermediate: Dimethylaminoethyl chloride

Manufacturers/Suppliers:

Aceto Chemicals, USA
** Aldrich Chemicals, USA
** Chemical Dynamics, USA
KNE/ICN, USA
** Kepec, F.R. Germany
Ray and Baker, UK
** PCAS, France
** Sandoz AG, Switzerland
** Schuler and Lange, F.R. Germany
Schuchardt, F.R. Germany
** Sigma, USA

Product:

Cimetidine

Raw Material/

Chemical Intermediate:

4-Hydroxyethyl-5-methylimidazole

Manufacturers/Suppliers:

- ** BASF, F.R.Germany
- ** Caorep, France

Product:

Cimetidine

Raw Material/

Chemical Intermediate:

Manufacturers/Suppliers:

Ethyl-2-chloro-aceto-acetyl chloride

- ** Aldrich Chemicals, USA
- ** Aceto Chemicals, USA
- EGA Chemie, F.R. Germany
- Ferak AG, F.R.Germany
- Fluka AG, Switzerland
- KNK/ICN, USA
- ** Lancaster Synthesis, UK
- ** Lonza, Italy

Product: Cloxacillin

Raw Material/
Chemical Intermediate: 3-(o-chlorophenyl)-5-methyl-4-isoxazole-
carbonyl chloride

Manufacturers/Suppliers:

- Aceto Chemicals, USA
- ** Arsynco, USA
- ** Chemical Dynamics, USA
- ** Recordati, Italy
- ** Ward Blenkinsop, UK

Product: Cloxacillin

Raw Material/
Chemical Intermediate: 6-Aminopenicillanic acid

Manufacturers/Suppliers:

- ** Antibioticos SA, Spain
- ** Bago Laboratorios, Argentina
- ** Bayer AG, F.R.Germany
- ** Biochemie, Austria
- ** Borge International, USA
- ** Companhia CIBRAN, Brazil
- ** CIPAN, Portugal
- ** Deva Holdings, Turkey
- ** Fako, Turkey
- ** Fermentaciones y Synthesis, Mexico
- ** Flamma, Italy
- ** GistBrocades, The Netherlands
- ** R.W. Greef, USA
- ** Hoechst AG, F.R.Germany
- ** IDPL, India
- ** ISF Spa, Italy
- ** Karl Helm, F.R.Germany
- ** Mustafa Nevzat, Turkey
- ** Pharmachim, Bulgaria
- ** Rhone Poulenc, France
- Transmedica, F.R. Germany

Product:

Dexamethasone

Raw Materials/
Chemical Intermediate:

Diosgenin

Manufacturers/Suppliers:

BDH Chemicals, UK
** China National Chemicals, China
** CIPLA, India
Ferak, F.R.Germany
Koch Light, UK
** Kurram Chemicals, Pakistan
C.Roth, F.R.Germany

Product: Diazepam

Raw Material/
Chemical Intermediate: 2-Amino-5-chlorobenzophenone B-oxime

Manufacturers/Suppliers:

- ** Aldrich Chemicals, USA
- ** Chemical Dynamics, USA
- EGA Chemie, F.R.Germany
- ICN/KNK, USA
- ** Trans World Chemicals, USA

Product: Diazepam

Raw Material/
Chemical Intermediate: 2-Amino-5-chlorobenzophenone

Manufacturers/Suppliers:

- ** Aldrich Chemicals, USA
- ** Chemical Dynamics, USA
- ** Chemie Linz, Austria
- EGA Chemie, F.R.Germany
- ** Fabbrica Italiana Sintetici, Italy
- Ferak, F.R.Germany
- Fluka AG, Switzerland
- ICN/Life Science, USA
- Koch Light, UK
- Nipa Laboratories, UK
- ** Sandoz AG, Switzerland
- ** UCE, Belgium
- ** Trans World Chemicals, USA

Product:

Diazepam

Raw Material/
Chemical Intermediate:

Chloroacetyl chloride

Manufacturers/Suppliers:

Aceto Chemicals, USA
Aldrich Chemicals, USA
BDH Chemicals, UK
**Bayer AG, F.R.Germany
**Dow Chemicals, USA
**Hoechst AG, F.R.Germany
Hopkins and Williams, UK
**E. Merck, F.R.Germany
**Montedison Spa, Italy
Saurefabrik Schweizerhall, Switzerland
**White Chemical Corpn, USA

Product:

Diazepam

Raw Material/
Chemical Intermediate:

Hydroxylamine Hydrochloride

Manufacturers/Suppliers:

**Aldrich Chemicals, USA
**American Reasearch Co, USA
Chemical Dynamics, USA
EGA Chemie, F.R.Germany
Fluka AG, Switzerland
Koch Light, UK
May and Baker, UK
**E. Merck, F.R.Germany
**UCB, Belgium

Product: Doxycycline

Raw Material/
Chemical Intermediate: Methacycline

Manufacturers/Suppliers:

- ** Ankerfarm, Italy
- ** Hovione, Portugal
- ** Lark, Italy
- ** Pfizer, France
- ** Pliva, Yugoslavia
- ** Prochim, Italy

Product: Doxycycline

Raw Material/
Chemical Intermediate: N-Chlor-succinimide

Manufacturers/Suppliers:

- ** Alpha Chemicals, USA
- Aldrich Chemicals, USA
- ** Chemical Dynamics, USA
- ** Chimimportexport, Rumania
- Eurobase, Italy
- Fluka AG, Switzerland
- ** Kepec, F.R.Germany
- ** Migori Kagaku, Japan
- ** Jonas Chemicals, USA
- ** PCAS, France

Product: Folic Acid

Raw Material/
Chemical Intermediate: p-Aminobenzoyl L-glutamic acid

Manufacturers/Suppliers:

- Aceto Chemicals, USA
- ** Biosynth, Switzerland
- ** Chemical Dynamics, USA
- Fluka AG, Switzerland
- ICN/KNK, USA
- ** Senn Chemicals, Switzerland

Product: Folic Acid

Raw Material/
Chemical Intermediate: 2,4 Diamino-6-hydroxypyrimidine

Manufacturers/Suppliers:

- ** Aldrich Chemicals, USA
- ** Biosynth, Switzerland
- ** Boehringer Ingelheim, F.R.Germany
- Chemical Dynamics, USA
- Chemical Procurement, USA
- ** Genzyme, USA
- Lancaster Synthesis, UK
- ** Lonza, Italy
- Sigma Chemicals, USA

Product: Folic Acid

Raw Material/
Chemical Intermediate: 2,3 Dibromopropionaldehyde

Manufacturers/Suppliers:

- Aldrich Chemicals, USA
- ** Chemical Dynamics, USA
- ** Chemical Procurement, USA
- Fluka AG, Switzerland
- ** Genzyme, USA
- ** RSA Corporation, USA
- Sigma Chemicals, USA

Product:

Hydrocortisone

Raw Materials/
Chemical Intermediate:

Diosgenin

Manufacturers/Suppliers:

- ELH Chemicals, UK
- ** China National Chemicals, China
- ** CIPLA, India
- Ferak, F.R.Germany
- Koch Light, UK
- ** Kurram Chemicals, Pakistan
- C.Roth, F.R.Germany

Product:

Ibuprofen

Raw Material/
Chemical Intermediate:

4-Iso-butylphenyl acetate

Manufacturers/Suppliers:

- ** Bofors-Nobel, Sweden
- ** Chemical Dynamics, USA
- ** Haarman and Reimer, USA
- ** Penta Manufacturing, USA

Product:

Ibuprofen

Raw Material/

Morpholine

Manufacturers/Suppliers:

- Aldrich Chemicals, USA
- ** BASF, F.R.Germany
- BDH Chemicals, UK
- ** Dow Chemicals
- EGA Chemie, F.R.Germany
- Fluka AG, Switzerland
- ** Genzyme, USA
- Hopkins & Williams, UK
- Koch Light, UK
- **Mallinkrodt, USA
- May & Baker, UK
- ** E. Merck, F.R.Germany
- ** Schuchardt, Switzerland
- Sigma Chemicals, USA
- ** Texaco Chemicals, USA

Product: Indometacin

Raw Material/
Chemical Intermediate: p-Methoxy-phenylhydrazine

Manufacturers/Suppliers:

- ** Aceto Chemicals, USA
- Aldrich Chemicals, USA
- ** Chemical Dynamics, USA
- EGA Chemie, F.R.Germany
- Fluka Ag, Switzerland
- KNK/ICN Life Sciences, USA
- ** Lancaster Synthesis, UK
- ** Trans World Chemicals, USA

Product: Indometacin

Raw Material/
Chemical Intermediate: Methyl levulinate

Manufacturers/Suppliers:

- ** CTC Organics, USA
- ** Incue Perfumery, Japan

Product: Indomethacin

Raw Material/
Chemical Intermediate: p-Chlorobenzoyl chloride

Manufacturers/Suppliers:

- Aldrich Chemicals, USA
- ** Bayer AG, F.R. Germany
- Chemical Dynamics, USA
- Chemical Procurement, USA
- EGA Chemie, F.R.Germany
- Fluka AG, Switzerland
- Genzyme, USA
- ** Hoechst AG, F.R.Germany
- ** Janssen, Belgium
- ** Jonas Chemicals, USA
- Koch Light, UK
- ** Rhone Poulenc, France

Product:

Mebendazole

Raw Material/
Chemical Intermediate:

3-4 Diamino-benzophenone

Manufacturers/Suppliers:

- ** Bofors Nobel, Sweden
Chemical Dynamics, USA
- ** Chemische W. Lahr, F.R. Germany
Delmar Inc, USA
- ** Fairdeal Corporation, India
- ** Janssen, Belgium
Raptakos Brett, India

Product:

Mebendazole

Raw Material/
Chemical Intermediate:

S-Methyl thiourea

Manufacturers/Suppliers:

- ** Davos Chemical, USA
- ** Janssen, Belgium
- ** Sigma, USA

Product: Methyldopa

Raw Material/
Chemical Intermediate: 3-4 Dimethoxy-phenylacetonitrile

Manufacturers/Suppliers:

- ** Aceto Chemicals, USA
- Aldrich Chemicals, USA
- ** Chemical Dynamics, USA
- Daiki Chemicals, Japan
- EGA Chemie, F.R.Germany
- ** Knoll AG, F.R.Germany
- KNK/ICN, USA
- ** Phillips Duphar, The Netherlands
- ** Recordati, Italy
- ** S EAC, France

Product: Methyldopa

Raw Material/
Chemical Intermediate: A-Methylbenzylamine

- Aldrich Chemicals, USA
- Chemical Procurement, USA
- ** Dynamit Nobel, F.R.Germany
- EGA Chemie, F.R.Germany
- Fluka AG, Switzerland
- ** Janssen, Belgium
- Lancaster Synthesis, UK
- ** Rhone Poulenc, France
- Sigma Chemicals, USA
- ** UCB, Belgium

Product: Metrifonate

Raw Material/
Chemical Intermediate: Dimethyl phosphite

Manufacturers/Suppliers:

- ** Albright and Wilson, UK
- Aldrich Chemicals, USA
- ** Ceca, France
- ** Ihara Chemical, Japan
- ** Maybridge Chemical, UK
- ** Reel Quimica, Mexico
- ** Stauffer Chemical, USA

Product: Metrifonate

Raw Material/
Chemical Intermediate: Chlcrai

Manufacturers/Suppliers:

- Aldrich Chemicals, USA
- EDH Chemicals, UK
- Fluka AG, Switzerland
- Hopkins & Williams, UK
- Koch Light, UK
- ** Kureha Chemical, Japan
- ** Mallinkrodt, USA
- ** E. Merck AG, F.R.Germany
- ** Produits Chimiques Usines Kuhlman, France

Product:

Metronidazole

Raw Material/
Chemical Intermediate:

2-Methyl-5-nitroimidazole

Manufacturers/Suppliers:

- ** Aceto Chemicals, USA
- Aldrich Chemicals, USA
- ** BASF, F.R.Germany
- ** Chemical Dynamics, USA
- ** Dolder, Switzerland
- EGA Chemie, F.R.Germany
- IDPL, India
- Koch Light, UK
- ** Searle, USA

Product:

Metronidazole

Raw Material/
Chemical Intermediate:

Ethylene chlorhydrin

Manufacturers/Suppliers:

- ** BASF, F.R.Germany
- ** Genzyme, USA
- E. Merck, F.R.Germany
- ** PCUK, France
- Schuchardt, F.R.Germany
- ** Standard Alkali, India
- ** Toyo Soda, Japan
- ** Union Carbide, USA

Product:

Nitrofurantoin

Raw Material/
Chemical Intermediate:5-Nitro-2-furaldehydeManufacturers/Suppliers:

- ** Aceto Chemicals, USA
- Aldrich Chemicals, USA
- ** Expansia, France
- Fabbrica Italiana Sintetici Spa, Italy
- ICN/K+K, USA
- IDPL, India
- Lancaster Synthesis, UK

Product:

Nitrofurantoin

Raw Material/
Chemical Intermediate:Ethyl hydrazinoacetateManufacturers/Suppliers:

- ** Aceto Chemicals, USA
- ** Aldrich Chemicals, USA
- ** EGA Chemie, F.R.Germany
- ** UCB, Belgium

Product: Phenobarbital

Raw Material/
Chemical Intermediate: Ethyl phenyl malonic ethyl ester

Manufacturers/Suppliers:

- ** Aceto Chemicals, USA
- ** Dynamit Nobel, F.R.Germany
- ** Stauffer Chemical, USA

Product: Phenobarbital

Raw Material/
Chemical Intermediate: Urea

Manufacturers/Suppliers:

- Aldrich Chemicals, USA
- Ames Laboratories, USA
- ** BASF, F.R.Germany
- ** Chemical Dynamics, USA
- Chemical Service, USA
- ** Chemie Linz, Austria
- Fluka AG, Switzerland
- ** ICI, UK
- ** Montedison, Italy
- Sigma Chemicals, USA

Product: Phenytoin

Raw Material/
Chemical Intermediate: Benzil

Manufacturers/Suppliers:

- ** ABM Chemicals, UK
Aldrich Chemicals, USA
- ** Bayer AG, F.R.Germany
BDH Chemicals, UK
- ** High Purity Chemicals, India
Hopkins and Williams, UK
Koch Light, UK
E. Merck, F.R.Germany
- ** Napp Chemicals, USA
Schuchardt, F.R.Germany

Product: Phenytoin

Raw Material/
Chemical Intermediate: Sodium ethoxide

Manufacturers/Suppliers:

- Aldrich Chemicals, USA
- ** Dynamit Nobel, F.R.Germany
EGA Chemie, F.R.Germany
- ** Rhone Poulenc, France
- * Schuchardt, F.R.Germany

Product: Praziquantel

Raw Material/
Chemical Intermediate: Cyclohexane carbonyl chloride

Manufacturers/Suppliers:

- ** Aceto Chemicals, USA
- Aldrich Chemicals, USA
- ** CTC Organics, USA
- ICN/KNK, USA
- ** Kepec, F.R.Germany
- ** Tokyo Kasei Kogyo, Japan

Product: Prednisolone

Raw Material/
Chemical Intermediate: Hydrocortisone

Manufacturers/Suppliers:

- ** Cilag, Mexico
- ** China National Chemical, China
- ** Diosynth, USA
- ** Hoechst, F.R.Germany
- ** Merck and Co, USA
- ** E. Merck, F.R.Germany
- ** Pfizer, USA
- ** Roussell-Uclaf, France
- ** Schering AG, F.R.Germany
- ** Sigma Corpn, USA
- ** Upjohn, USA

Product: Primaquine

Raw Material/
Chemical Intermediate: 8-Amino-6-methoxyquinoline

Manufacturers/Suppliers:

- Aldrich Chemicals, USA
- Chemical Procurement, USA
- ** Chemical Service, USA
- EGA Chemie, F.R.Germany
- Ferak, F.R.Germany
- Koch Light, UK
- ** Polysciences, USA

Product: Primaquine

Raw Material/
Chemical Intermediate: 1,4 Dibromopentane

Manufacturers/Suppliers:

- Aldrich Chemicals, USA
- CTC Organics, USA
- Chemical Procurement, USA
- Ferak, F.R.Germany
- Fluka AG, Switzerland
- ** Interchim, France
- ** Jonas Chemicals, USA
- ICN/K&K, USA

Product: Primaquine

Raw Material/
Chemical Intermediate: Phthalimide

Manufacturers/Suppliers:

- Aldrich Chemicals, USA
- ** Bayer AG, F.R.Germany
- BDH Chemicals, UK
- ** Chemie Linz, Austria
- ** Chemical Dynamics, USA
- ** Eastman Kodak, USA
- ** EGA Chemie, F.R.Germany
- ** Rhone Poulenc, France
- Fisons, UK
- ** Fluka AG, Switzerland
- ** E. Merck, F.R.Germany
- ** Parke-Davis, USA

Product: Promethazine

Raw Mateial/
Chemical Intermediate: Phenothiazine

Manufacturers/Suppliers:

- Aldrich Chemicals, USA
- ** China National Chemical, China
- ** Hoechst AG, F.R.Germany
- ** ICI, UK
- ** Schuchardt, F.R.Germany
- ** Sumitomo, Japan
- ** West Agro-chemicals, USA

Product: Promethazine

Raw Material/
Chemical Intermediate: 1-Dimethylamino-2-chloropropane

Manufacturers/Suppliers:

- Chemical Procurement Ins, USA
- Fluka AG, Switzerland
- ** Hoechst AG, F.R.Germany
- ** KNK/ICN Life Sciences, USA
- ** Lancaster Synthesis, UK

Product: Propranolol

Raw Material/
Chemical Intermediate: 1-Chloro-3(1-naphthoxy)2-propanol

Manufacturers/Suppliers:

- ** Aldrich Chemicals, USA
Chemical Procurement, USA
- ** EGA Chemie, F.R.Germany

Product: Propranolol

Raw Material/
Chemical Intermediate: Isopropylamine

Manufacturers/Suppliers:

- Aldrich Chemicals, USA
- ** BASF, F.R.Germany
- ** Chemapol, Czechoslovakia
- ** Chimimportexport, Rumania
Chemical Service, USA
- ** Daicel Chemicals, Japan
- ** Hoechst AG, F.R.Germany
- ** ICI, UK
- ** PCUK, France
- ** Rhone Poulenc, France
- ** Union Carbide, USA

Product: Pyrantel

Raw Material/
Chemical Intermediate: 1-Amino 3-methylaminopropane

Manufacturers/Suppliers:

- ** Ames Laboratories, USA
- ** BASF, F.R.Germany

Product: Pyrantel

Raw Material/
Chemical Intermediate: 1,2 Dimethyl,1-1,4,5,6 tetrahydro-
-pyrimidine

Manufacturers/Suppliers:

- ** Ward Blenkinsop, UK

Product: Pyrantel

Raw Material/
Chemical Intermediate: Thiophen-2-carboxaldehyde

Manufacturers/Suppliers:

- ** Aceto Chemicals, USA
- ** Farnos, Finland
- Fluka, Switzerland
- ** Jonas Chemicals, USA
- ** Lancaster Synthesis, UK
- ** PCAS, France
- ** Stauffer Chemicals, USA

Product:

Fyrazinamide

Raw Material/
Chemical Intermediate:2,3Fyrazin-dicarboxylic acidManufacturers/Suppliers:

Aceto Chemicals, USA
Aldrich Chemicals, USA
** CTC Organics, USA
** Chemical Dynamics, USA
EGA Chemie, F.R.Germany
Ferak, F.R.Germany
Fluka, Switzerland
KNK/ICN, USA
** Nisso Mining, Japan
** Pyrazine Specialities, USA
** Schuchardt, F.R.Germany

Product: Pyridoxine

Raw Material/
Chemical Intermediate: 1-4 Diethoxy-2-butanone

Manufacturers/Suppliers:

- Aceto Chemicals, USA
- Aldrich Chemicals, USA
- ** BASF, F.R.Germany
- Chemical Service Inc, USA
- ** Genzyme, USA
- ** Hindustan Organic, India
- Sigma, USA

Product: Pyridoxine

Raw Material/
Chemical Intermediate: Ethyl glycinate

Manufacturers/Suppliers:

- Aldrich Chemicals, USA
- ** All World Sciences, USA
- Crescent Chemicals, USA
- Chemical Service, USA
- ** EM Sciences, USA

Product: Pyridoxine

Raw Material/
Chemical Intermediate: Ethyl pyruvate

Manufacturers/Suppliers:

Aceto Chemicals, USA
Aldrich Chemicals, USA
** Boehringer Ingelheim, F.R.Germany
Chemical Procurement, USA
Chemical Service, USA
EGA Chemie, F.R. Germany
Ferak, F.R.Germany
Fluka AG, Switzerland
** Genzyme, USA
** Jonas Chemicals, USA
ICN/K&K, USA
** Kepec GmbH, F.R.Germany
** E. Merck, F.R.Germany
** Koch Light, UK
** PCAS, France
** RSA Corporation, USA
** Schuchardt, F.R.Germany
** SEAC, France
Sigma Chemicals, USA
** UCB, Belgium

Product: Riboflavin

Raw Material/
Chemical Intermediate: D-Ribitol

Manufacturers/Suppliers:

Aceto Chemicals, USA
** Aldrich Chemicals, USA
** Ames Laboratories, USA
** Biosynth AG, Switzerland
Chemical Service Inc, USA
** Koch Light, UK
Lancaster Synthesis, UK
** E. Merck, F.R.Germany
** Senn Chemicals, Switzerland
Sigma, USA

Product: Riboflavin

Raw Material/
Chemical Intermediate: 4,5 Dimethylphenylenediamine

Manufacturers/Suppliers:

Aceto Chemicals, USA
** Aldrich Chemicals, USA
Fluka AG, Switzerland
** Koch Light, UK
KNK/ICN, USA
Lancaster Synthesis, UK
** Schuchardt, Switzerland
Sigma, USA
** SSF AG, Switzerland

Product:

Salbutamol

Raw Material/
Chemical Intermediate:N-Benzyl-tert-butylamineManufacturers/Suppliers:

- Aceto Chemicals, USA
- ** Ames Laboratories, USA
- Ferek, F.R.Germany
- ** CIPLA, India
- Fluka, AG, Switzerland
- ** Hexcel Corpn, USA
- KNK/ICN, USA
- Lancaster Synthesis, UK
- ** Ward Blenkinsop, UK

Product:

Salbutamol

Raw Material/
Chemical Intermediate:Methyl 4-acetylsalicylateManufacturers/Suppliers:

- ** Alpha Products, USA
- ** Aceto Chemicals (P&B), USA
- Chemical Procurement, USA
- Lancaster Synthesis, UK

Product:

Salbutamol

Raw Material/
Chemical Intermediate:Methyl 4-aminosalicylateManufacturers/Suppliers:

** Delmar Chemicals, USA

Product:

Salbutamol

Raw Material/
Chemical Intermediate:AcetaldoximeManufacturers/Suppliers:

- ** Aldrich Chemicals, USA
- ** Ames Laboratories, USA
- ** BASF, F.R.Germany
- ** Chemical Dynamics, USA
- Chemical Procurement, USA
- Fisons, UK
- ICN/KNK, USA
- Interchem Corporation, USA
- ** Lancaster Synthesis, UK
- ** Tokyo Kasei Kogyo, Japan

Product: Sulphamethoxazole

Raw Material/
Chemical Intermediate: 3-Amino-5-methyl-isoxazole

Manufacturers/Suppliers:

- Aceto Chemicals, USA
- Chemical Dynamics, USA
- Fluka, Switzerland
- KNK/ICN, USA
- Lancaster Synthesis, UK
- ** Maybridge Chemicals, UK
- ** Raylo Chemicals, USA
- ** Shionogi, Japan

Product: Sulphamethoxazole

Raw Material/
Chemical Intermediate: Acetyl-sulphanil chloride

Manufacturers/Suppliers:

- Aceto Chemicals, USA
- Aldrich Chemicals, USA
- ** American Cyanamide, USA
- ** Bayer AG, F.R.Germany
- ** Ciba-Geigy, Switzerland
- Chemical Dynamics, USA
- Fluka AG, Switzerland
- ** May and Baker, UK
- ** Rhone Poulenc, France

Product: Thiamine

Raw Material/
Chemical Intermediate: 4-Methyl-5(2-hydroxy)ethyl-thiazole

Manufacturers/Suppliers:

- ** Biosynth, USA
- ** CTC Organics, USA
- ** IDPL, India
- ** Penta Inc, USA
- ** Pyrazine Specialitis, USA
- ** Sigma, USA

Product: Thiamine

Raw Material/
Chemical Intermediate: Acetamide

Manufacturers/Suppliers:

- Aldrich Chemicals, USA
- BDH Chemicals, UK
- ** Fisons, UK
- ** Genzyme, USA
- ** High Purity Chemicals, India
- Koch Light, UK
- ** Mallinkrodt, USA
- E. Merck, F.R.Germany
- ** Nippon Synthetic Chemicals, Japan
- ** Rhone Poulenc, France
- ** Schhardt, F.R.Germany
- Sigma Chemicals, USA

Product: Trimethprim
Raw Material/
Chemical Intermediate: Trimethoxybenzaldehyde

Manufacturers/Suppliers:

- ** Aldrich Chemicals, USA
- ** Borregaard, Norway
- ** Chemical Dynamics, USA
- ** Fluka AG, Switzerland
ICN/K+K, USA
- ** IDPL, India
- ** Koch Light, UK
Lancaster Synthesis, UK
- ** NIPA Laboratories, UK
- ** Oce Andeno, The Netherlands
- ** Schuchardt, F.R. Germany

Product: Trimethoprim
Raw Material/
Chemical Intermediate: Guanidine hydrochloride

Manufacturers/Suppliers:

- Aldrich Chemicals, USA
- BDH Chemicals, UK
- ** Chemical Dynamics, USA
- ** Chemie Linz, Austria
- ** Eastman Kodak, USA
Fluka Ag, Switzerland
- ** Genzyme, USA
- ** ICI, UK
- ** E. Merck, F.R.Germany
Sigma, USA
- ** IDPL, India

Section II: Names and addresses of producers and suppliers

ABM Chemicals Ltd
Woodley, Stockport, Cheshire SK61PQ
UNITED KINGDOM
Te 531255; Tx 667835

Alpha Products Division
152 Andover Street, Denver MA01923
U.S.A. Te (617)777-1970; Tx 951360

American Research Products Company
P.O. Box 21009, South Euclid OH44121
U.S.A. Te (216)371-4100

Ames Laboratories Inc.
200 Rock Lane, Milford CT06460
U.S.A. Te(203)874-2463

Ankerfarm Spa
C.p. 42, 20092 Cinesella Balsamo
ITALY Te (2)928-7121; Tx 330017

Arsynco Inc
P.O. Box 8, Carlstadt NJ0072
U.S.A. Te (201)933-2323

Biosynth AG
116 Seefeldsrasse, 8034 Zurich
SWITZERLAND
Te (1)342011 ; Tx 55378

Borregaard A/S
1701 Sarpsborg
NORWAY Te (31)51120; Tx 71400

Caorep
245-249 Avenue de Argenteuil
92270 Bois Colombes
FRANCE Te (1)782-717 ; Tx620360

Ceca SA
E.F. 66, 78141Velizy-Villacoublay
FRANCE Te (1)946-9635; Tx 697584

Chemical Service Inc.
P.O. Box 114, 660 Tower Lane
West Chester PA 19380
U.S.A. Te (215)692-3926

Cilag Mexico SA
K.A. de Quevedo247
Delgacion Coyocon 04310, Mexico DF
MEXICO Te (5)658-6022; Tx 177240

CSIR Centre for Biochemicals
University of Delhi Campus
Delhi 110.007
INDIA Te 225602

Daiki Chemical Co Ltd
3-46 Taka Sago, Takaishi City
Osaka Pref 593
JAPAN Te (722)683-001

Eastman Kodak Company
343 State Street, Rochester NY 14650
U.S.A. Te (716)724-4879; Tx 978481

EGA Chemie KG
7924 Steinheim/Albuch
FEDERAL REPUBLIC OF GERMANY
Te (03329)-6011; Tx 7-14838

Eurobase Spa
4 via Umbria, San Giuliano Milanese
ITALY Te (2)988-0395; Tx 312888

Expansia SA
204 rue de Faubourg St Honore
F 75008 Paris
FRANCE Te (1)763-1052; Tx 660102

Farmos Group
P.O. Box 425, 20101 Turku 10
FINLAND Te(21)-382111; Tx 62114

Ferek Berlin (Laborat)
36-44 Nobelstrasse, 1000 Berlin 44
FEDERAL REPUBLIC OF GERMANY
Te(030)-684-6020; Tx 183653

Genzyme Corporation
75 Kneeland Street, Boston MA 02111
U.S.A. Te (617)415-1925; Tx 951282

Granata Spa
Strada Padana Superiore 32
20063 Cernusco Sul Naviglio MI
ITALY Te (2)904-0493

Haarman & Reimer Corporation
P.O. Box 275, 111 US Highway 22
Springfield NJ 07081
U.S.A. Te (201)686-3132; Tx 138387

Hexagon Laboratories Inc
4166 Boston Post Road, New York NY10475
U.S.A. Te (212)324-7559 ; Tx127298

Hexcel Chemical Products Inc
2515 North Centennial Street
Zeeland MI 49464
U.S.A. Te (616)772-2193; Tx226375

ICN/K&K Life Sciences Group
121 Express Street, Plainview NY 11803
U.S.A. Te (516)433-6262

Ihara Chemical Industry Co Ltd
1-4-26 Ikenohata, Taito-ku
Tokyo 110
JAPAN Te (3)828-6181; Tx 2655354

Inoue Perfumery Mfg Co Ltd
1-36-11 Okusawa, Setagaya-ku
Tokyo 158
JAPAN Te (3)726-1861; Tx 32619

Isochim
4 Avenue Phillippe Lebon
92230 Gennevilliers
FRANCE Te (1)794-9700; Tx 630617

Jonas Chemicals Inc
5 Beekman Street, New York NY 10038
U.S.A. Te (212)732-1818; Tx 423616

Kepec Chemische Fabrik GmbH
Postfach 2020, 5800 Hagen
FEDERAL REPUBLIC OF GERMANY
Te (2241)620915, Tx 889554

Kureha Chemical Industry Co Ltd
1-9-11 Nihonbashi Horidome-chu,
Chuo-ku, Tokyo 103
JAPAN Te (3)662-9611; Tx 2522736

Kurram Chemical Co Ltd
P.O. Box 40, Rawalpindi
PAKISTAN Te (96)63387

Lancaster Synthesis Ltd
Eastgate, White Lund
Morecombe Lancs LA3 3DY
UNITED KINGDOM
Te (524)36101; Tx 65151

Lark Spa
25/A via Fabio Filzi
2012 Milan
ITALY Te (2)657-5451; Tx 312496

Maybridge Chemical Co Ltd
Trevillet, Tintagel Cornwall PL3 40HW
UNITED KINGDOM
Te (140)770-453; Tx 45606

Migori Kagaku Co Ltd
3-19-12 Kamiochiai, Shinjuku-ku
Tokyo 161
JAPAN Te (3)364-2846; Tx 2952728

NIPA Laboratories Ltd
NIPA Industrial Estate, Llantwit
Farde, Pontypridd, Wales CF38 2SN
UNITED KINGDOM
Te (0443)205311; Tx 497111

Nisso Mining Co Ltd
Shin Ohtimachi Building
2-2-1 Ohtimachi, Chiyoda-ku
Tokyo 100
JAPAN Te (3)211-2111

Oce Andeno BV
P.O. Box 81, 5900 AX Venlo
THE NETHERLANDS
Te (077)21551 Tx 58310

PCAS
BP 111, 91161 Longjumeau
FRANCE Te (6)909-7785; Tx 690250

Penta Manufacturing Co
P.O. Box 1452, West Caldwell NJ 07007
U.S.A. Te (201)575-7475; Tx 219472

Pfizer France
P.B. 60, 91401 Orsay-Cedex
FRANCE Te (1)907-7829; Tx 692807

Polychemicals Laboratories Inc
490-498 Hunts Point Avenue
New York NY 10474
U.S.A. Te (212)893-0333; Tx 420483

Polysciences Inc
400 Valley Road
Warrington PA 18976
U.S.A. Te (215)343-6484; Tx 6658542

Prochim Re Spa
via Lura 236,
21042 Carrono Pertussella
ITALY Te (2)965-8117; Tx 334465

Pyrazine Specialities
F.O. Box 6933, Atlanta GA 30315
U.S.A. Te (404)524-6744; Tx 542250

Raylo Chemicals Ltd
8045 Argyle Road
Edmonton, Alta T6C 4A9
CANADA Te (403)465-7937; Tx 373022

Recordati Industria Chimica e
Farmaceutica Spa
1 via Civitale 20148 Milan
ITALY Te (2)4020; Tx 331089

Reel Quimica,
Apartado Posto 74-088, 09810 Mexico
MEXICO Te (5)582-0900

C. Roth GmbH
D-Postfach 21 1162
Shoenperlenstrasse 1-5
D-7500 Karlsruhe 21
FEDERAL REPUBLIC OF GERMANY
Te (0721)591011; Tx 7826526

Sandoz AG
35 Lichtstrasse, 4002 Basel13
SWITZERLAND
Te (61)2411111; Tx 65711

Sankyo Company Ltd
2-7-12 Ginza, Chuo-ku, Tokyo 104
JAPAN Te (3)562-0411; Tx 24838

Schering-Plough Corporation
1011 Morris Avenue, Union NJ07083
U.S.A. Te (201)558-4000; Tx 138704

Schuler & Lange Chem Fabrik KG
139-147 Bornkampsweg
2000 Hamburg 50
FEDERAL REPUBLIC OF GERMANY
Te (40-894-017; Tx 211125

SEAC
15 rue Trebois, 92306 Levallois
FRANCE Te (1)270-1990; Tx 620860

Senn Chemicals
8157 Dielsdorf
SWITZERLAND
Te(1)853-1835; Tx 58786

Shionogi & Co Ltd
3-12 Dosho-machi
Higashi-ku, Osaka 541
JAPAN Te (6)202-2161; Tx 63596

Siegfried AG
4800 Zofingen
SWITZERLAND
Te (62)5011111; Tx 68434

All World Chemicals Inc
3259, 20th Avenue West
Seattle WA 98199
USA Te(206)282-2133; Tx 321011

Crescent Chemicals Co Inc
1324 Motor Parkway, Hauppauge NY11788
U.S.A. Te (516)348-0333; Tx 143169

Sigma Chemical Co
P.O. Box 14508, St Louis Mo 63178
U.S.A. Te (314)771-570

SSF Schweizersche Sprengstoff Fabrik
5605 Dottikon
SWITZERLAND
Te (57)261155; Tx 52694

Standard Alkali Chemicals Division
P.O. Box 1051, Bombay 400.021
INDIA Te (22)231-823; Tx 114240

Stauffer Chemical Co
Nyala Farm Road
Westport CT 06881
U.S.A. Te (203)222-3000; Tx 710457-3588

Tokyo Kasei Kogyo Co Ltd
3-9-4 Nihonbashi Honchu Chuo-ku
Tokyo 103
JAPAN Te (3)241-0861; Tx 2223592

Toyo Soda Manufacturing Co Ltd
Toso Building, 1-7-7 Akasaka, Minatoku
Tokyo 107
JAPAN Te (3)585-3311; Tx 24475

Transworld Chemicals Inc
P.O. Box 4173
Washington DC 20015
U.S.A. Te (301)949-1121

West Agro-Chemicals Inc
1900 West 47th Place
Westwood Ks 66205
U.S.A. Te(913)384-1660; Tx 910743-4151

White Chemical Corporation
P.O. Box 278
East 22nd Street
Bayonne NJ 07002
U.S.A.
Te (201)437-0050

Hovione Sociedade Quimica Lda
C.p. 2533, 1113 Lisbon
PORTUGAL
Te (19)600095; Tx 12611

EM Sciences Inc
480 Democrat Road, Gibbstown NJ08027
U.S.A. Te(609)423-6003; Tx 831857

Interchim SA
BP 15, 03105 Montlucon Cedex
FRANCE Te (70)294733; Tx 990343

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Methacycline	Doxycycline	13
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N-Methylbenzylamine	Methyl dopa	19
Methyl dichloroacetate	Chloramphenicol	5
4-Methyl 5(2-hydroxy)ethylthiazole	Thiamine	38
Methyl levulinate	Indometacin	17
2-Methyl 5-nitroimidazole	Metronidazole	21
S-Methylthiourea	Mebendazole	18
Morpholine	Ibuprofen	16
p-Nitroacetophenone	Chloramphenicol	5
5-Nitro 2-furaldehyde	Nitrofurantoin	22
Pheniramine	Chlorphenamine	7
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Phthalimide	Primaquine	27
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D-Ribitol	Riboflavin	34
Sodium ethoxide	Phenytoin	24
Thiophen 2-carboxaldehyde	Pyrantel	30
Trimethoxybenzaldehyde	Trimethoprim	39
Urea	Phenobarbital	23