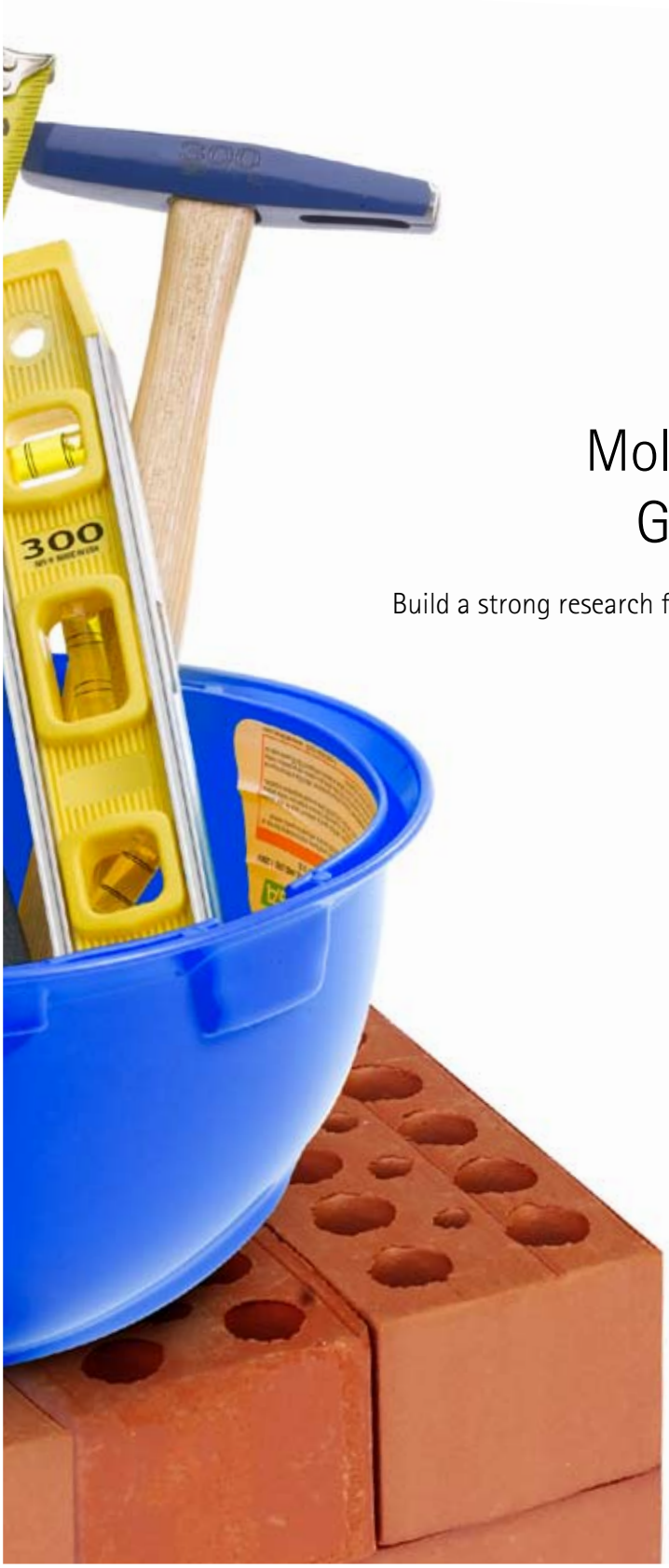

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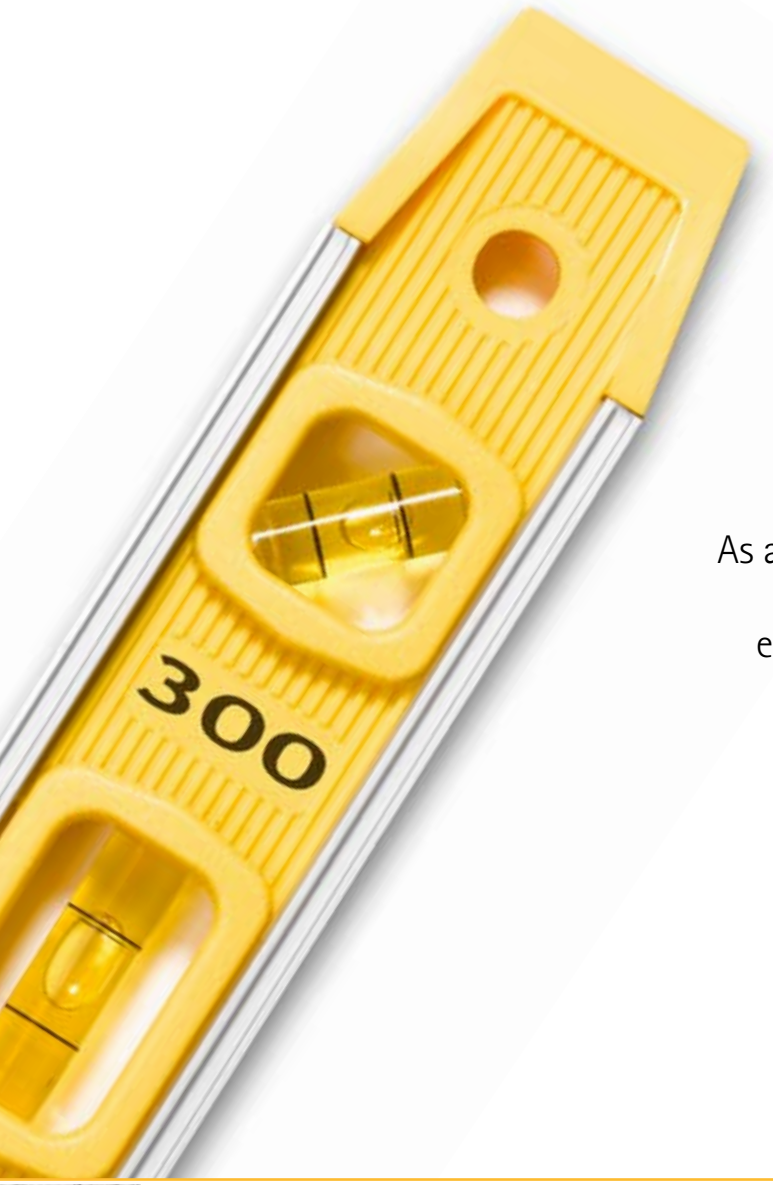
Molecular Biology Grade Reagents

Build a strong research foundation with quality tools

EMD



How can EMD Chemicals help me improve the quality of my research?

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As an affiliate of Merck KGaA, Darmstadt, Germany, EMD Chemicals offers over 300 years of expertise and a wide range of Molecular Biology Grade research essentials that give you a firm foundation to build your research on.

That's what's in it for you. EMD Chemicals

Achieve Your Research Goals with Highly Cited Calbiochem® Reagents

EMD Chemicals has years of experience in delivering the highest quality Calbiochem® and Novagen® products that have been cited in over 100,000 peer-reviewed articles and have enabled scientists worldwide to rapidly achieve their research goals. Our Molecular Biology Grade antibiotics, buffers, detergents, and other research essentials undergo extensive quality testing to ensure consistent performance and to provide you with a strong foundation in every experiment. For greater peace of mind, you can always count on the best in class technical support.

Key Features

Reproducible results | Each lot of reagent undergoes extensive quality testing to ensure consistent results in every experiment.

Proven performance | Get the best performance with products that have been cited in thousands of peer-reviewed articles.

Peace of mind | Our highly trained technical support scientists are at your service to help you in every step of your experiment.

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Antibiotics and Selection Agents

Antibiotics are natural substances secreted by microorganisms that are toxic to other microorganisms, but are generally non-toxic toward higher organisms. The modern age of antibiotics began in the late 1920s, when Alexander Fleming discovered that the mold *Penicillium notatum* was able to block bacterial growth. Natural antibiotics had inadvertently been used for centuries, but with Fleming's discovery, the full potential of antibiotics could be appreciated.

The key advantage of some antibiotics is their ability to selectively target a microorganism's metabolic pathway without seriously affecting the eukaryotic host. Because many metabolic activities of the bacterial cell differ from those in the mammalian cell, these differences in antibiotics can be exploited to develop new agents. Furthermore, antibiotic resistance has proven to be advantageous in a variety of research applications.

Calbiochem® antibiotics are manufactured in a controlled environment and perform with exceptional consistency to ensure the best results, lot-after-lot.

Four primary methods by which antibiotics act on bacteria are:

- Inhibition of cell wall synthesis
- Inhibition of protein synthesis
- Inhibition of nucleic acid synthesis
- Anti-metabolic activity or competitive antagonism

Antibiotics can also be categorized based on:

- Narrow- or Broad-spectrum
- Gram-positive or Gram-negative
- Bactericidal or Bacteriostatic

Below are examples of antibiotics offered with corresponding number of citations:

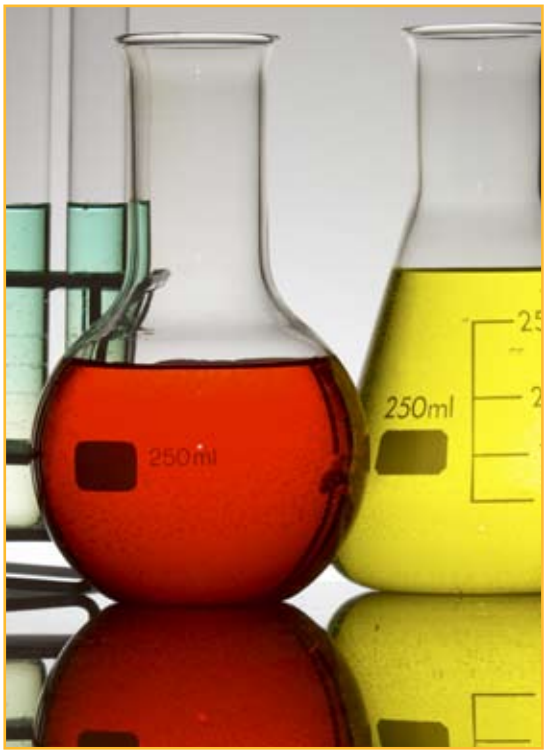
Cat No	Product Description	Available Sizes	# Citations from 2000 to 2009
345810	G 418 Sulfate, Cell Culture Tested	250 mg,1 g, 5 g, 25 g, 100 g, 250 g, 500 g, 1 kg	6200
196000	Bafilomycin A1, *Streptomyces griseus*	10 µg	460
400052	Hygromycin B, *Streptomyces sp.*, Cell Culture-Tested	1 ml, 5 ml, 20 ml, 50 ml	2550

See page 6 for recent citations

For more information as well as the entire product line please visit our website www.emdbiosciences.com/Antibiotics

Buffers

Buffers are aqueous systems that resist changes in pH when small amounts of acid or base are added. Buffer solutions are composed of a weak acid (the proton donor) and its conjugate base (the proton acceptor). Buffering results from two reversible reaction equilibria in a solution wherein the concentration of proton donor and its conjugate proton acceptor are equal. Buffers have both intensive and extensive properties. The intensive property is a function of the pKa value of the buffer acid or base. Most simple buffers work effectively in the pH scale of pKa $^{+}$/-1.0. The extensive property of the buffers is also known as the buffering capacity. It is a measure of the protection a buffer offers against changes in pH. Buffering capacity generally depends on the concentration of buffer solution. Buffers with higher concentrations offer greater buffering capacity.



EMD Chemicals offers a wide selection of buffers, each tailored for specific applications. For greater flexibility some buffers can be purchased either as solids or as ready-to-use solutions.

Below are examples of buffers offered with corresponding number of citations:

Cat. No	Product Description	Available Sizes	# Citations from 2000 to 2009
625718	Triethylammonium Acetate, 1 M Solution	1 l	150
524650	PBS Tablets	1 ea	1040
391338	HEPES, Free Acid, ULTROL®	25 g, 100 g, 500 g, 1 kg, 5 kg	2550

See page 6 for recent citations

An exceptional guide for the preparation and use of buffers in biological systems. Includes an in-depth overview of buffers and how they work. A PDF file can be downloaded from our website.

For more information as well as the entire product line please visit our website www.emdbiosciences.com/Buffers

Detergents

In order to understand the function and structure of membrane proteins, it is necessary to carefully isolate these proteins in their native and highly purified state. Although membrane protein solubilization can be accomplished by using amphiphilic detergents, preservation of their biological and functional activities can be a challenging process as many membrane proteins are susceptible to denaturation during the isolation process. Detergents solubilize membrane proteins by mimicking the lipid bi-layer environment.

Type of Detergents: Main Features

Type of Detergent	Ionic Detergents	Non-Ionic Detergents	Zwitterionic Detergents
Examples	Anionic: Sodium dodecyl sulfate (SDS) Cationic: Cetyl methyl ammonium bromide (CTAB)	TRITON®-X-100, *n*-octyl-ß-D-glucopyranoside	CHAPS, ZWITTERGENT® Detergents
Comments	• Contain head group with a net charge. • Either anionic (- charged) or cationic (+ charged). • Micelle size is determined by the combined effect of hydrophobic attraction of the side chain and the repulsive force of the ionic head group. • Neutralizing the charge on the head group with increasing counter ions can increase micellar size. • Useful for dissociating protein-protein interactions. • The CMC of an ionic detergent is reduced by increasing the ionic strength of the medium, but is relatively unaffected by changes in temperature.	• Uncharged hydrophilic head group. • Better suited for breaking lipid-lipid and lipid-protein interactions. • Considered to be non-denaturants. • Salts have minimal effect on micellar size. • Solubilize membrane proteins in a gentler manner, allowing the solubilized proteins to retain native subunit structure, enzymatic activity and/or non-enzymatic function. • The CMC of a non-ionic detergent is relatively unaffected by increasing ionic strength, but increases substantially with rising temperature.	• Offer combined properties of ionic and non-ionic detergents. • Lack conductivity and electrophoretic mobility. • Do not bind to ion-exchange resins. • Suited for breaking protein-protein interactions.

Below are examples of detergents offered with corresponding number of citations:

Cat. No	Product Description	Available Sizes	# Citations from 2000 to 2009
693017	ZWITTERGENT® 3-14 Detergent	5 g, 25 g, 100 g	182
300410	Digitonin, High Purity	250 mg, 1 g, 5 g	470
220201	CHAPS	1 g, 5 g, 10 g, 25 g	3000

See page 6 for recent citation information

Our detergents brochure offers guidelines for solubilization of membrane proteins, helps select tools for detergent removal, and touches on detergent usage basics. A pdf version can be downloaded from our website.

For more information as well as the entire product line please visit our website www.emdbiosciences.com/Detergents

Recent Citations

Antibiotics and Selection Agents

Hui, L., Yao, Y., et al. (2009) Inhibition of Janus kinase 2 and signal transduction and activator of transcription 3 protect against cecal ligation and puncture-induced multiple organ damage and mortality. *J Trauma.* **66(3)**:859-65.

Petschnigg, J., Wolinski, H., et al. (2009) Good Fat, Essential Cellular Requirements for Triacylglycerol Synthesis to Maintain Membrane Homeostasis in Yeast. *J. Biol. Chem.* **284**:30981 - 30993.

Nijnik, A., Pistolic, J., et al. (2009) Human Cathelicidin Peptide LL-37 Modulates the Effects of IFN- on APCs. *J. Immunol.* **183**: 5788 - 5798.

Buffers

Hawkins, J., Robbins, M.D., et al.J (2008) Pharmacologic Inhibition of Site 1 Protease Activity Inhibits Sterol Regulatory Element-Binding Protein Processing and Reduces Lipogenic Enzyme Gene Expression and Lipid Synthesis in Cultured Cells and Experimental Animals. *J. Pharmacol. Exp. Ther.* **326**: 801 - 808

Wilsher, N.E., Court, W.J., et al. (2007) The Phosphoinositide-Specific Phospholipase C Inhibitor U73122 (1-(6-((17ß-3-Methoxyestra-1,3,5(10)-trien-17-yl)amino)hexyl)-1H-pyrrole-2,5-dione) Spontaneously Forms Conjugates with Common Components of Cell Culture Medium. *Drug Metab. Dispos.*, **35**:1017 - 1022.

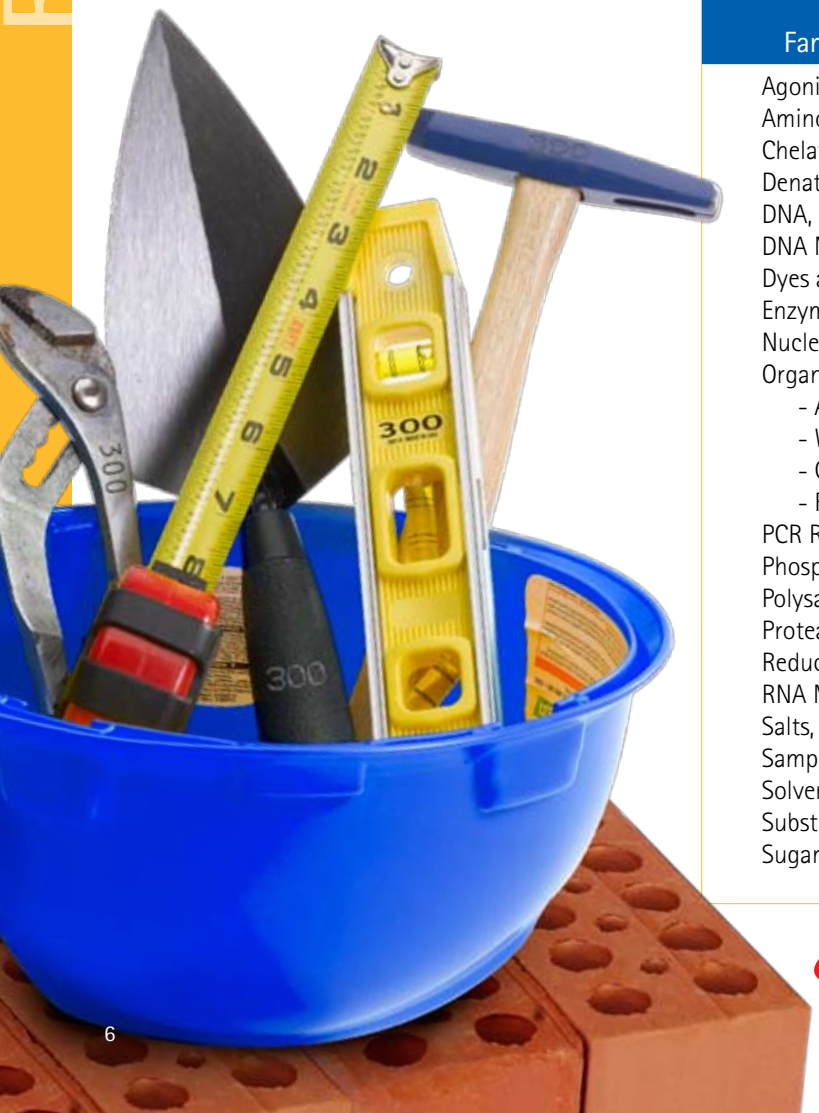
Nichols, R.A., Dengler, A.F., et al. (2007) A Constitutive, Transient Receptor Potential-like Ca^{2+} Influx Pathway in Presynaptic Nerve Endings Independent of Voltage-gated Ca^{2+} Channels and $Na+/Ca^{2+}$ Exchange. *J. Biol. Chem.*, **282**: 36102 - 36111.

Detergents

Schug, Z.T., Joseph, S.K. (2006) The Role of the S4-S5 Linker and C-terminal Tail in Inositol 1,4,5-Trisphosphate Receptor Function. *J. Biol. Chem.*, **281**:24431 - 24440.

Zakrzewska, M., Wiedlocha, A., et al. (2009) Increased Protein Stability of FGF1 Can Compensate for Its Reduced Affinity for Heparin. *J. Biol. Chem.*, **284**:25388 - 25403.

Wang, A., Rud, J., et al. (2009) Phosphorylation of Nur77 by the MEK-ERK-RSK Cascade Induces Mitochondrial Translocation and Apoptosis in T Cells. *J. Immunol.*, **183**: 3268 - 3277.



Other Molecular Biology Related Products

Families of Products	Applications
Agonists and Antagonists	Affinity Chromatography
Amino Acids	Bead based assays
Chelating Agents	Cell Culture
Denaturants	Cell Expression
DNA, RNA Polymerases	Cloning
DNA Markers	Cytokine analysis
Dyes and Stains	Dialysis
Enzymes	DNA analysis and interaction
Nucleases and Nucleic Acids	Electrophoresis
Organics and Inorganics	ELISA
- Agarose	Glycoanalysis
- Water	Nucleic acid purification
- Glycerol	PCR
- Formaldehyde	Protein Folding and Refolding
PCR Reagents	Protein Expression and Purification
Phosphatases	Protein-to-protein interactions
Polysaccharides	RNA analysis
Proteases	Sample Preparation and clean-up
Reducing Agents	Transfection
RNA Markers	Western Blotting
Salts, Acids and Bases	
Sample Loading Buffers	
Solvents	
Substrates	
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North America – www.emdbiosciences.com

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