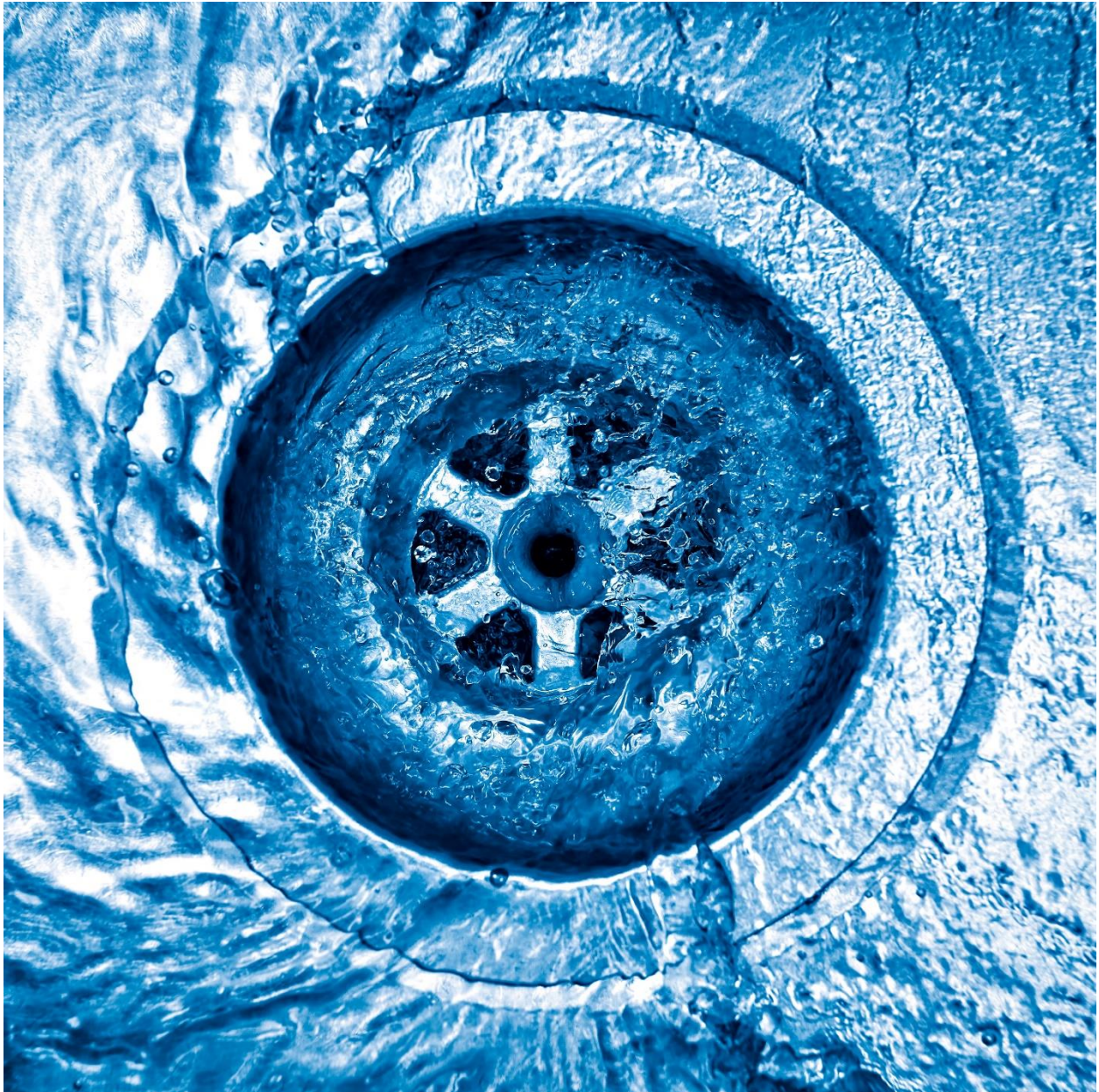




National Institutes of Health

NIH DRAIN DISCHARGE GUIDE



NIH, **September** 2020

NIH Drain Discharge Guide, Version 1, September 2020



<u>OVERVIEW</u>	2
<u>WASTE POLICY</u>	2
<u>CHEMICALS APPROVED FOR DRAIN DISPOSAL</u>	3
<u>CHEMICAL DETERMINATION FOR HAZARDOUS WASTE</u>	4
<u>WASTE CONTAINING ANTIBIOTICS</u>	5
<u>LIQUID BIOHAZARDOUS WASTE DISPOSAL</u>	5
<u>NANOMATERIAL-CONTAINING WASTE</u>	6
<u>PHARMACEUTICAL WASTE</u>	6
<u>REFERENCE LIST</u>	7
<u>APPENDIX A – NIH ICS CHEMICAL WASTE DISPOSAL CONTACTS LIST</u>	8
<u>APPENDIX B – EXPANDED LIST OF CHEMICAL SOLUTIONS APPROVED FOR DRAIN DISPOSAL</u>	9

OVERVIEW

The National Institutes of Health (NIH) is made up of 27 Institutes and Centers, each with a specific research agenda, focusing on diseases or body system. The NIH has over 3000 labs on the Bethesda campus, including local off-campus and regional facilities, where biomedical research is conducted including animal facilities, clinical and patient care areas and industrial activities. These activities produce an array of waste both hazardous and nonhazardous which must be managed appropriately. This document provides guidance based on policy, permits, and regulations, for materials which must be collected for proper disposal and a select group of chemicals which can be discharged under specific conditions. The NIH objective is to dispose of chemicals via the waste management service and limit discharges to the sanitary sewer. Current NIH waste management practices include collection of chemicals through waste disposal services. **Only chemicals pre-approved for drain disposal** may be disposed of down the drain (see [page 3](#)). All other chemical waste should be managed and disposed of as chemical waste according to the instructions on [page 3](#) of this guide. The NIH will review policies, regulations and procedures, and update this guide on a periodic basis.

WASTE POLICY

The [NIH waste policy](#) requires that all wastes be reduced to the greatest extent feasible to limit any negative environmental impact. Proper management of all wastes, including their characterization, collection, labeling, packaging, storage, recycling, transportation, treatment and final disposal, is also required. Disposal of chemical wastes, including pharmaceutical wastes, via the sanitary sewer is regulated by federal, state and local laws and regulations. Violation of these regulations may result in citations for non-compliance from local, state or federal authorities.

Per EPA regulations, wastes are considered hazardous if they exhibit any of the following characteristics: ignitability, corrosivity, reactivity, and toxicity; or if they are specifically named on one of four lists of hazardous wastes in the [Code of Federal Regulations](#) (40 CFR). Additional state and local laws and regulations also apply respectively to waste generated in NIH facilities. These regulations and restrictions must be adhered to by all NIH personnel, contractors and/or anyone involved with the generation of wastes or waste management and support services at all NIH facilities, including but not limited to the Bethesda main campus, local off-campus facilities (Baltimore, Frederick, Poolesville and Rockville) and regional facilities (Montana and North Carolina).

CHEMICALS APPROVED FOR DRAIN DISPOSAL

It is the responsibility of each NIH laboratory worker to ensure that chemical waste generated from their activities is disposed of properly. Chemicals put down the drain may interfere with the process of removing contaminants from Publicly Owned Treatment Works (POTW). After treated waste water leaves the POTW, it flows to major recreational and drinking water resources in our areas. The stewardship of these important natural resources is our collective responsibility.

Laboratory workers should consult this guide before undertaking drain disposal of any lab chemicals. **Only chemical approved for drain disposal** by the NIH Division of Environmental Protection (NIH/DEP) may be disposed of down the drain. **Surplus solid chemicals must be disposed of through the NIH chemical waste services and not discharged down the sanitary sewer.** Below is the approved chemicals list. Click A – Z to expand the list for approved chemicals or see the Expanded List at the end of this Guide (see [Appendix B](#)).

Chemicals that are not listed below must be managed as chemical waste and collected by your IC's chemical waste service for disposal (see [Appendix A](#)). Dilution to achieve compliance is prohibited per [EPA CFR Dilution Prohibition](#).

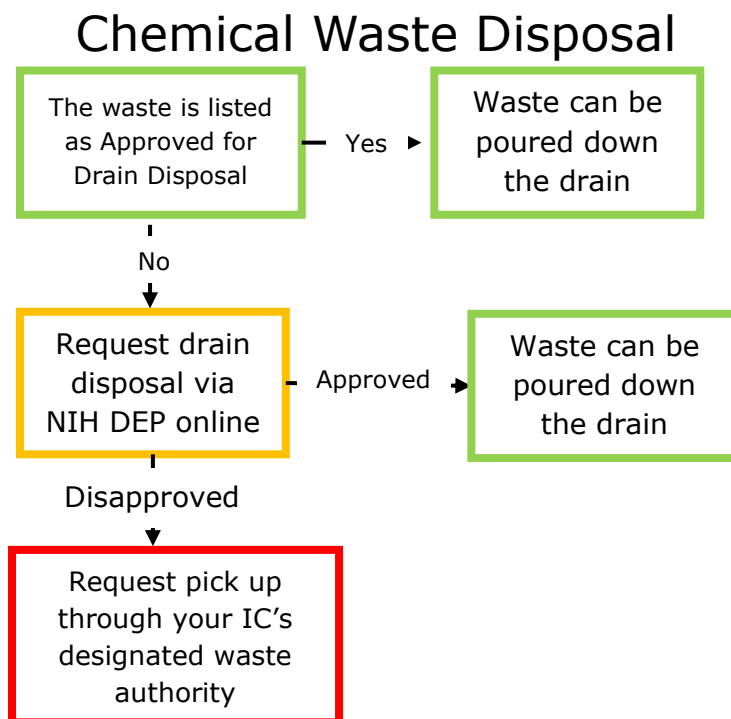
[When disposing of approved chemical via the drain use the following procedure:](#)

- 1. Ensure the sink to be used for drain disposal of chemicals is clear of all items.*
- 2. The worker shall wear appropriate PPE (lab coat, nitrile gloves, and protective eye wear).*
- 3. Turn on cold water and let run for about one (1) minute to ensure there is adequate flow of water down drain, no back up into the sink. Do not use the sink for disposal of chemicals if water does not freely flow down the drain.*
- 4. Slowly pour material down the sink drain minimizing splashing.*
- 5. Rinse out the material container if to dispose of, recycle, or reuse.*
- 6. Clean sink to ensure sink basin is free of material.*
- 7. Let tap water run for about two (2) minutes after pour to allow the material to flush through p-traps.*
- 8. Shut off water taps to sink.*

CHEMICAL DETERMINATION FOR HAZARDOUS WASTE

If the chemical in question is not already on the “Chemicals Approved for Drain Disposal” list (see [Appendix B](#)), the NIH will need to determine if it is acceptable for disposal. **Generally, if the chemical waste is Ignitable, an Oxidizer, Corrosive, Reactive or Toxic, it is a hazardous waste that needs to be collected for disposal. Additionally, chemicals on EPA waste lists F, K, P, and U are identified as hazardous waste and subject to disposal regulations.** EPA periodically updates the [CFR Title 40 – Protection of Environment, Volume 27, Part 261 – Identification and Listing of Hazardous Waste](#).

Chemical wastes that are already listed on the “Chemicals Approved for Drain Disposal” list (see [Appendix B](#)) are approved for disposal down the drain when not mixed with unapproved materials. If a chemical waste that is generated in your lab, does not appear on the list, you can request standing approval for drain disposal at [DEP’s Application for Disposal of Specific Chemical Reagents to the Sanitary Sewer](#). System wastes, disinfection wastes, or chemicals associated with disapproved mixtures will be approved on a case-by-case basis. If approved, the chemical will be added by DEP to the list of Chemicals Approved for Drain Disposal. If disapproved, collect as chemical waste and request pickup through waste disposal authority (see [Appendix A](#)).



WASTE CONTAINING ANTIBIOTICS

NIH is committed to avoiding the release of antibiotics that can reach the ecosystem. Autoclaving is the best practice and reliable means to inactivate antibiotics. Antibiotic waste must be treated differently depending on its stability. Request discharge to drain, with inactivation by other methods, requires an approval at [DEP's Application for Disposal of Specific Chemical Reagents to the Sanitary Sewer](#).

Inactivate by heat (autoclave or boil) before pouring down the drain	Must be submitted for combustion (treated as hazardous waste)
Ampicillin	Blasticidin-S
Amphotericin B (Fungizone)	Choramphenicol
Carbenicillin	Ciprofloxacin
Erythromycin	Enrofloxacin
Geneticin (G418)	Kanamycin
Gentamicin	Nalidixic acid
Neomycin	Vancomycin
Penicillin	Zeocin
Puromycin	Zeomycin
Streptomycin	
Sulfadoxine	
Tetracycline	

Antibiotics not listed above should be collected as chemical waste. See waste services disposal guide for additional information.

LIQUID BIOHAZARDOUS WASTE DISPOSAL

Proper biohazardous waste treatment is important to ensure sterilization or deactivation prior to disposal. Biohazardous wastes consist of microbial cultures, viruses or recombinant DNA. Biosafety Risk Groups are designated 1 (agents with little risk to an individual or community) to 4 (agents with the highest risk to an individual or community). In this guide, only Risk Groups 1 and 2, with approval, will be considered for drain disposal. Risk Group 1 agents represent little to no risk to an individual or community. Risk Group 2 represents moderate risk to an individual but no risk to a community. Risk Groups 3 and 4 should be collected as Medical Pathological Waste (MPW). Risk Group 3 agents are serious or lethal human disease for which preventive or therapeutic interventions may be available. Risk Group 4 agents cause serious or lethal human disease without preventive or therapeutic interventions available. For more information, see [DHHS's Biosafety Risk Groups](#). Biohazardous waste containing chemicals or radioactive waste should be collected for disposal through the appropriate waste management service

Below are the steps necessary for drain disposal of Risk Group 1 and 2 biohazardous wastes:

1. Wear appropriate PPE such as gloves, lab coat and eye protection when working with biohazardous waste
2. A bleach mixture (final concentration of 1:10 or 10%) for a contact time of a minimum of 20 minutes should be used to decontaminate biohazardous liquids. Once the liquid has been decontaminated, it can be poured down the drain. If using another disinfectant such as alcohol-based or Wescodyne® for decontamination, direct to the waste disposal guide for the appropriate disposal method.

NANOMATERIAL-CONTAINING WASTE

Chemical wastes containing nanoparticles shall not be disposed of as regular waste or poured down the drain (refer to the [NIH Nanotechnology Safety and Health Program](#), 9.0 Waste, pages 7-8). Contact the waste management service for additional assistance with disposal recommendations for all nanomaterial related waste.

PHARMACEUTICAL WASTE

Hazardous pharmaceutical wastes governed by regulations under the [Resource Conservation and Recovery Act](#) (RCRA). Pharmaceuticals entering the environment via drain disposal have the potential to negatively impact aquatic ecosystems, including fish and animal populations, and can lead to water contamination and other public safety concerns. **Any pharmaceutical waste must be handled as chemical waste.** Pharmaceutical wastes are drugs, vaccines, and anti-neoplastic drugs; including contaminated pharmaceutical products and equipment. The acquisition, use and disposal of controlled substances at NIH is subject to strict [Federal Drug Enforcement Administration \(DEA\) and State Department of Justice regulations](#). These regulations and directives set specific requirements and restrictions on registration, acquisition, usage, record keeping, transfer, storage and disposal.

Individuals who manufacture, distribute, dispense, import, export, conduct research or perform chemical analysis with any controlled substances including precursor chemicals are subject to a DEA registration.

REFERENCE LIST

Waste Policy

3032 – Environmental Management and Waste Minimization at the NIH,
<https://policymanual.nih.gov/3032> (NIH/DEP, Apr 2019, retrieved on Jun 27, 2019)

3033 - Procurement, Use and Disposal of Mercury and Its Compounds,
<https://policymanual.nih.gov/3033> (OD/OM/ORFDO/DEP, May 2014)

Chemicals Approved for Drain Disposal

EPA CFR Dilution Prohibition

https://www.ecfr.gov/cgi-bin/text-idx?SID=95d8417912f93e3e920333baef3bebf&mc=true&node=se40.27.268_13&rgn=div8 (EPA, May 1998, retrieved on Jun 26, 2019)

Chemical Determination for Hazardous Waste

NIH/DEP Application for Disposal of Specific Chemical Reagents to the Sanitary Sewer <https://spapps.od.nih.gov/sites/DEPAuthorizations/SitePages/Home.aspx> (NIH/DEP, retrieved on Jun 26, 2019)

NIH Waste Disposal Guide (2014)

<https://www.orf.od.nih.gov/EnvironmentalProtection/WasteDisposal/Documents/2014WasteGuide508-09302015.pdf> (NIH/OM, 2014, retrieved on Jun 26, 2019)

APPENDIX A – NIH ICS CHEMICAL WASTE DISPOSAL CONTACTS LIST

NIH

NIH/ORF/Waste Management Services

<https://www.orf.od.nih.gov/EnvironmentalProtection/WasteDisposal/Pages/default.aspx>

For questions and help, contact your Safety and Health Specialist,
NIH/OM/SOSB/DOHS,

https://www.ors.od.nih.gov/sr/dohs/safety/laboratory/Pages/safety_health_specialists.aspx

NIH at Baltimore

<https://nems.nih.gov/Documents/NIA%20Waste%20Guide.pdf>

Montana

Hamilton

[https://nems.nih.gov/NEMS-](https://nems.nih.gov/NEMS-locations/Pages/NIAID_at_Rocky_Mountain_Laboratories_Montana.aspx)

[locations/Pages/NIAID_at_Rocky_Mountain_Laboratories_Montana.aspx](https://nems.nih.gov/NEMS-locations/Pages/NIAID_at_Rocky_Mountain_Laboratories_Montana.aspx)

North Carolina

Research Triangle Park

<https://apps.niehs.nih.gov/hsb/pickups/>

NCI at Frederick

Fort Detrick

<https://ncifrederick.cancer.gov/Ehs/WasteManagement/>

APPENDIX B – EXPANDED LIST OF CHEMICAL SOLUTIONS APPROVED FOR DRAIN DISPOSAL

Note: (*) = allowable concentration limit (•) = antibiotic

A

A-Glucosidase, Type I

*Acetic Acid ($\leq 10\%$ with pH > 6)

Albumin, Bovine (without Sodium azide)

Albumin, Serum (Human) (without Sodium azide)

Alconox ($\leq 1\%$) (10 g/L)

Alpha-D (+) Melibiose

•Amphotericin B (Fungizone) (Autoclave, pg. 5)

•Ampicillin (Autoclave, pg. 5)

*Animal Drinking Water ($\leq 4\%$ Deuterated Water)

Artificial Cerebrospinal Fluid (aCSF) (NaCl, MgSO₄, KCl, KH₂PO₄, Dextrose, NaHCO₃, CaCl₂, Kynureic Acid)

B

B-D (+) Glucose, and all Isomers – Beta D Glucose

Bacto Tryptic Soy Broth

Basal Medium Eagle

BD™ FACSFlow™ Sheath Fluid

Beta-Glucuronidase, Type VIII

Bicine [N, N-bis (2-hydroxyethyl) glycine]

Bile Salts

*Bleach ($\leq 10\%$ Clorox Bleach)

Blood Bank Saline

Bovine Serum Albumin (BSA)

Brain Slicing Perfusion Solution

C

Calcium Bicarbonate

Calcium Carbonate

Calcium Chloride

Calcium Citrate

Calcium Phosphate, Monobasic

Calcium Sulfate

•Carbenicillin (Autoclave, pg. 5)

Carboxypeptidase B

Carboxypeptidase Y

Carrageenan, Type II
Casein
Cellulase, all types
Chitin
Chondroitin
Chymotrypsinogen
Click's Medium
CM Cellulose Powder
Cocarcboxylase
Coenzyme A, Sodium Salt
Collagen & Collagenase
Complete Dulbecco's Modified Eagle's Media (DMEM-C)
Cytidine 2' & 3' - Monophosphates
Cytidine 2' & 3' – Triphosphates
Cytosin

D

2' DeoxyAdenosine 5' Triphosphate
2-Deoxy-D-Ribose
D-Broth (Dehydrated Broth) ($\leq 1\%$ Sodium chloride)
D-Cellobiose
D-Erythrose
D-Fructose and other Isomers & Enzymes
D-Glycogen
D- (+) Maltose, Monohydrate
D-Ribose 5-Phosphate, Disodium Salt
D-Sorbitol
D-Xylose
Deoxyribonucleic Acid, Type XV
Dextran
Dextrose
*Dialysis Buffer for Protein Purification [(20mM Tris-HCl, 100mM Urea) with removal of DDT, BME, or preservatives]
*Diethylene Triamine Penta Acetic Acid (DTPA) (<10 mM with pH ≤ 6)
Disodium Phosphate
*Dithiothreitol (DTT) (≤ 1 M)
DL-Cystine
DL-Histine
DL-Homoserine
DL-Isoleucine
DL-Leucine
DL-Serine
DL-Threonine

DNA Polymerase I

*Donkey Serum, Normal ($\leq 5\%$) without Sodium Azide]

Dulbecco's Modified Eagle's Medium (DMEM)

Dulbecco's Modified Eagle Medium (DMEM), without Phenol Red

Dulbecco's Modified Eagle Medium (DMEM), with Phenol Red

Dulbecco's Modified Eagle's Medium (DMEM)/Ham's Nutrient Mixture F-12

Dulbecco's Modified Eagle Medium (DMEM), High Glucose, Pyruvate without Phenol Red

Dulbecco's Modified Eagle Medium (DMEM) High Glucose

Dulbecco's Modified Eagle Medium/Nutrient Mixture F-12 (DMEM/F12), without Phenol Red

Dulbecco's Modified Eagle Medium/Nutrient Mixture F-12 (DMEM/F12), with Phenol Red

E

Eagle's Minimum Essential Medium (EMEM)

Earl's Balanced Salt Solution (EBSS)

Elastase Type III

EmbryoMax® Advanced KSOM Medium

Enolase

Epidermal Growth Factor, Human (hEGF)

•Erythromycin (Autoclave, pg. 5)

Essential 6 Medium

*Ethanol ($\leq 10\%$ with a Flash Point $> 140^\circ\text{F}$)

*Ethylenediaminetetraacetic Acid (EDTA) (≤ 10 mM)

*Ethylene Glycol Tetraacetic Acid (EGTA) (≤ 10 mM)

F

F-12 Coon's Modification Formulation

Fetal Bovine Serum (FBS)

Fetal Bovine Serum Charcoal Stripped

Fetal Calf Serum (FCS) (FCS)

Fibrinogen

Fibronectin

Fischer's Medium

Flavin Adenine Dinucleotide

Folic Acid

Fructose

G

Galactose

Gelatin

- Geneticin (G418) (G418) (Autoclave, pg. 5)
- Gentamicin (Autoclave, pg. 5)
- Gibberellic Acid (GA)
- Glasgow Minimum Essential Media
- Glucose
- Glucose Enzymes & Phosphates (All)
- Glutamax
- Glutamic Acid (including D, L, DL Isomers)
- *Glutamine Autoclave Prior to Disposal)
- Glycine
- GlycylGlycine
- Grace's Insect Medium
- Guanosine 3', 5' Cyclic Monophosphate

H

- Ham's F-12 Medium (F-12)
- Hank's Balanced Salt Solution (HBSS)
- Hemoglobin
- HEPES (N-2-hydroxyethylpiperazine-N-2-ethane sulfonic acid) Buffer
- HEPES-Buffered Saline
- Hexokinase
- Histone
- Human Basic Fibroblast Growth Factor (hFGF basic/hFGF-B)
- Hyaluronidase Type I-S
- *Hydrogen Peroxide ($\leq 8\%$)

I

- Immunoglobulins, IgG
- Immunoglobulins, IgM
- Immunoglobulins, IgE
- Insect Medium Supplement
- Instant Ocean® Sea Salt
- Insulin
- Invertase, Grade V
- IPL-41 Insect Medium
- Iscove's Modified Dulbecco's Medium (IMDM)
- IsoFlow™ Sheath Fluid (Beckman Coulter)
- *Isopropanol (2-propanol) (<2% with Flash Point >140°F)

J

- Joklik's Minimum Essential Medium Eagle

K

Krebs-Henseleit Buffer

L

L-Citrulline

L-Glutamine

L-15 Media

L-Proline

L-Serine

L-Sorbose

L-Threonine

L-Valine

Lactic Dehydrogenase (including D-isomer)

Lactoferrin, Globulin, alpha-Lactose

Lactose

Lectin

Lectin from Glycine Max

Leibovitz's L-15 Medium

Lithium Acetate

Litmus Milk Medium

Lithium Carbonate

*Lithium Chloride ($\leq 1\%$)

*Lithium Sulfate ($\leq 1\%$)

Luria Broth (LB)

Lysozyme, Grade I

M

M2 Medium

M9 Minimal Medium

M9 Minimal Salts

M16 Medium

Magnesium Chloride ($\leq 1\%$)

Magnesium Sulfate ($\leq 1\%$)

Maltose

McCoy's 5A Modified Medium

MCDB Medium

Medium 199

*MEM Amino Acids (1X) (pH >6 and <9)

*MEM Vitamin Solution (1X)

Methylcellulose (Paraben)

*Methylene Blue Embryo Water (Zebrafish only, 2ml of 0.1% methylene blue)

Milk (Non-fat dry)

[Minimum Essential Medium Eagle \(MEM\)](#)
[Modified Ringer's "Artificial Cerebrospinal Fluid" Solution](#)
[Monopotassium Phosphate](#)

N

[Nicotinamide Adenosine Diphosphate \(NADP\)](#)
[NCTC Medium](#)
[Nematode Medium \(Axenic\)](#)
•[Neomycin](#) (Autoclave, pg. 5)
[NERL™ Blood Bank Saline](#)
[Nerve Growth Factor](#)
[Neuraminidase, Type X and Type VIII](#)
[Nutrient Mixtures \(HAM\) F-10](#)
[Nutrient Mixtures \(HAM\) F-12](#)
[NZY Broth](#)

O

[Opti-MEM/Reduced Serum Medium](#)

P

[Pectin](#)
[Pectinase](#)
•[Penicillin](#) (pg. 5)
[Penicillinase Type 1](#)
*[pH 4 Calibration Buffer](#) (without Phenylmercuric Acetate)
*[pH 7 Calibration Buffer](#) (without Phenylmercuric Acetate)
*[pH 10 Calibration Buffer](#) (without Phenylmercuric Acetate)
Phosphatase Alkaline, Type VII-NT, Bovine (without Glycerol)
*[Phosphate Buffer Saline \(PBS\)](#) (Unused only)
Phosphodiesterase
[Phosphodiesterase 3', 5' Cyclic Nucleotide](#) (Without Glycerol)
[Plasmin](#)
[Polyoxyethylenesorbitan Monolaurate \(Tween-20\) \(<5%\)](#)
[Potassium Acetate](#)
[Potassium Bicarbonate](#)
[Potassium Bitartrate](#)
*[Potassium Chloride](#) ($\leq 1\%$)(stock solution must be submitted as chemical waste)
[Potassium Phosphate \(dibasic\)](#)
[Potassium Phosphate \(mono\)](#)
[Potassium Thiosulfate](#)
[Proline & Isomer DL](#)
•[Puromycin](#) (Autoclave, pg. 5)

[Pyridoxal Phosphate](#)

Q

R

[Raffinose Pentahydrate](#)

[Riboflavin](#)

[Ribonuclease A](#)

[Ribonuclease S](#)

[Ribonuclease T1](#)

[Roswell Park Memorial Institute \(RPMI\) 1640 Medium](#)

[RPMI 1640 Medium Auto-Mod™ for Autoclaving](#)

[RPMI 1640 Medium Dutch Modification](#)

S

[Sarcosine](#)

[Schneider's Insect Media](#)

[Shields and Sang M3 Insect Medium](#)

[SmBM□□ Smooth Muscle Cell Growth Basal Medium](#)

[Sodium Acetate](#)

[Sodium Ascorbate](#)

[Sodium Bicarbonate](#) (Sodium Hydrogen Carbonate also known as Baking Soda)

[Sodium Carbonate](#)

[Sodium Chloride \(NaCl\)](#) ($\leq 1\%$)

*[Sodium Chloride Sodium Citrate \(SSC\)](#) (1x)

[Sodium Citrate](#)

*[Sodium Dodecyl Sulfate](#) (Sodium Lauryl Sulfate) (SDS) ($\leq 10\%$ concentration)

[Sodium Hydrogen Phosphate](#)

*[Sodium Hypochlorite Solution](#) (Bleach) ($\leq 10\%$)

[Sodium Phosphate Buffer](#)

[Sodium Phosphate Dibasic](#)

[Sodium Phosphate Monobasic](#)

[Sodium Pyruvate](#)

[Sodium Sulfate](#)

[Sodium Thiosulfate](#)

[Starch](#)

[StemFlex Medium](#)

[Streptokinase](#)

•[Streptomycin](#) (Autoclave, pg. 5)

[Succinamide](#)

[Sucrose](#) (and Isomers)

•[Sulfadoxine](#) (Autoclave, pg. 5)

Super Optimal Broth with Catabolite Repression (SOC) Medium

T

TAPS (3-[[tris(hydroxymethyl)methyl]amino]propanesulfonic acid)

TC-100 Insect Medium

Terrific Broth

- Tetracycline (Autoclave, pg. 5)

TMB Substrate Solution A

TNM-FH Insect Medium

Transferrin, Human

*Tricaine Methanesulfonate (MS-222) Buffered Solution ($\leq 300\text{mg/L}$)

Tricine [N-tris(hydroxymethyl)methylglycine]

TrypLE Select Enzyme

Tris

*Tris, Acetic Acid and EDTA (TAE) Buffer (1x)

*Tris Buffered Saline (TBS) (1x)

*Tris-EDTA (20mM Tris, 1mM EDTA)

*Tris-Glycine Buffer (1x)

Tris Hydrochloride (Tris-HCl)

*Triton X-100 Lysis Buffer (1x)

*Triton X-100 ($\leq 1\%$)

*Trypsin Inhibitor (Undiluted stock must be submitted as chemical waste)

*Trypsin-EDTA ($\leq 0.25\%$)

Tryptic Soy Broth Medium

Tryptone Peptone

*Tween-20 (Polyoxyethylenesorbitan Monolaurate) ($\leq 5\%$)

*Tyrode's buffer (10mM HEPES, 137mM NaCl, 4.5mM Potassium Chloride, 0.5mM Magnesium Sulfate, 0.5mM Potassium Phosphate, 10mM Glucose, 1.8mM Calcium Chloride)

U

Urea

V

Vinegar ($\text{pH} \leq 6$)

W

Waymouth Medium MB

Whittens's Medium

William's Medium E

X

Y

Yeast Extract

Yeast Extract with Supplements (YES) Medium

Yeast extract, Peptone and Dextrose (YPD) Medium

YP-GAL Broth

*YT Culture Medium (2x)

Z