APPENDIX 3

Safety Cautions

Appendix 3 briefly describes safety cautions that should be observed for specific chemicals used throughout this manual. This appendix should not be considered a comprehensive listing nor does it contain comprehensive safety information. Suppliers of hazardous chemicals are required by the Occupational Safety and Health Administration to provide Material Safety Data Sheets. Refer to these sheets for more complete information.

Acetonitrile is very volatile and extremely flammable. It is an irritant and a chemical asphyxiant that can exert its effects by inhalation, ingestion, or absorption through the skin. Treat cases of severe exposure as cyanide poisoning. Wear gloves and safety glasses and work in a chemical fume hood.

Concentrated acids should be handled with great care. Wear gloves and a face mask.

Unpolymerized **acrylamide** and **bisacrylamide** are potent neurotoxins and are absorbed through the skin (the effects are cumulative). Wear gloves and a face mask when handling powdered acrylamide and methylenebisacrylamide and, if possible, weigh in a chemical fume hood and do not breathe the dust. Wear gloves, safety glasses, and protective clothing when handling solutions containing these chemicals. Polyacrylamide is considered to be nontoxic, but it should be handled with care because it might contain small quantities of unpolymerized acrylamide.

Actinomycin D is a teratogen and a carcinogen. It is highly toxic and may be fatal if inhaled, swallowed, or absorbed through the skin. It may also cause irritation. Wear gloves, safety glasses, and a face mask and always work in a chemical fume hood.

Ammonium hydroxide (see concentrated bases).

Antipain may be harmful if inhaled, swallowed, or absorbed through the skin. Wear gloves and safety glasses.

Aprotinin may be harmful if inhaled, swallowed, or absorbed through the skin. It may also cause allergic reactions. Exposure may cause gastrointestinal effects, muscle pain, blood pressure changes, or bronchospasm. Wear gloves, safety glasses, and a face mask and do not breathe the dust.

Concentrated bases should be handled with great care. Wear gloves and a face mask.

Bisacrylamide (see acrylamide).

Human blood, blood products, and tissues may contain occult infectious materials such as hepatitis B virus and HIV that may result in laboratory-acquired infections. Investigators working with EBV-transformed lymphoblastoid cell lines are also at risk of EBV infection. Any human blood, blood products, or tissues should be considered a biohazard and should be handled accordingly. Wear disposable gloves, protective clothing, and goggles; use mechan-

ical pipetting devices; work in a laminar-flow hood or biological safety cabinet; protect against the possibility of aerosol generation (e.g., during centrifugation or mixing by vortexing); and disinfect all waste materials before disposal. Autoclave contaminated plasticware before disposal; autoclave contaminated liquids or treat with bleach (10% [v/v] final concentration) for at least 30 minutes before disposal. Consult the local institutional safety officer for specific handling and disposal procedures.

BrdU is a mutagen. It may be harmful if inhaled, swallowed, or absorbed through the skin. It may cause irritation. Wear gloves and safety glasses and always work in a chemical fume hood.

***n*-Butanol** and ***sec*-butanol** are irritating to the mucous membranes, upper respiratory tract, skin, and especially the eyes. Wear gloves, safety glasses, and a face mask and do not breathe the vapors. *n*-Butanol and *sec*-butanol are also highly flammable.

Chloroform is irritating to the skin, eyes, mucous membranes, and respiratory tract. It is a carcinogen and may damage the liver and kidneys. Wear gloves and safety glasses and always work in a chemical fume hood.

***m*-Cresol** is extremely destructive to the mucous membranes of the respiratory tract, the eyes, and the skin. It may be fatal if inhaled, swallowed, or absorbed through the skin. Exposure can cause burns and may damage the kidneys and eyes. Wear gloves, protective clothing, and safety glasses and always work in a chemical fume hood.

DAPI is a possible carcinogen. It may be harmful if inhaled, swallowed, or absorbed through the skin. It may also cause irritation. Wear gloves, safety glasses, and a face mask and do not breathe the dust.

DEPC is a potent protein denaturant and a suspected carcinogen. Aim the bottle away from you when opening it; internal pressure can lead to splattering. Wear gloves and protective clothing and work in a chemical fume hood.

Diethyl ether is extremely volatile and extremely flammable. It is irritating to the eyes, mucous membranes, and skin. It is also a CNS depressant with anesthetic effects. Diethyl ether exerts its effects through inhalation, ingestion, or absorption through the skin. Wear gloves and safety glasses and always work in a chemical fume hood. Explosive peroxides can form in concentrated solutions during storage or on exposure to air or direct sunlight.

DMF is irritating to the eyes, skin, and mucous membranes. It can exert its toxic effects through inhalation, absorption through the skin, or ingestion. Chronic inhalation can cause liver and kidney damage. Wear gloves, safety glasses, and a face mask and work in a chemical fume hood.

Use of EBV-transformed lymphoblastoid cell lines poses a risk for EBV infection. Discarded cells or flasks should be considered a biohazard and should be handled accordingly. Consult the local institutional safety officer for specific handling and disposal procedures.

Ethidium bromide is a powerful mutagen and is moderately toxic. Wear gloves when working with solutions that contain this dye. Consult the local institutional safety officer for specific handling and disposal procedures.

Formaldehyde is toxic and is also a carcinogen. It is readily absorbed through the skin and is irritating or destructive to the skin, eyes, mucous membranes, and upper respiratory tract. Wear gloves and safety glasses and always work in a chemical fume hood.

Formamide is teratogenic. The vapor is irritating to the eyes, skin, mucous membranes, and upper respiratory tract. It may be harmful if inhaled, ingested, or absorbed through the skin. Wear gloves and safety glasses and always work in a chemical fume hood when using concentrated solutions of formamide. Keep working solutions covered as much as possible.

Glacial acetic acid is volatile. Concentrated acids must be handled with great care. Wear gloves, safety glasses, and a face mask and work in a chemical fume hood.

Glutaraldehyde is toxic. It is readily absorbed through the skin and is irritating or destructive to the skin, eyes, mucous membranes, and upper respiratory tract. Wear gloves and safety glasses and always work in a chemical fume hood.

Concentrated HCl is volatile. Concentrated acids should be handled with great care. Wear gloves, safety glasses, and a face mask and work in a chemical fume hood.

8-Hydroxyquinoline is irritating to the eyes, skin, mucous membranes, and upper respiratory tract. It may be harmful if inhaled, ingested, or absorbed through the skin. Wear gloves, safety glasses, and a face mask and do not breathe the dust.

Leupeptin may be harmful if inhaled, swallowed, or absorbed through the skin. Wear gloves and safety glasses.

LIDS is harmful if inhaled. Wear gloves and a face mask when weighing LIDS.

Liquid nitrogen's temperature is −185°C. Handle frozen samples with extreme caution. Seepage of liquid nitrogen into frozen vials can cause the vial to explode when it is removed from the liquid nitrogen. Use vials with O-rings when possible. Wear thermal gloves and a face mask when working with liquid nitrogen.

β-Mercaptoethanol may be fatal if inhaled or absorbed through the skin and is harmful if swallowed. High concentrations are extremely destructive to the mucous membranes, upper respiratory tract, skin, and eyes. Wear gloves and safety glasses and work in a chemical fume hood.

Methanol is poisonous and can cause blindness. Adequate ventilation is necessary to limit exposure to vapors.

Methotrexate is a carcinogen and a teratogen. It may be harmful if inhaled, ingested, or absorbed through the skin. Exposure may cause gastrointestinal effects, bone marrow suppression, or liver or kidney damage. It may also cause irritation. Wear gloves and safety glasses and always work in a chemical fume hood.

Methylenebisacrylamide (see acrylamide).

Pepstatin A may be harmful if inhaled, swallowed, or absorbed through the skin. Wear gloves and safety glasses.

Phenol is highly corrosive and can cause severe burns. Wear gloves, protective clothing, and safety glasses and always work in a chemical fume hood. Rinse any areas of skin that come in contact with phenol with a large volume of H_2O and wash with soap and H_2O; do not use ethanol!

***p*-Phenylenediamine** is harmful if swallowed, inhaled, or absorbed through the skin. Wear gloves and safety glasses.

PMSF is a highly toxic cholinesterase inhibitor. It is extremely destructive to the mucous membranes of the respiratory tract, the eyes, and the skin. It may be fatal if inhaled, swallowed, or absorbed through the skin. Wear gloves and safety glasses and always work in a chemical fume hood. In case of contact, immediately flush eyes or skin with copious amounts of H_2O and discard contaminated clothing.

KOH should be handled with great care. Wear gloves and a face mask.

Propidium iodide is harmful if inhaled, swallowed, or absorbed through the skin. It is irritating to the eyes, skin, mucous membranes, and upper respiratory tract. It is mutagenic and possibly carcinogenic. Wear gloves, safety glasses, and protective clothing, and always work in a chemical fume hood.

Wear gloves, protective clothing, and safety glasses when handling **radioactive substances**. Consult the local safety office for further guidance in the appropriate use and disposal of radioactive materials.

SDS is harmful if inhaled. Wear a face mask when weighing SDS.

Human semen should be treated with the same precautions as human blood, blood products, and tissues (see above).

Sigmacote may be harmful if inhaled, swallowed, or absorbed through the skin. The vapor is irritating to the eyes, skin, mucous membranes, and upper respiratory tract. Sigmacote is also flammable. Wear gloves and safety glasses and always work in a chemical fume hood.

Silane is harmful if inhaled. It is extremely flammable. Avoid contact with eyes and skin. Wear gloves and safety glasses and always work in a chemical fume hood.

Sodium azide is highly poisonous. It blocks the cytochrome electron transport system. Solutions containing sodium azide should be clearly marked. Wear gloves and handle sodium azide with great care.

Sodium deoxycholate is irritating to mucous membranes and the respiratory tract and is harmful if swallowed. Wear gloves, safety glasses, and a face mask when handling the powder and do not breathe the dust.

Solid **NaOH** is caustic and should be handled with great care. Wear gloves and a face mask. Concentrated bases should be handled in a similar manner.

TCA should be handled with great care. Wear gloves and a face mask.

Concentrated TFA is volatile. Concentrated acids must be handled with great care. Wear gloves and a face mask and work in a chemical fume hood.

Toluene vapors are irritating to the eyes, skin, mucous membranes, and upper respiratory tract. Toluene can exert harmful effects by inhalation, absorption through the skin, and ingestion. Wear gloves, safety glasses, and a face mask and do not breathe the vapors. Toluene is extremely flammable.

Triethylamine is flammable. It is extremely corrosive to the mucous membranes, upper respiratory tract, eyes, and skin. It may be harmful if inhaled, ingested, or absorbed through the skin. Wear gloves and safety glasses and work in a chemical fume hood.

UV radiation is dangerous, particularly to the eyes. To minimize exposure, make sure that the UV light source is adequately shielded. Wear protective goggles or a full safety mask that efficiently blocks UV light. Wear protective gloves when holding materials under the UV light source. UV radiation is also mutagenic and carcinogenic.