



**ARBOR ASSAYS**  
Interactive Assay Solutions™

# **METABOLISM ASSAY KITS**

**WEB INSERT 181026**

**MULTI SPECIES**

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**ORDERING**

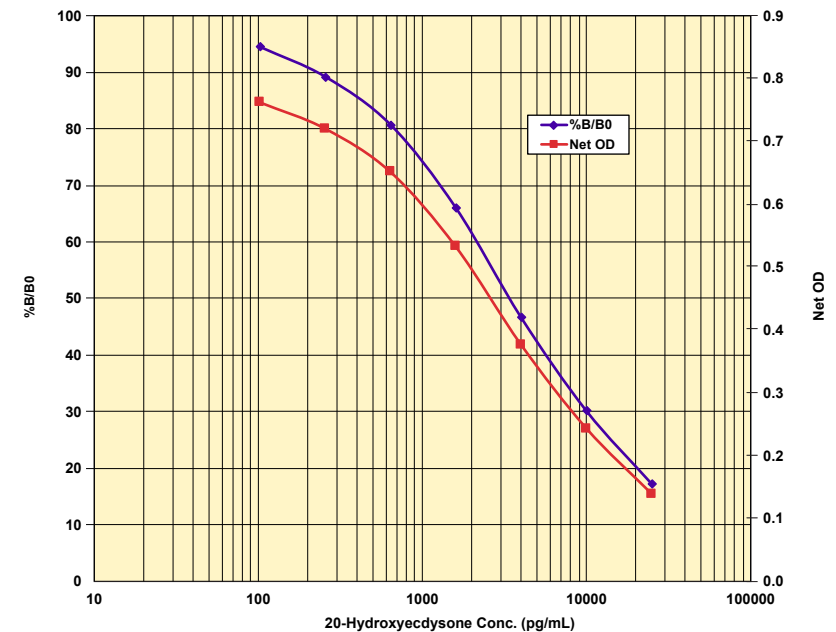
- Online:** [www.ArborAssays.com/order-form](http://www.ArborAssays.com/order-form)
- Phone:** Call 734-677-1774 or Toll Free: 855-677-1774. Monday-Friday 8:30 am to 5:30 pm, EST.
- Fax:** Send faxes to 734-677-6860.
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- Distributors:** Check our website at [www.ArborAssays.com/distributors](http://www.ArborAssays.com/distributors) for a list of distributors.

**FEATURES**

- ▶ Use: Measure 20-Hydroxyecdysone in Arthropods and Plants
- ▶ Sample: Tissue Extracts
- ▶ Samples/Kit: 39 or 231 in Duplicate
- ▶ Stability: Liquid 4°C Stable Reagents

**SCIENTIFIC RELEVANCE**

The first insect molting hormone was isolated from silkworm pupae and determined to be a steroid, so named ecdysone, in 1954. Later, 20-hydroxyecdysone was identified in crayfish and recognized as a derivative of ecdysone. These molecules and related forms are a family of steroid hormones that regulate metamorphosis, cell death, reproduction in arthropods, and are widely distributed in plant species (phytoecdysteroids). Of the many ecdysteroids, 20-hydroxyecdysone is the most functionally active and widely distributed in arthropods. To accommodate growth during all immature stages of insects and other arthropods, 20-hydroxyecdysone levels change and activate signaling through an ecdysone receptor that results in the synthesis of a new exoskeleton and ecdysis of the old cuticle. In female mosquitoes and flies, 20-hydroxyecdysone regulates egg development. In plants, 20-hydroxyecdysone facilitates the defense mechanisms against insects. Recent studies of vertebrate animals have discovered the ability of 20-hydroxyecdysone to increase osteogenesis and bone mass by reducing cartilage degradation and increasing protein synthesis in humans. There is also medical research and marketing interest in the use of 20-hydroxyecdysone as a bodybuilding supplement to increase muscle mass.



## Corticosterone EIA & CLIA Kits

## Cortisol EIA Kits

EIA Catalog No: K014-H1 (1 Plate) K014-H5 (5 Plate)  
 CLIA Catalog No: K014-C1 (1 Plate) K014-C5 (5 Plate)

Catalog No: K003-H1 (1 Plate) K003-H5 (5 Plate) Strip Plates  
 Catalog No: K003-H1W (1 Plate) K003-H5W (5 Plate) Whole Plates

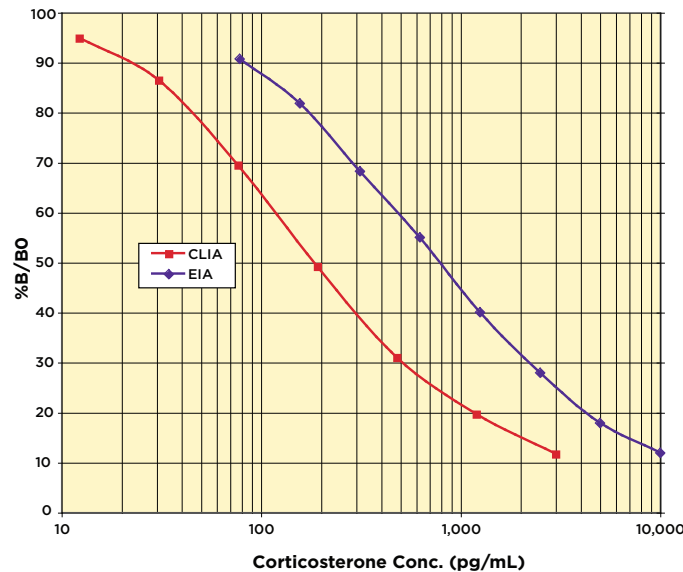
### FEATURES

- ▶ Use Stress Marker in as Little as **1 µL** Serum or Plasma
- ▶ Sample Serum, Plasma, Hair, Feathers, Urine, Fecal, Respiratory Vapor, and TCM
- ▶ Validation Mice, Rats, Humans, Monkeys, Birds, Cats, Ungulates
- ▶ Time to Answer 1.5 Hours (EIA) or 2 Hours (CLIA)
- ▶ Format 96-Well, Break-Apart Strip
- ▶ Species Species Independent
- ▶ Samples/Kit 38/230 (EIA) or 39/231 (CLIA) in Duplicate
- ▶ Stability Liquid 4°C Stable Reagents
- ▶ Readout EIA: 450 nm CLIA: Glow Luminescent



### SCIENTIFIC RELEVANCE

Corticosterone (Kendall's Compound 'B') is a glucocorticoid secreted by the cortex of the adrenal gland. It is produced in response to stimulation of the adrenal cortex by ACTH and is the precursor of aldosterone. Corticosterone is a major indicator of stress and is the major stress steroid produced in non-human mammals. Studies involving corticosterone and levels of stress include impairment of long term memory retrieval, chronic corticosterone elevation due to dietary restrictions and in response to burn injuries. In addition to stress levels, corticosterone is believed to play a decisive role in sleep-wake patterns.



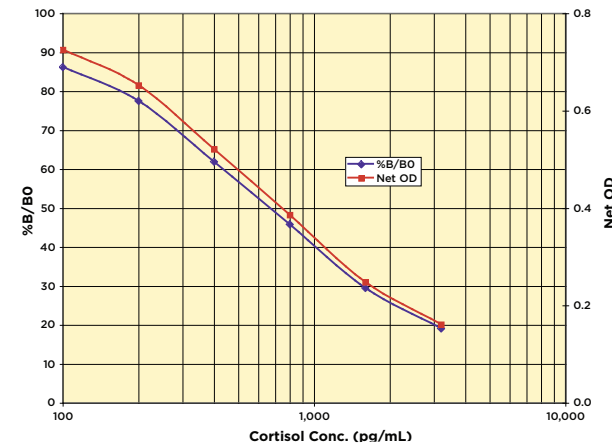
### FEATURES

- ▶ Use Stress Marker in as Little as **1 µL** Serum or Plasma
- ▶ Sample Serum, Plasma, Saliva, Hair, Urine, Fecal, and Respiratory Vapor
- ▶ Validation Humans, Primates, Ungulates, Monkeys
- ▶ Time to Answer 1.5 Hours
- ▶ Format 96-Well, Break-Apart Strip or Whole Plates
- ▶ Species Species Independent
- ▶ Samples/Kit 39 or 231 in Duplicate
- ▶ Stability Liquid 4°C Stable Reagents
- ▶ Readout Colorimetric, 450 nm



### SCIENTIFIC RELEVANCE

Cortisol (hydrocortisone, Kendall's Compound 'F') is the primary glucocorticoid produced and secreted by the adrenal cortex. It is often referred to as the "stress hormone" as it affects blood pressure, blood sugar levels, and other actions of stress adaptation. Immunologically, cortisol functions as an important anti-inflammatory and plays a role in hypersensitivity, immunosuppression, and disease resistance. In the metabolic aspect, cortisol promotes gluconeogenesis, liver glycogen deposition, and the reduction of glucose utilization. Production of cortisol follows an ACTH-dependent circadian rhythm, with a peak level in the morning and decreasing levels throughout the day. All but 4% of serum cortisol is bound to proteins including corticosteroid binding globulin and serum albumin. Abnormal cortisol levels are being evaluated for correlation with a variety of different conditions, such as prostate cancer, depression, schizophrenia, Cushing's Syndrome, and Addison's Disease.



## Cortisone EIA & CLIA Kits

EIA Catalog No: K014-H1 (1 Plate) K014-H5 (5 Plate)  
 CLIA Catalog No: K014-C1 (1 Plate) K014-C5 (5 Plate)

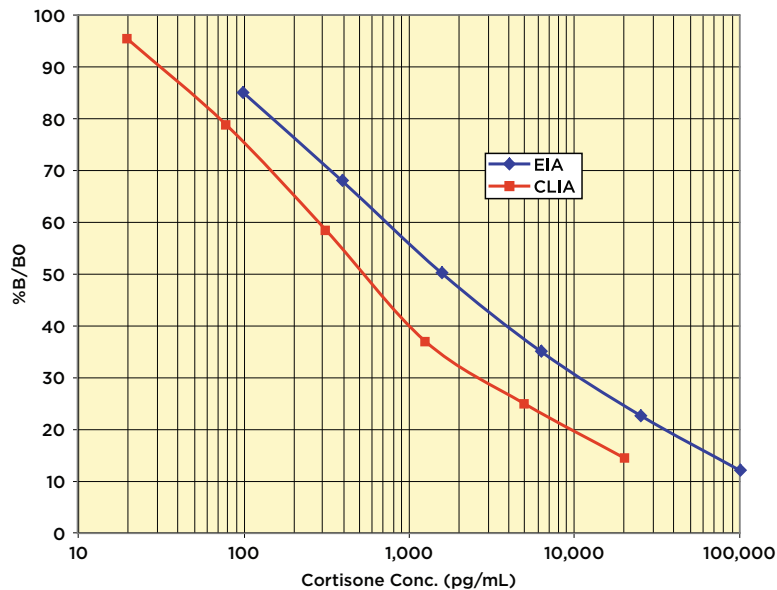
### FEATURES

- ▶ Use Stress Marker in as Little as **1 µL** Serum or Plasma
- ▶ Sample Serum, Plasma, Hair, Feathers, Urine, Saliva, Fecal Extracts
- ▶ Validation Mice, Rats, Humans, Monkeys, Birds, Felids, Ungulates
- ▶ Time to Answer 2.5 Hours (EIA) or 2 Hours (CLIA)
- ▶ Species Species Independent
- ▶ Samples/Kit 40/232 in Duplicate
- ▶ Stability Liquid 4°C Stable Reagents
- ▶ Readout EIA: 450 nm CLIA: Glow Luminescent



### SCIENTIFIC RELEVANCE

Cortisone (C<sub>21</sub>H<sub>28</sub>O<sub>5</sub>, Kendall's Compound 'E') was identified by extraction from bovine suprarenal gland tissue. Cortisol and cortisone concentrations vary due to the activity of two 11β-hydroxysteroid dehydrogenases (11β-HSD). 11β-HSD1 is found primarily in the liver where it converts cortisone to cortisol while 11β-HSD2 is found in tissues such as the kidney where cortisol receptor binding is required. This glucocorticoid "shuttle" helps to initiate and regulate the anti-inflammatory response.



## Creatinine Serum Detection Kits

Catalog No: KB02-H1 (2 Plate) KB02-H5 (4 Plate)  
 Low Sample Volume Catalog No: KB02-H1D (384-well)

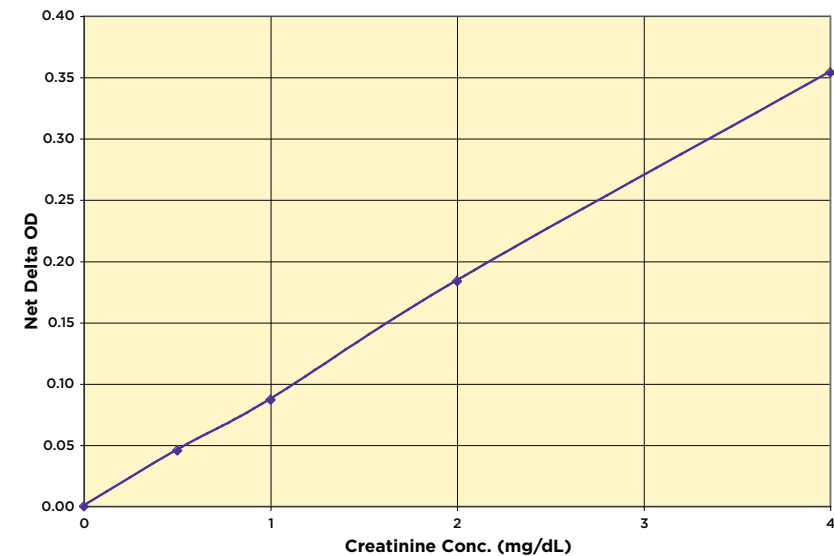
### FEATURES

- ▶ Use Kidney Damage
- ▶ Sample Serum and Plasma
- ▶ Samples/Kit 91 or 187 in Duplicate
- ▶ Calibrated N-Cal Kit, NIST-Calibrated
- ▶ Stability Liquid 4°C Stable Reagents



### SCIENTIFIC RELEVANCE

Creatinine (2-amino-1-methyl-5H-imidazol-4-one) is a metabolite of phosphocreatine (p-creatine), a molecule used as a store for high-energy phosphate that can be utilized by tissues for the production of ATP. Creatine either comes from the diet or synthesized from the amino acids arginine, glycine, and methionine. This occurs in the kidneys and liver, although other organ systems may be involved and species-specific differences may exist. Creatine and p-creatine are converted non-enzymatically to the metabolite creatinine, which diffuses into the blood and is excreted by the kidneys. In vivo, this conversion appears to be irreversible and in vitro it is favored by higher temperatures and lower pH. Creatinine forms spontaneously from p-creatine. Under normal conditions, its formation occurs at a rate that is relatively constant and as intra-individual variation is <15% from day to day, creatinine is a useful tool for normalizing the levels of other molecules found in urine. Additionally altered creatinine levels may be associated with other conditions that result in decreased renal blood flow such as diabetes and cardiovascular disease.



## Cyclic AMP (cAMP) EIA & CLIA Kits

EIA Catalog No: K019-H1 (1 Plate) K019-H5 (5 Plate)  
 CLIA Catalog No: K019-C1 (1 Plate) K019-C5 (5 Plate)

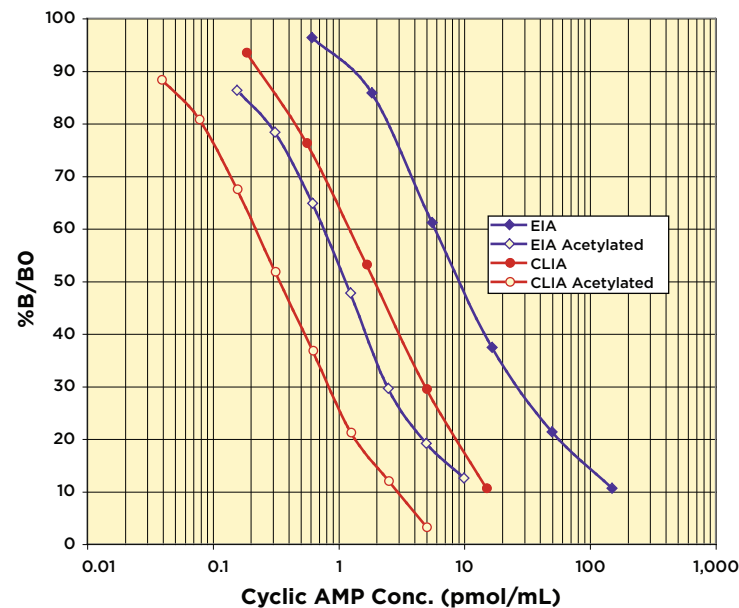
### FEATURES

- ▶ Use Measure cAMP DIRECTLY
- ▶ Sample Cells, Saliva, Urine, Plasma and Tissue
- ▶ Convenient Lyse, Stabilize and Measure in One Step
- ▶ Sensitivity 4.2 fmol (EIA) or 0.75 fmol (CLIA) per well
- ▶ Samples/Kit 39/231 (EIA) or 38/230 (CLIA) in Duplicate
- ▶ Time to Answer Results in 2.5 Hours (EIA) or 2 Hours (CLIA)
- ▶ Readout EIA: 450 nm CLIA: Glow Luminescent



### SCIENTIFIC RELEVANCE

Adenosine-3', 5'-cyclic monophosphate, or cyclic AMP (cAMP), is one of the most important second messengers and a key intracellular regulator. It was discovered by Sutherland and Rall in 1957. Cyclic AMP functions as a mediator of activity for a number of hormones, including epinephrine, glucagon, and ACTH. Adenylate cyclase is activated by the hormones glucagon and adrenaline, and by G protein. Liver adenylate cyclase responds more strongly to glucagon, and muscle adenylate cyclase responds more strongly to adrenaline. cAMP decomposition into AMP is catalyzed by the enzyme phosphodiesterase. In the Human Metabolome Database there are 166 metabolic enzymes listed that convert cAMP.



**NEW!**

## 2',3'-Cyclic GAMP (cGAMP) EIA Kits

Catalog No: K067-H1 (1 Plate) K067-H5 (5 Plate)

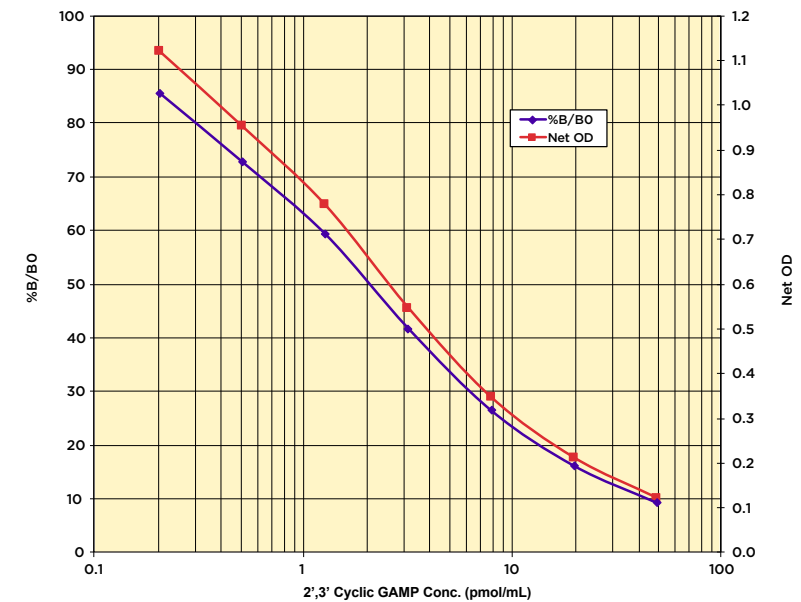
**MOST SENSITIVE**

### FEATURES

- ▶ Use Measure 2',3'-cGAMP in tissues and cells
- ▶ Sample Cell Lysates, Tissue Extracts, TCM
- ▶ Convenient Lyse, Stabilize and Measure in One Step
- ▶ Sensitivity 0.08 pmol/mL, 4 fmol/well
- ▶ Samples/Kit 39 or 231 in Duplicate
- ▶ Stability Liquid 4°C Stable Reagents

### SCIENTIFIC RELEVANCE

2',3'-Cyclic guanosine monophosphate-adenosine monophosphate (cyclic GMP-AMP, cGAMP, cyclic [G(2',5')pA(3',5')p]) was the first cyclic di-nucleotide found in metazoa. 2',3'-cGAMP is also referred to as "noncanonical" cGAMP due to the presence of the atypical 2'-5' phosphodiester linkage between the guanosine and the adenosine. 2',3'-Cyclic GAMP is a novel second messenger in innate immunity that regulates type I interferon (IFN) production. Produced in mammalian cells by cGAS (cGAMP synthase) in response to double-stranded DNA in the cytoplasm binding to cGAS, cGAMP binds to the stimulator of interferon genes (STING). Subsequently STING induces the TBK1-IRF3-dependent production of IFN-β. This cGAS-cGAMP-STING pathway has been shown to play a critical role in pathogen detection and physiological conditions such as metabolic dysregulation, autoimmunity, and cancer.



## Cyclic GMP (cGMP) EIA & CLIA Kits

EIA Catalog No: K020-H1 (1 Plate) K020-H5 (5 Plate)  
 CLIA Catalog No: K020-C1 (1 Plate) K020-C5 (5 Plate)

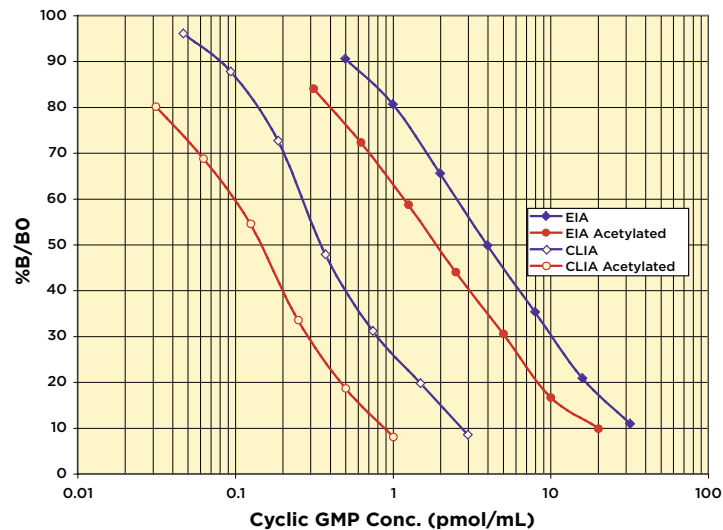
### FEATURES

- ▶ Use Measure cGMP DIRECTLY
- ▶ Sample Lysates, Urine, Plasma, Saliva and Tissue
- ▶ Convenient Lyse, Stabilize and Measure in One Step
- ▶ Sensitivity 0.188 pmol/mL (EIA, Acetylated) or 0.023 pmol/mL cGMP (CLIA, Acetylated)
- ▶ Samples/Kit 39 or 231 in Duplicate
- ▶ Time to Answer Results in 2.5 Hours (EIA) or Overnight (CLIA)
- ▶ Readout EIA: 450 nm CLIA: Glow Luminescent



### SCIENTIFIC RELEVANCE

Guanosine 3', 5'-cyclic monophosphate (cyclic GMP; cGMP) is a critical and multifunctional second messenger present at levels typically 10-100 fold lower than cAMP in most tissues. Intracellular cGMP is formed by the action of the enzyme guanylate cyclase (GC) on GTP and degraded through phosphodiesterase hydrolysis. Guanylate cyclases are either soluble or membrane bound. Soluble GCs are nitric oxide responsive, whereas membrane bound GCs respond to hormones such as acetylcholine, insulin and oxytocin. Other chemicals like serotonin and histamine also cause an increase in cGMP levels. Cyclic GMP regulates cellular composition through cGMP-dependent kinase, cGMP-dependent ion channels or transporters, and through its hydrolytic degradation by phosphodiesterase.



## NEW!

## Cyclic GMP (cGMP) EIA Kits - Improved

EIA Catalog No: K065-H1 (1 Plate) K065-H5 (5 Plate)

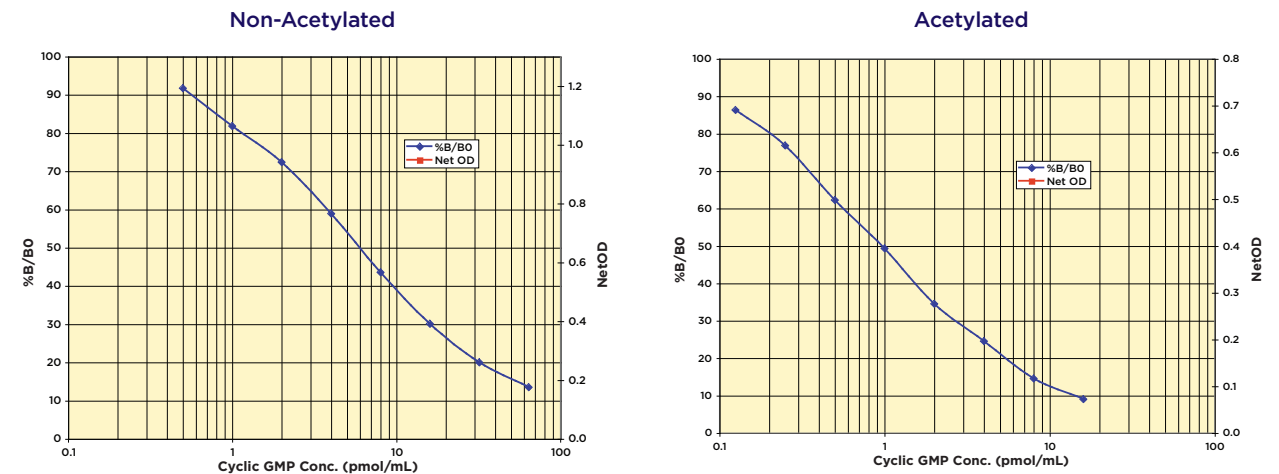
### FEATURES

- ▶ Use Measure cGMP DIRECTLY
- ▶ Sample Cell and Tissue Lysates, Urine, Plasma, Saliva, and TCM
- ▶ Convenient Lyse, Stabilize and Measure in One Step
- ▶ Sensitivity 0.091 pmol/mL, 4.55 fmol/well
- ▶ Samples/Kit 38 or 230 in Duplicate
- ▶ Time to Answer Results in 2.5 Hours
- ▶ Readout Colorimetric, 450 nm
- ▶ Comparison Improved Sensitivity and Enhanced Signal over K020-H



### SCIENTIFIC RELEVANCE

Guanosine 3', 5'-cyclic monophosphate (cyclic GMP; cGMP) is a critical and multifunctional second messenger present at levels typically 10-100 fold lower than cAMP in most tissues. Intracellular cGMP is formed by the action of the enzyme guanylate cyclase (GC) on GTP and degraded through phosphodiesterase hydrolysis. Guanylate cyclases are either soluble or membrane bound. Soluble GCs are nitric oxide responsive, whereas membrane bound GCs respond to hormones such as acetylcholine, insulin and oxytocin. Other chemicals like serotonin and histamine also cause an increase in cGMP levels. Cyclic GMP regulates cellular composition through cGMP-dependent kinase, cGMP-dependent ion channels or transporters, and through its hydrolytic degradation by phosphodiesterase.



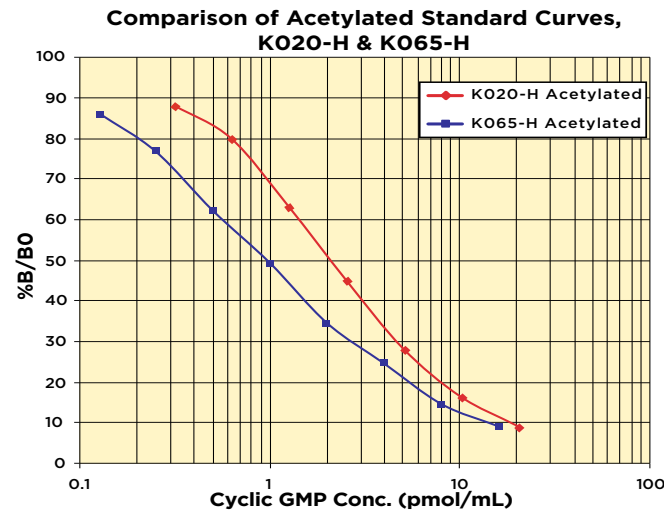
## Comparison of cGMP EIA Kits (K065-H vs. K020-H)

## Dehydroepiandrosterone sulfate (DHEA-S) EIA Kits

Catalog No: K054-H1 (1 Plate) K054-H5 (5 Plate)

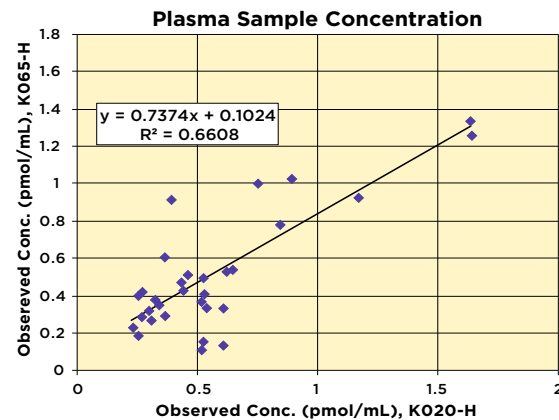
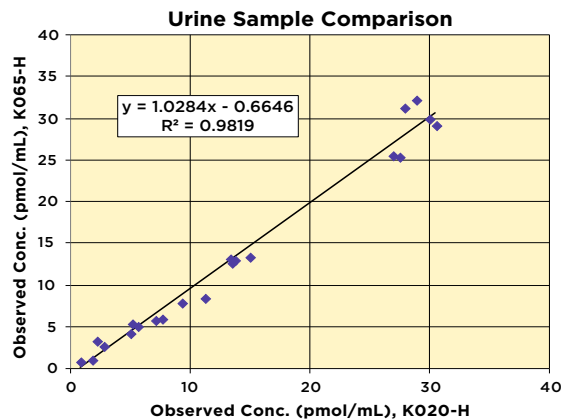
### ADDITIONAL INFORMATION

Cyclic GMP levels in most systems are an order of magnitude lower than those found for cyclic AMP and in our constant effort to deliver the easiest, most reliable and sensitive assays we have developed a new cGMP antibody to give you enhanced sensitivity. Our new Cyclic GMP EIA Kits (K065-H) are 2-fold more sensitive than our current cGMP assay (K020-H).



The improvement in sensitivity is shown by the Limits of Detection and calculated Sensitivity for the 2 assays, with K065-H being half that of K020-H.

Urine dilutions were run in the nonacetylated format of K065-H and K020-H, side by side, and measured cGMP concentrations were similar. Plasma dilutions were run in the acetylated format for each kit with only a slightly larger difference seen between the measured concentrations.



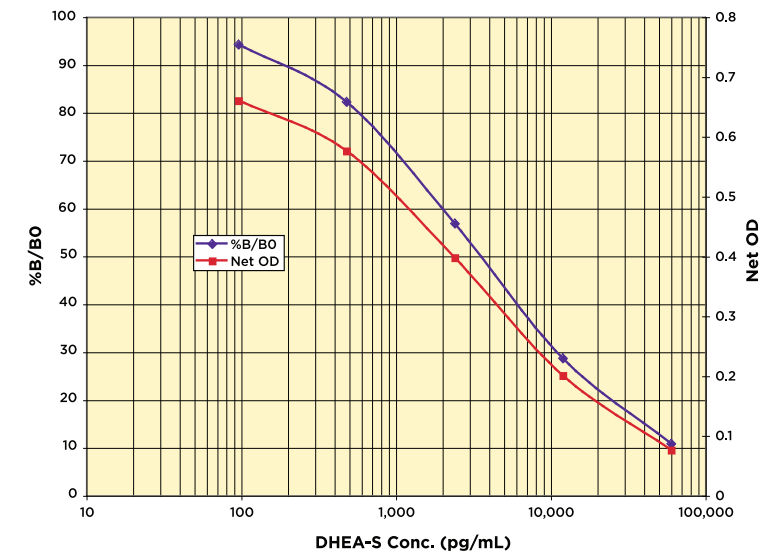
### FEATURES

- ▶ Use: Estrogen Deficiency
- ▶ Sample: Serum, Plasma, Saliva, Urine, Media, and Fecal Extracts
- ▶ Validation: Human, Monkey, Felids, Ungulates
- ▶ Time to Answer: 2.5 Hours
- ▶ Format: 96-Well, Break-Apart Strip
- ▶ Species: Species Independent
- ▶ Samples/Kit: 41 or 233 in Duplicate
- ▶ Stability: Liquid 4°C Stable Reagents
- ▶ Readout: Colorimetric, 450 nm



### SCIENTIFIC RELEVANCE

Dehydroepiandrosterone sulfate (DHEA-S) is the major C19 steroid secreted by the adrenal cortex, and is a precursor to testosterone and estrogen biosynthesis. It is produced by the addition of a sulfate group to dehydroepiandrosterone (DHEA), catalyzed by the sulfotransferase enzymes, SULT1A1 and SULT1E1, which also produce estrone sulfate from estrone. Due to the 17-ketone group rather than hydroxyl group, DHEA-S has relatively low androgenic activity. The bioactivity of DHEA-S may be high due to its serum concentrations at 100-1,000 -fold higher than testosterone or DHEA and its weak affinity for sex-hormone binding globulin.



## Galactose Colorimetric Detection Kit

Catalog No: K042-H1 (2 Plate)

### FEATURES

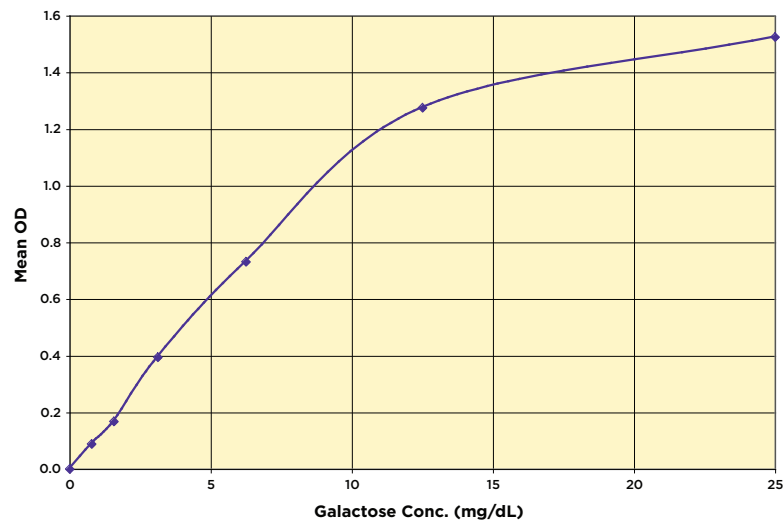
- ▶ Use Measurement of Galactose
- ▶ Sample Serum, Plasma, Buffers, Media
- ▶ Time to Answer 30 Minutes
- ▶ Samples/Kit 88 in Duplicate
- ▶ Stability Liquid 4°C Stable Reagents



### SCIENTIFIC RELEVANCE

Galactose is a hexose sugar that differs from glucose only by the configuration of the hydroxyl group at the carbon-4 position. Present as an anomeric mixture of  $\alpha$ -D-galactose and  $\beta$ -D-galactose, this monosaccharide exists abundantly in milk, dairy products and many other food types such as fruits and vegetables.

Absorption of galactose in humans is mediated by the  $\text{Na}^+$ /glucose co-transporters SGLT1 and SGLT2 from food across the brush border membrane of the proximal jejunum and renal epithelium. Additionally, adults can produce up to 2 grams of galactose per day. Inside cells,  $\beta$ -D-galactose is epimerized to  $\alpha$ -D-galactose and is subsequently converted to galactose-1-phosphate (Gal-1-P). In the presence of galactose-1-phosphate uridylyltransferase, Gal-1-P reacts with UDP-glucose to form UDP-galactose and glucose-1-phosphate. Glucose-1-phosphate produced can enter the glycolytic pathway or react with UTP in the presence of UDP-glucose pyrophosphorylase to form a new molecule of UDP-glucose. This enzyme pathway comprises the evolutionarily conserved Leloir pathway of galactose metabolism. If the flow of galactose through the Leloir pathway is perturbed either due to congenital deficiency of any of the above-mentioned enzymes or an overwhelming presence of this hexose, toxicity syndromes (galactosemia) will be observed.



## Glucose Colorimetric & Fluorescent Detection Kits

Colorimetric  
Fluorescent

Catalog No: K039-C1 (2 Plate)  
Catalog No: K039-F1 (2 Plate)

### FEATURES

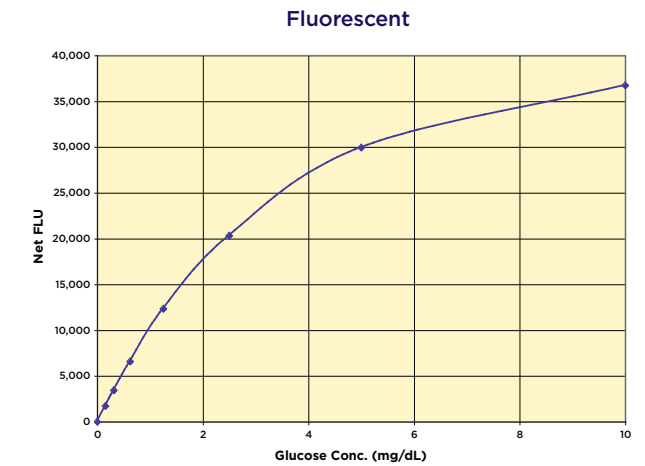
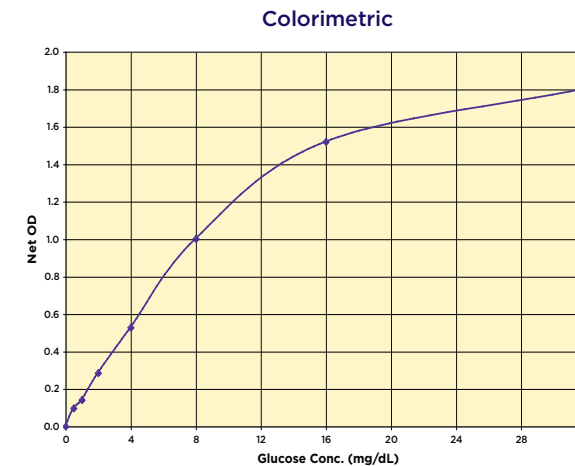
- ▶ Use Measurement of Glucose
- ▶ Sample Serum, Plasma, Urine, Buffers, TCM
- ▶ Time to Answer 30 Minutes
- ▶ Samples/Kit 88 in Duplicate
- ▶ Stability Liquid 4°C Stable Reagents
- ▶ Detection Colorimetric: 560nm      Fluorescent: 590 nm



### SCIENTIFIC RELEVANCE

Glucose is by far the most common carbohydrate energy source for the cell. It is a monosaccharide, an aldose, a hexose, and a reducing sugar, and is also known as dextrose because it is dextrorotatory (rotates polarized light clockwise). For all biological and molecular events and for multiple cellular functions, energy is essential. Reduced energy levels threaten cellular homeostasis and integrity. Impaired energy metabolism may trigger pro-apoptotic signaling (programmed cell death), oxidative damage, or excitotoxicity and impede mitochondrial DNA repair.

A serious fall in blood glucose can be characterized by metabolic dysfunction, neuroglycopenia, seizure, and death. A persistent elevation in blood glucose leads to "glucose toxicity." Glucose toxicity contributes to  $\beta$ -cell dysfunction and the pathology grouped together as complications of diabetes. Estrogen-induced signaling pathways in hippocampal and cortical neurons involve the mitochondria to enhance mitochondrial function and to sustain aerobic glycolysis and citric acid cycle oxidative phosphorylation and ATP generation.





## Glutathione (GSH) Colorimetric Detection Kit

Catalog No: K006-H1 (4 Plate) K006-H1C-H/L (200 Cuvette)

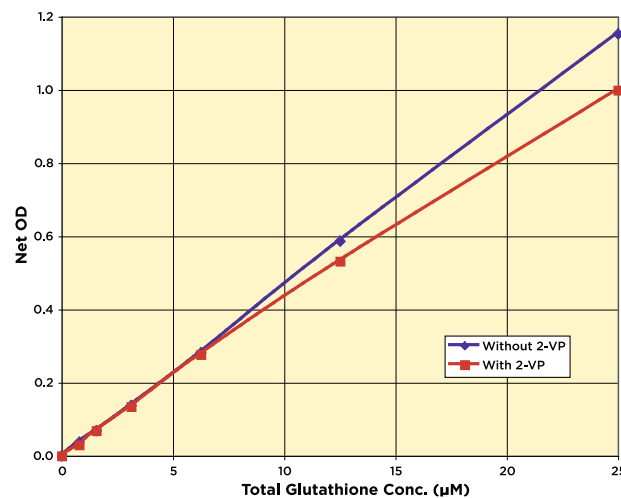
### FEATURES

- ▶ Use Measure GSH/GSSG to Determine Oxidative Stress
- ▶ Samples Whole Blood, Serum, Plasma, Erythrocytes, Urine, Lysates, TCM
- ▶ Sensitivity 0.634 μM (plate)
- ▶ Format 96-well or Cuvette
- ▶ Species Species Independent
- ▶ Samples/Kit 89 (Total and GSSG) in Duplicate
- ▶ Stability Liquid 4°C Stable Reagents
- ▶ Readout Colorimetric, 405 nm



### SCIENTIFIC RELEVANCE

Glutathione (L-γ-glutamyl-L-cysteinylglycine; GSH) is the highest concentration non-protein thiol in mammalian cells and is present in concentrations of 0.5 - 10 mM. GSH is a tripeptide that contains an unusual peptide linkage between the amine group of cysteine and the carboxyl group of the glutamate side-chain. It is an antioxidant, preventing damage to important cellular components caused by reactive oxygen species such as free radicals and peroxides. Glutathione reduces disulfide bonds formed within cytoplasmic proteins to cysteines by serving as an electron donor. In the process, glutathione is converted to its oxidized form, glutathione disulfide (GSSG). Glutathione is found mostly in its reduced form, since the enzyme that reverts it from its oxidized form, glutathione reductase, is constitutive and inducible upon oxidative stress. The ratio of reduced glutathione to oxidized glutathione within cells is often used as a measure of cellular toxicity.



## Glutathione (GSH) Fluorescent Detection Kits

96 Well: Catalog No: K006-F1 (1 Plate)  
 384 Well: Catalog No: K006-F1D (2 Plate)

K006-F5 (5 Plate)

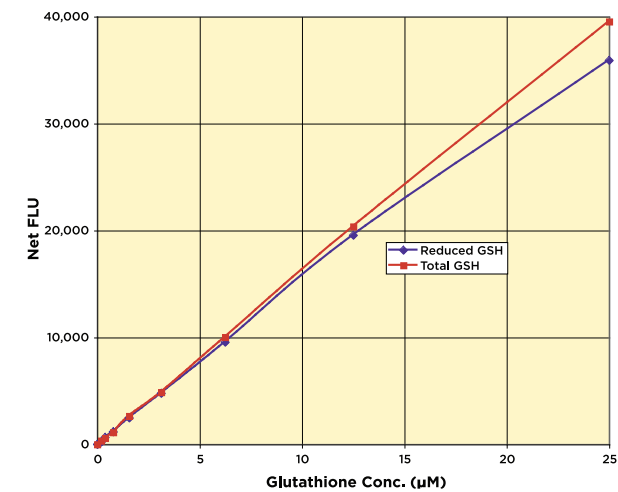
### FEATURES

- ▶ Use Measure GSH/GSSG in the Same Sample Well
- ▶ Sample Whole Blood, Serum, Plasma, Erythrocytes, Urine, Lysates, TCM
- ▶ Species Species Independent
- ▶ Sensitivity 45 nM Free GSH, 48 nM Total GSH
- ▶ Samples/Kit 96-well kits: 39 or 231 in Duplicate  
384-well kit: 183 in Duplicate
- ▶ Stability Liquid 4°C Stable Reagents
- ▶ Readout Fluorescent, 510 nm



### SCIENTIFIC RELEVANCE

Glutathione (L-γ-glutamyl-L-cysteinylglycine; GSH) is the highest concentration non-protein thiol in mammalian cells and is present in concentrations of 0.5 - 10 mM. GSH is a tripeptide that contains an unusual peptide linkage between the amine group of cysteine and the carboxyl group of the glutamate side-chain. It is an antioxidant, preventing damage to important cellular components caused by reactive oxygen species such as free radicals and peroxides. Glutathione reduces disulfide bonds formed within cytoplasmic proteins to cysteines by serving as an electron donor. In the process, glutathione is converted to its oxidized form, glutathione disulfide (GSSG). Glutathione is found mostly in its reduced form, since the enzyme that reverts it from its oxidized form, glutathione reductase, is constitutive and inducible upon oxidative stress. The ratio of reduced glutathione to oxidized glutathione within cells is often used as a measure of cellular toxicity.



## Insulin Human EIA Kit

Catalog No: K046-H1 (1 Plate)

### FEATURES

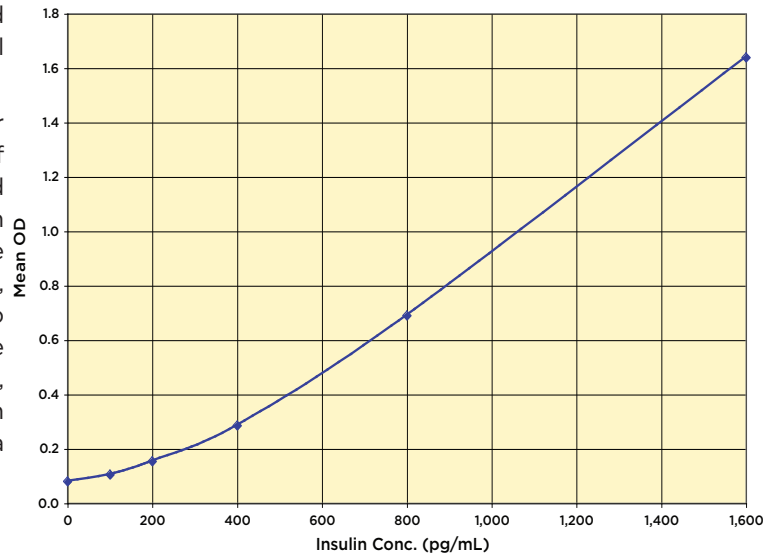
- ▶ Sensitivity Measure Human Insulin
- ▶ Sample Serum, Plasma, TCM
- ▶ Samples/Kit 42 in Duplicate
- ▶ Range 1,600 to 100 pg/mL
- ▶ Calibrated WHO 1st International Standard 1975 (66/304)
- ▶ Time to Answer 2 Hours



### SCIENTIFIC RELEVANCE

The human insulin protein is a 51 amino acid anabolic peptide-hormone that is secreted by the pancreatic β-cells in the Islets of Langerhans. Insulin consists of two chains (A and B) connected by disulfide bonds. One of its primary functions is the stimulation of glucose uptake from the systemic circulation, as well as the suppression of hepatic gluconeogenesis, thereby serving a major role in glucose homeostasis and preventing the metabolic disorder diabetes mellitus. The work of Banting, Best, Collip and MacLeod in the early 1920's resulted in the identification of a substance in extracts of pancreas that had the remarkable ability to reduce blood glucose levels in diabetic animals and by 1923 these pancreas extracts were being used to successfully treat diabetic patients. Insulin exists primarily as a monomer at low concentrations ( $\sim 10^{-6}$  M) and forms dimers at higher concentrations at neutral pH. At high concentrations and in the presence of zinc ions insulin aggregates further to form hexameric complexes. Preproinsulin, the first translational product from the insulin gene, is a 110 amino acid polypeptide with a 24 amino acid signal peptide.

The major function of insulin is to counter the concerted actions of a number of hyperglycemia-generating hormones and to maintain low blood glucose levels. In addition to its role in regulating glucose metabolism, insulin stimulates lipogenesis, diminishes lipolysis, and increases amino acid transport into cells. Because there are numerous hyperglycemic hormones, untreated disorders associated with insulin generally lead to severe hyperglycemia and shortened life span.



## P450 Demethylating Fluorescent Activity Kit

Catalog No: K011-F1

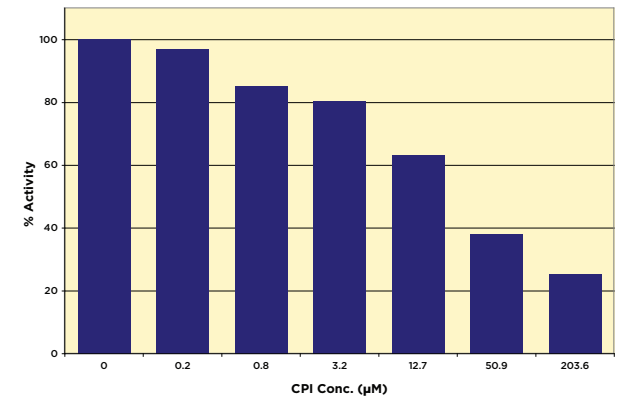
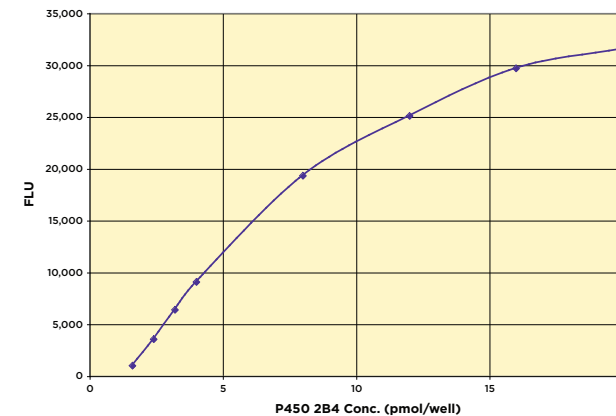
### FEATURES

- ▶ Use P450 Activity, Drug Metabolism
- ▶ Sample P450 Demethylating Systems, Native or Recombinant
- ▶ Samples/Kit 89 in Duplicate
- ▶ Time to Answer 30 Minutes
- ▶ Readout Fluorescent, 510 nm

### SCIENTIFIC RELEVANCE

The cytochrome P450s (P450s) are a superfamily of heme containing enzymes that display tremendous diversity with regard to substrate specificity and catalytic activity. Usually they form part of multicomponent electron transfer reactions. The P450s play a crucial role in the development of new drug entities as drug interactions commonly inhibit cytochrome P450 activities.

The DetectX® P450 Fluorescent Activity kit allows activity measurement of any demethylating P450 system WITHOUT any additions to the the P450:Substrate reaction. This assay measures the formaldehyde generated by demethylation and the signal is read AFTER the P450 reaction has been terminated. Convenient plate assay with 30 minute fluorescent substrate incubation and detection readout at 510 nm. Tested in 3A4, 2D6 and 2B4 P450 systems with erythromycin, dextromethorphan or benzphetamine.



# Retinol Binding Protein Multi-Format EIA Kits

# Testosterone EIA Kits

Catalog No: K062-H1 (1 Plate) K062-H5 (5 Plate)

Catalog No: K032-H1 (1 Plate) K032-H5 (5 Plate)

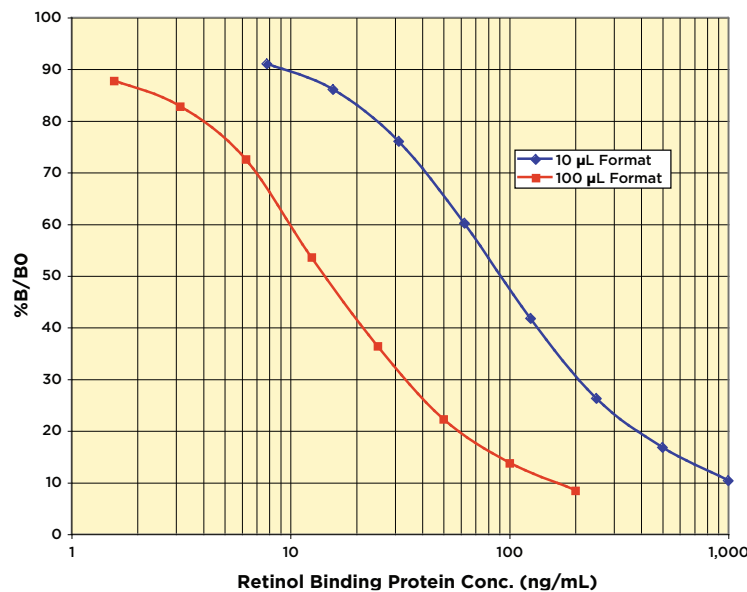
## FEATURES

- ▶ Use Measure a Broad Range of RBP Concentrations
- ▶ Dual Range 7.81-1000 ng/mL or 1.56-200 ng/mL
- ▶ Sample Type Serum, Plasma, Urine, Dried Blood Spots
- ▶ Samples/Kit 38 or 230 in Duplicate
- ▶ Species Species Independent
- ▶ Time to Answer 90 Minutes
- ▶ Readout Colorimetric, 450 nm



## SCIENTIFIC RELEVANCE

Retinol binding protein (RBP) is from a family of structurally related proteins that bind small hydrophobic molecules such as bile pigments, steroids, odorants, etc. RBP is a 21 kDa highly conserved, single-chain glycoprotein, consisting of 182 amino acids with 3 disulfide bonds and a hydrophobic pocket which binds retinol (vitamin A). RBP is totally filtered by the glomeruli and reabsorbed by proximal tubules. Urinary RBP is used to study renal function in heart or kidney transplant recipients, type 1 and 2 diabetics, and in people exposed to uranium from mining operations. RBP may also be used to monitor Vitamin A deficiency.



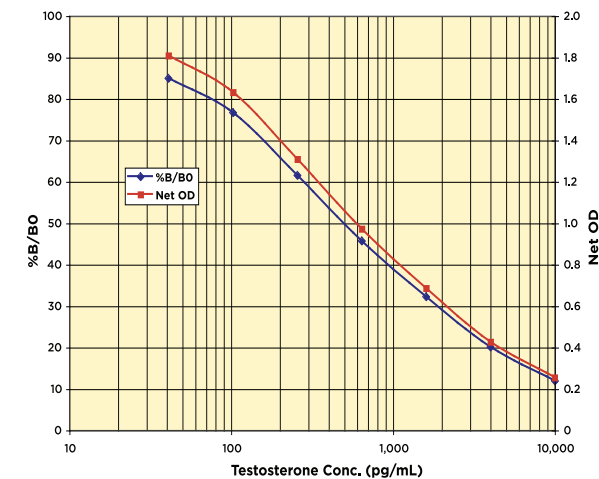
## FEATURES

- ▶ Use Inborn Errors of Sex Steroid Metabolism
- ▶ Sample Urine, Media, and Extracted Serum, Plasma, and Fecal
- ▶ Validation Multiple Species
- ▶ Time to Answer 2.5 Hours
- ▶ Format 96-Well, Break-Apart Strip
- ▶ Species Species Independent
- ▶ Samples/Kit 39 or 231 in Duplicate
- ▶ Stability Liquid 4°C Stable Reagents
- ▶ Readout Colorimetric, 450 nm



## SCIENTIFIC RELEVANCE

Testosterone (4-Androsten-17β-ol-3-one) is an anabolic steroid hormone from the androgen group and is found in mammals, reptiles, birds, and other vertebrates. In mammals, testosterone is primarily secreted in the testes of males and the ovaries of females, although small amounts are also secreted by the adrenal glands. It is the principal male sex hormone and plays key roles in the development of reproductive tissues such as the testis and prostate, and in promoting secondary sexual characteristics such as increased muscle, bone mass, and body hair. In addition, testosterone is essential for health and well-being as well as the prevention of osteoporosis. Testosterone plays a significant role in glucose homeostasis and lipid metabolism. Cross-sectional epidemiological studies have reported a direct correlation between plasma testosterone and insulin sensitivity. Low testosterone levels are associated with an increased risk of type 2 diabetes, dramatically illustrated by androgen deprivation in men with prostate carcinoma.



## Thyroxine (T<sub>4</sub>) EIA Kits

Catalog No: K050-H1 (1 Plate) K050-H5 (5 Plate)

### FEATURES

- ▶ Use Non-invasive Measurement of T<sub>4</sub>
- ▶ Sample Dried Fecal Extracts, Serum, Plasma, Urine, and Media
- ▶ Species Species Independent
- ▶ Range 20-0.63 ng/mL or 2000-63 pg/mL
- ▶ Time to Answer 90 Minutes
- ▶ Samples/Kit 40 or 232 in Duplicate

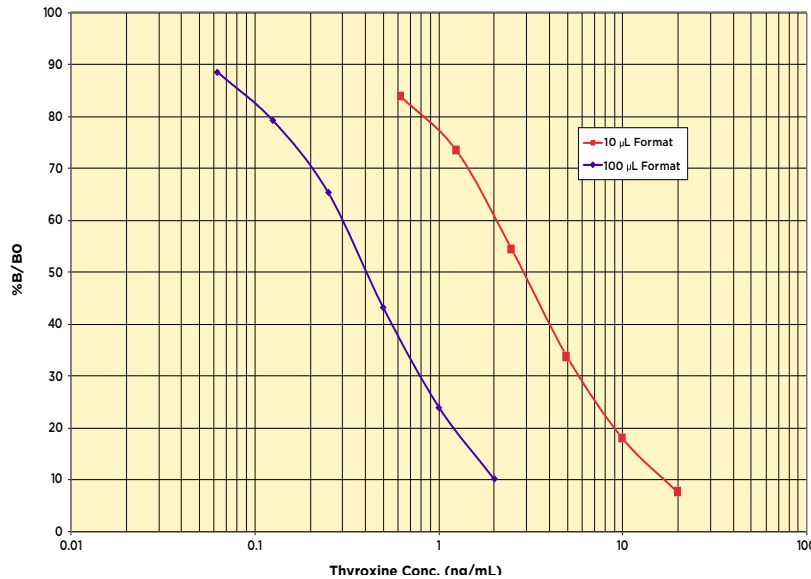


### SCIENTIFIC RELEVANCE

The thyroid hormones, triiodothyronine (T<sub>3</sub>) and thyroxine (T<sub>4</sub>) are tyrosine-based hormones produced by the thyroid gland that are primarily responsible for regulation of metabolism. Iodine is necessary for the production of T<sub>3</sub> and T<sub>4</sub>. A deficiency of iodine leads to decreased production of T<sub>3</sub> and T<sub>4</sub>, enlarges the thyroid tissue and will cause the disease known as goitre.

The major form of thyroid hormone in blood is T<sub>4</sub>, which has a longer half-life than T<sub>3</sub>. The ratio of T<sub>4</sub> to T<sub>3</sub> released into the blood is roughly 20 to 1. T<sub>4</sub> is converted to the active T<sub>3</sub> (three to four times more potent than T<sub>4</sub>) within cells by deiodinases. All three deiodinase isoforms are selenium-containing enzymes, thus dietary selenium is essential for T<sub>3</sub> production.

Hypothyroidism is the condition that results from under-production of thyroxine by the thyroid gland either because the gland is naturally underactive or because radioiodine therapy or surgery for an overactive gland has resulted in underactivity. Thyroxine is commonly taken to replace the deficiency which exists in such situations and therefore to restore normal metabolic activity. The concentration of T<sub>3</sub> and T<sub>4</sub> in the blood regulates the pituitary release of thyrotropin in a negative feedback loop such that when T<sub>3</sub> and T<sub>4</sub> concentrations are high, TSH production is reduced.



## Triiodothyronine (T<sub>3</sub>) EIA Kits

Catalog No: K056-H1 (1 Plate) K056-H5 (5 Plate)

### FEATURES

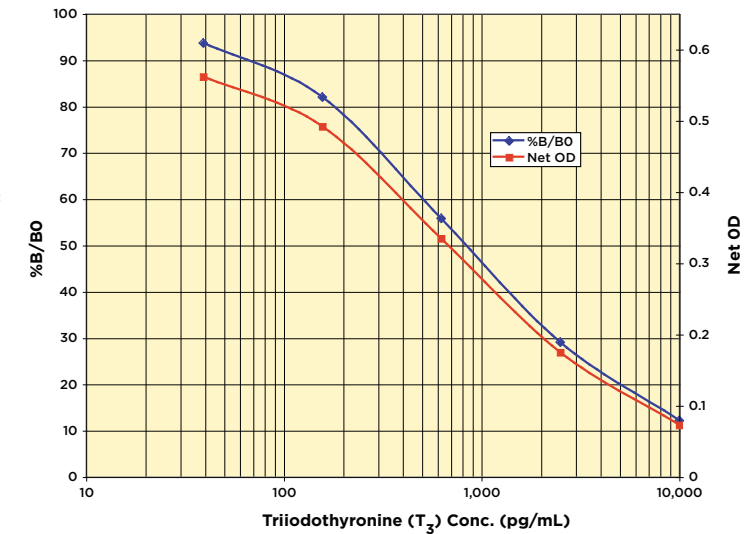
- ▶ Use Non-invasive Measurement of T<sub>3</sub>
- ▶ Sample Urine, Media, Fecal Extracts, Extracted Serum and Plasma
- ▶ Species Species Independent
- ▶ Sensitivity 37.4 pg/mL
- ▶ Time to Answer 2.5 hours
- ▶ Samples/Kit 39 or 231 in Duplicate



### SCIENTIFIC RELEVANCE

Triiodothyronine, also known as T<sub>3</sub>, is a thyroid hormone. Thyroid hormones regulate a number of developmental, metabolic, and neural activities throughout the body. T<sub>3</sub> affects almost every physiological process in the body, including growth and development, metabolism, body temperature, and heart rate. Production of T<sub>3</sub> and its prohormone, thyroxine (T<sub>4</sub>), is activated by thyroid-stimulating hormone (TSH), which is released from the pituitary gland. This pathway is part of a closed-loop feedback process when elevated concentrations of T<sub>3</sub> and T<sub>4</sub> in the blood inhibit the production of TSH in the pituitary gland. As concentrations of these hormones decrease, the pituitary gland increases production of TSH, and by these processes, a feedback control system stabilizes the amount of thyroid hormones in the bloodstream. The concentration of serum T<sub>4</sub> is 20 times that of T<sub>3</sub>.

Circulating levels of T<sub>4</sub> are much greater than T<sub>3</sub> levels, but T<sub>3</sub> is the more metabolically active hormone (3-4 times more potent than T<sub>4</sub>) although its effect is briefer due to its shorter half-life. In hyperthyroidism, both T<sub>4</sub> and T<sub>3</sub> levels are usually elevated, but in a small subset of hyperthyroid patients only T<sub>3</sub> is elevated (T<sub>3</sub> toxicosis). Triiodothyronine values greater than 2 ng/mL in adults or in children are consistent with hyperthyroidism or increased thyroid hormone-binding proteins. In hypothyroidism, T<sub>4</sub> and T<sub>3</sub> levels are decreased. T<sub>3</sub> levels are frequently low in sick or hospitalized euthyroid patients.





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