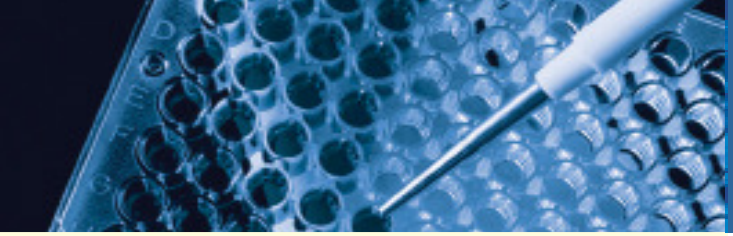

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Solutions for Research & Drug Discovery

Convenient, Safe and Cost-effective

BIOASSAY SYSTEMS

BIOASSAY SYSTEMS offers assay kits that are simple, convenient to use and superior in performance. With our assay kits, researchers need little-to-no time for assay optimization. We specialize in biochemical and cell-based assays for both routine laboratory tests and for high-throughput drug discovery applications with a focus on safe, non-radioactive assay formats such as absorbance, fluorescence and luminescence detection techniques. Key features of our assays include simplicity, high-throughput, sensitivity, accuracy and low interference. Our assays can be used with a wide variety of samples and have been frequently cited in papers published in first-tier journals such as *Nature*, *Nature Medicine* and *PNAS*.

Our product portfolio consists of kits and analytical services for a broad range of research areas including:

- **Blood/Urine Chemistry**
- **Energy Metabolism**
- **Enzyme Activity**
- **HTS Reagents**
- **Ion Assays**
- **Oxidative Stress**

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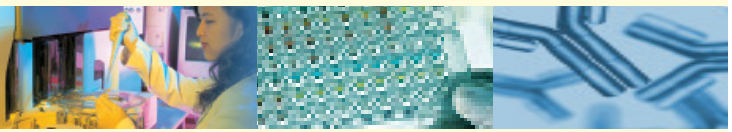


BioAssay Systems offers high quality assay kits, analytical services, assay design and development services

Blood/Urine Chemistry
- Acetate
- Acetylcholine
- Acetylcholinesterase
- Alanine
- Alanine transaminase
- Albumin
- Alkaline phosphatase
- Ammonia (NH_3/NH_4^+)
- Amylase
- Arginase
- Aspartate transaminase
- Bilirubin
- Calcium (Ca^{2+})
- Chloride (Cl^-)
- Cholesterol
- Choline
- Coenzyme A (CoA)
- Copper (Cu^+/Cu^{2+})
- Creatine
- Creatine kinase
- Creatinine
- Ethanol
- Formaldehyde
- Free fatty acid
- Fructose
- Galactose, Glucose
- Glutamate
- Glutathione GSH
- Glycerol
- HDL, LDL
- Heme, Hemoglobin
- Iron (Fe^{2+}/Fe^{3+})
- Ketone body
- *L*-, *D*-Lactate
- Lactate dehydrogenase
- Lactose
- Lipase
- Magnesium
- Phenylalanine
- Phosphate
- Phospholipid
- Sialic acid
- Sucrose
- Sulfate
- Superoxide Dismutase SOD
- Triglyceride
- Urea
- Uric acid
- Zinc

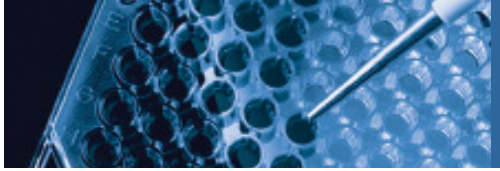
Energy Metabolism
- Acetate
- Adipolysis
- ADP, ATP, ADP:ATP
- Alanine
- Ascorbic acid
- Cholesterol
- Coenzyme A (CoA)
- Creatine
- DNA
- Ethanol
- Free fatty acid
- Fructose
- Galactose
- Glucose
- *α*/*β*-Glucosidase
- Glutamate, Glutamine
- Glycogen
- HDL, LDL
- *L*-, *D*-Lactate
- Lactose
- NAD, NADH
- NADP, NADPH
- Phenylalanine
- Phospholipid
- Protein
- Pyruvate
- Sialic acid
- Starch
- Sucrose
- Triglyceride

Enzyme Activity
- Acetylcholinesterase
- Alanine transaminase
- Alkaline phosphatase
- Amylase, Arginase
- Aspartate transaminase
- ATPase, GTPase
- Catalase
- Creatine kinase
- *α*/*β*-Glucosidase
- Glutathione peroxidase
- Invertase
- Kinases
- Lactate dehydrogenase
- Lipase
- Monoamine oxidase MAO
- Neuraminidase
- Nitric oxide synthase
- Peroxidase
- Phosphatase
- Phospholipase D
- Protein kinase
- Sucrase
- Urease

Oxidative Stress
- Antioxidant
- Ascorbic acid
- Glutathione GSH/GSSG
- Glutathione peroxidase
- Nitric oxide
- Nitric oxide synthase
- Peroxidase
- Peroxide
- Superoxide Dismutase SOD
- TBARS

Cations and Anions
- Acetate
- Ammonium (NH_4^+)
- Calcium (Ca^{2+})
- Chloride (Cl^-)
- Copper (Cu^+/Cu^{2+})
- Iron (Fe^{2+}/Fe^{3+})
- Magnesium (Mg^{2+})
- Phosphate (PO_4^{3-})
- Sulfate (SO_4^{2-})
- Zinc (Zn^{2+})

HTS Reagents
- Adipolysis
- Antioxidant
- ATPase
- GTPase
- Catalase
- Cell viability
- Cytotoxicity
- Formaldehyde
- *α*/*β*-Glucosidase
- Luciferase single/dual reporter assays
- Monoamine Oxidase MAO
- Neurominidase
- Phosphate
- Protein kinase



We specialize in biochemical & cell-based assays …

QuantiChrom™ Hemoglobin Assay Kit (DIHB-250)

Colorimetric Determination of Total Hemoglobin at 400 nm Quantitation of blood hemoglobin has been a key diagnostic parameter for various diseases such as anemia, polycythemia and dehydration. BioAssay Systems' hemoglobin assay kit is based on an improved Triton/NaOH method, in which the hemoglobin is converted into a uniform colored end product. The intensity of color is directly proportional to hemoglobin concentration in the sample. The optimized formulation exhibits high sensitivity and substantially reduces interference by substances in the raw samples.

PUBLICATIONS

1. Thaker, P.H. et al (2006). Chronic stress promotes tumor growth and angiogenesis in a mouse model of ovarian carcinoma. Nature Med. 12: 939-44.

2. Liu D, et al (2010). Puma is required for p53-induced depletion of adult stem cells. Nat Cell Biol. 12:993-8.

3. Kasiappan R, et al (2009). Loss of p53 and MCT-1 overexpression synergistically promote chromosome instability and tumorigenicity. Mol Cancer Res. 7:536-48.

QuantiChrom™ Urea Assay Kit (DIUR-500)

Quantitative Colorimetric Urea Determination at 520 nm UREA determination is very useful for the medical clinician to assess kidney function of patients. In general, increased urea levels are associated with nephritis, renal ischemia, urinary tract obstruction, and certain extrarenal diseases. Decreased levels indicate acute hepatic insufficiency or may result from over-vigorous parenteral fluid therapy. BioAssay Systems' urea assay kit is designed to measure urea directly in biological samples without any pretreatment. The improved Jung method utilizes a chromogenic reagent that forms a colored complex specifically with urea. The intensity of the color, measured at 520 nm, is directly proportional to the urea concentration in the sample. The optimized formulation substantially reduces interference by substances in the raw samples.

PUBLICATIONS

1. Ramalingam, TR, et al (2008). Unique functions of the type II interleukin 4 receptor identified in mice lacking the interleukin 13 receptor alpha1 chain. Nat Immunol 9:25-33.

2. Roelandt, P, et al (2010). Differentiation of rat multipotent adult progenitor cells to functional hepatocyte-like cells by mimicking embryonic liver development. Nat Protoc. 5:1324-36.

3. Stanic, AK, et al (2006). Immune dysregulation accelerates atherosclerosis and modulates plaque composition in systemic lupus erythematosus. PNAS 103:7018-23.

EnzyChrom™ HDL, LDL/VLDL Assay Kit (E2HL-100)

Quantitative Determination of HDL and LDL/VLDL CHOLESTEROL in High-Density Lipoprotein (HDL) and Low-Density (LDL)/Very-Low-Density (VLDL) Lipoproteins are strong predictors for coronary heart disease. Simple, direct and automation-ready procedures for measuring HDL and LDL/VLDL concentrations are very desirable. BioAssay Systems' HDL and LDL/VLDL quantification kit is based on our improved PEG precipitation method in which HDL and LDL/VLDL are separated, and cholesterol concentrations are determined using a single Working Reagent. The color intensity of the reaction product at 570nm or fluorescence intensity at em/ex = 585/530nm is directly proportional to total cholesterol concentration in the sample.

PUBLICATIONS

1. Tam, J et al (2010). Peripheral CB1 cannabinoid receptor blockade improves cardiometabolic risk in mouse models of obesity. J Clin Invest. 120(8):2953-66.

2. Tucci, S et al (2010). Medium-chain triglycerides impair lipid metabolism and induce hepatic steatosis in very long-chain acyl-CoA dehydrogenase (VLCAD)-deficient mice. Mol. Gen. Met. 101: 40-47.

3. Oliver SR, et al (2010). Increased oxidative stress and altered substrate metabolism in obese children. Int J Pediatr Obes. 5:436-44.

EnzyChrom™ L-Lactate Assay Kit (ECLC-100)

Colorimetric Determination of L-Lactate at 565 nm LACTATE is generated by lactate dehydrogenase (LDH) under hypoxic or anaerobic conditions. Monitoring lactate levels is, therefore, a good indicator of the balance between tissue oxygen demand and utilization and is useful when studying cellular and animal physiology. BioAssay Systems' lactate assay kit is based on lactate dehydrogenase catalyzed oxidation of lactate, in which the formed NADH is coupled to the formazan (MTT)/phenazine methosulfate (PMS) Reagent. The intensity of the product color, measured at 565 nm, is directly proportionate to the lactate concentration in the sample. This room temperature assay involves adding a single working reagent to the sample, and reading the optical density at time zero and at 20 min. Assay detects as low as 50 µM L-lactate in serum, plasma, and cell media samples.

PUBLICATIONS

1. Toschi, A., et al. (2010). Phospholipase D-mTOR requirement for the Warburg effect in human cancer cells. Cancer Lett 299(1):72-9.

2. Wei, S., et al. (2010). Energy restriction as an antitumor target of thiazolidinediones. J Biol Chem 285(13):9780-91.

3. Zheng, Y., et al. (2009). Anergic T cells are metabolically anergic. J Immunol 183(10):6095-101.

QuantiChrom™ Arginase Assay Kit (DARG-200)

Quantitative Determination of Arginase Activity ARGINASE is present in mammals and plants. In humans, arginase is expressed predominantly in the liver, and to lesser degrees in breast, kidney, testes, salivary glands, and erythrocytes. Arginase catalyzes the conversion of arginine to ornithine and urea, completing the last step in the urea cycle. Arginase activity is a key diagnostic indicator. Increased levels of arginase activity in blood have been associated with liver damage while arginase deficiency is due to an inherited autosomal recessive disease. BioAssay Systems' arginase assay kit provides a sensitive and convenient method for arginase activity determination. The method utilizes a chromogen that forms a colored complex specifically with urea produced in the arginase reaction. The intensity of the color is directly proportional to the arginase activity in the sample.

PUBLICATIONS

1. Weiss JM, et al (2009). Successful immunotherapy with IL-2/anti-CD40 induces the chemokine-mediated mitigation of an immunosuppressive tumor microenvironment. PNAS 106:19455-60.

2. Wang D, et al (2010). Elevated mitochondrial reactive oxygen species generation affects the immune response via hypoxia-inducible factor-1alpha in long-lived Mclk1+/- mouse mutants. J Immunol. 184:582-90.

3. Eruslanov E, et al (2009). Altered expression of 15-hydroxyprostaglandin dehydrogenase in tumor-infiltrated CD11b myeloid cells: a mechanism for immune evasion in cancer. J Immunol. 182:7548-57.

QuantiChrom™ Lipase Assay Kit (DLPS-100)

Colorimetric Determination of Lipase Activity at 412 nm Human pancreatic lipase and its related protein 2 are the main lipases secreted by the pancreas. In acute pancreatitis, lipase levels can rise 5 to 10-fold within 24 to 48 hours. Increased activities have also been associated with pancreatic duct obstruction, pancreatic cancer, kidney disease, salivary gland inflammation, and other pancreatic diseases. Decreased levels may indicate permanent damage to lipase-producing cells in the pancreas. BioAssay Systems' lipase assay is based on an improved dimercaptopropanol tributyrate method, in which SH groups formed from lipase cleavage of dimercaptopropanol tributyrate react with 5,5'-dithiobis (2-nitrobenzoic acid) to form a yellow colored product. The color intensity, measured at 412 nm, is proportionate to the enzyme activity in the sample.

PUBLICATIONS

1. Narbonne, P. Roy, R. (2009). Caenorhabditis elegans dauers need LKB1/AMPK to ration lipid reserves and ensure long-term survival. Nature 457:210-4.

2. Gabbi, C., et al. (2008). Pancreatic exocrine insufficiency in LXRbeta-/- mice is associated with a reduction in aquaporin-1 expression. PNAS 105:15052-7.

3. Qatanani, M., et al. (2009). Macrophage-derived human resistin exacerbates adipose tissue inflammation and insulin resistance in mice. J Clin Invest 119:531-9.

SuperLight™ Luciferase Reporter Gene Assays

Bioluminescent Assay for Luciferase Reporter Expression This bioluminescent reporter gene assay is extremely sensitive and is especially suitable for quantifying luciferase expression in recombinant cells. This ultra-sensitive, homogeneous cell-based assay only requires adding a single reagent to the cells and measuring the light intensity after a short incubation step (2 minutes). Assays can be performed in tubes, cuvettes or multi-well plates. All kit components are compatible with culture media and with all liquid handling systems. With an extended luminescence emission kinetics (half-life 40 min), the SuperLight™ luciferase assays are especially suitable for high-throughput screening in 96-well, 384-well and 1536-well plates. In addition, the reagent provided in the kits has been formulated for maximum sensitivity, reproducibility and long shelf-life. Applications for this kit include gene regulation studies and high-throughput screening of gene modulators.

PUBLICATIONS

1. Zhao, L. and Haslam, D.B. (2005). A quantitative and highly sensitive luciferase-based assay for bacterial toxins that inhibit protein synthesis. J Med Microbiol 54:1023–1030.

2. Saenz JB, et al (2007). Identification and Characterization of Small Molecules That Inhibit Intracellular Toxin Transport. Infection and Immunity 75(9): 4552–4561.

3. Fuller CA, et al (2011). Shiga toxin subtypes display dramatic differences in potency. Infect Immun. 79(3):1329-37.

QuantiChrom™ Nitric Oxide Assay Kit (D2NO-100)

Quantitative Colorimetric Determination of Nitric Oxide NITRIC OXIDE is a reactive radical that plays an important role in many key physiological functions. Nitric oxide, an oxidation product of arginine by nitric oxide synthase, is involved in host defense and development and activation of regulatory proteins. BioAssay Systems' nitric oxide assay kit is designed to accurately measure nitric oxide production following reduction of nitrate to nitrite using an improved Griess reagent. The procedure is simple and the time required for sample pretreatment and assay is reduced to only 40 min. Linear detection range 0.6-200 µM nitric oxide in 96-well plate assay. This improved assay can be used to determine nitric oxide in plasma, serum, urine, tissue and cellular extracts.

PUBLICATIONS

1. Carrero Y, et al (2009). Increased vascular endothelial growth factor expression, CD3-positive cell infiltration, and oxidative stress in premalignant lesions of the cervix. Cancer 115:3680-8.

2. Bolander FF. (2005). The compartmentalization of prolactin signaling in the mouse mammary gland. Mol Cell Endocrinol. 245:105-10.

3. Zeng Q, et al (2011). Control of Cervicovaginal HPV-16 E7-Expressing Tumors by the Combination of Therapeutic HPV Vaccination and Vascular Disrupting Agents. Hum Gene Ther. 22:809-19.

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