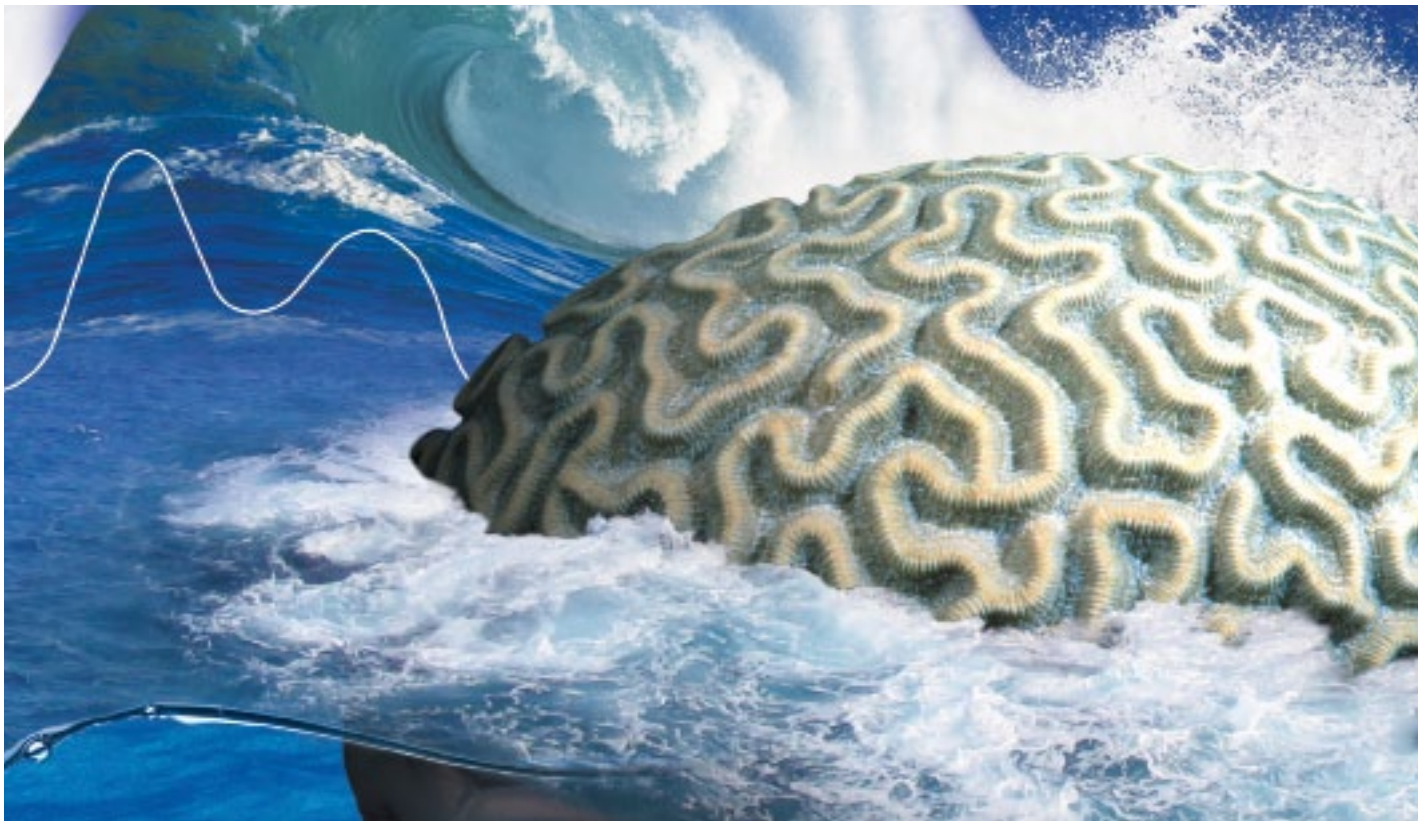
Introduction to

Endocrinology



The American consumer population believes in endocrinology. Scan the shelves of any dietary supplements/vitamin/nutraceutical outlet and it will become clear. There are persons who believe that they need to consume dihydro *epi*-androstenedione sulfate. Others believe that substances from palmetto plants regulate the health of their prostate glands. The concept that a small molecule from a bottle could uncouple fat oxidation from ATP utilization, resulting in "fat burning", is well represented by several jars of substances. The idea that a woman's reproductive cycle could be antagonized by the consumption of a synthetic estrogen is so ingrained that consumers now expect it to be accomplished entirely without any side effects.

It is a good time for those who study hormones, because unlike some other fields, such as cloning, the public believes overwhelmingly in what we do. The challenge for endocrinology is to bring complete credibility to the translation of our research into the marketplace. We are at risk of being used as the scientific justification for a massive industry of consumer fraud and charlatanism. Diabetics understand, grudgingly, that insulin regulates their blood sugar. But they remain susceptible to believing that hundreds of other less cumbersome things may do it as well. Certainly there are influences operating within the metabolic syndrome that even professional endocrinologists are still struggling to understand. For example, the documented benefits of CB_1 receptor antagonists include reduced LDL cholesterol, weight loss, reduced nicotine dependency, and even possible improvements in memory. Yet a full understanding of the CB system in metabolism, appetite, and memory still eludes us. Our challenge is to stay current and sufficiently relevant, so that the public at large does not abandon us for the offerings of snake oil vendors. Clearly, expectations are large.

This Endocrinology mini-catalog is dedicated to spotlighting the most recent small molecular tools and validated assays developed by Cayman for the research endocrinology community. We hope that scientists will find it useful in helping them to meet the myriad of challenges they face in their research endeavors. Additional information regarding products listed in this catalog, as well as additional reagents, antibodies, and assays available from Cayman Chemical, may be found at www.CaymanChem.com.

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ENDOCRINOLOGY

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abbreviations

AEA	Arachidonoyl Ethanolamide; Anandamide
AMP	Adenosine Monophosphate
ATP	Adenosine Triphosphate
BSA	Bovine Serum Albumin
CB	Cannabinoid
CGRP	Calcitonin Gene-Related Peptide
CNS	Central Nervous System
CSF	Cerebral Spinal Fluid
CYP	Cytochrome
DAG	Diacylglycerol
DBD	DNA Binding Domain
DNA	Deoxyribonucleic Acid
DTT	Dithiothreitol
EIA	Enzyme Immunoassay
ELISA	Enzyme-linked Immunosorbent Assay
FABP	Fatty Acid Binding Protein
FAS	Fatty Acid Synthase
FW	Formula Weight
GC	Gas Chromatography
GPCR	G Protein-Coupled Receptor
GST	Glutathione-S-Transferase
GTP	Guanosine Triphosphate
HDL	High-Density Lipoprotein
HRP	Horseradish Peroxidase
ICC	Immunocytochemistry
IFN-γ	Interferon-γ
IHC	Immunohistochemistry
IL	Interleukin
LBD	Ligand Binding Domain
LC	Liquid Chromatography
LDL	Low-Density Lipoprotein
MAGL	Monoacylglycerol Lipase
MAPK	Mitogen-activated Protein Kinase
MF	Molecular Formula
MS	Mass Spectrometry
NADPH	Nicotinamide Adenine Dinucleotide Phosphate
NO	Nitric Oxide
NOS	Nitric Oxide Synthase
iNOS	Inducible Nitric Oxide Synthase
PCR	Polymerase Chain Reaction
PL	Phospholipase
PPAR	Peroxisome Proliferator-activated Receptor
PUFA	Polyunsaturated Fatty Acid
RNA	Ribonucleic Acid
RXR	Retinoid X Receptor
sEH	Soluble Epoxide Hydrolase
D9-THC	D9-Tetrahydrocannabinol
TNFa	Tumor Necrosis Factor a
Vtg	Vitellogenin
WB	Western Blot
Zrp	Zona Radiata Proteins

Tom Brock, Ph.D.

PPARs

Proliferating Roles in Endocrinology

The PPARs were first described over a decade ago (an eon ago, in scientist years). So why are they still hot, with the NIH currently funding over 200 PPAR proposals? Part of the answer could lie in their multifaceted roles in diseases affecting millions of people worldwide-Obesity and Diabetes. PPARs, first identified as nuclear receptors activated by compounds known as peroxisome proliferators, such as fibrates, were generally found to regulate β-oxidation of lipids. Rapidly, four PPAR isoforms (α, β, γ, and δ) were identified; PPARδ, isolated from humans, was recognized to be equivalent to PPARβ, which had been isolated from *Xenopus*. (Interestingly, the PPARβ/δ isoform is usually referred to PPARδ in the U.S., where the human version was first described, and PPARβ in Europe, home to the *Xenopus* discovery.) The distinct PPAR isoforms are products of different genes and thus are regulated independently from one another. As a result, they differ in their tissue distribution, with PPARα abundant in liver (less in kidney, heart, brown adipose, intestine, and muscle), PPARγ in adipose (as well as small intestine and lymphatic tissue), and PPARβ/δ especially important in skeletal muscle. Through alternative splicing of mRNA, PPARγ occurs in two isoforms that differ in the length of their amino terminus.

Like other nuclear receptors, the PPARs have distinct DNA binding domains (DBD) and ligand binding domains (LBD). The amino terminus, referred to as activation function-1 (AF-1), is thought to have a transactivation function, folding back above the DBD to stabilize heterocomplex formation between the LBD and associating proteins. A second, short AF-2 region at the carboxy terminus of the LBD often folds in after ligand binding to form a stable ligand-PPAR association.

Figure 1. General layout of PPAR isoforms (p, phosphorylation sites) and structure of PPARγ ligand binding domain with ligand (AF-2 in brown).

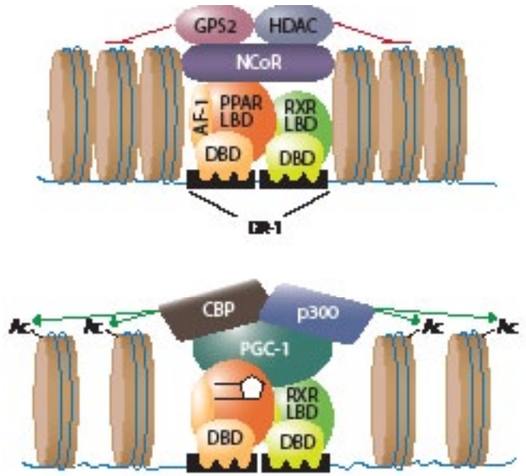

Figure 2. Conceptual models of PPAR-RXR corepressor complex (above) and PPAR-RXR coactivator complex after ligand binding (below).

PPAR Activation

In the classical model of PPAR activation, PPAR is heterodimerized with PPRE termed DR-1, which consists of direct repeats of AGGTCA separated by a single intervening nucleotide. Activation of transcription through this dimer is blocked by associated co-repressor proteins, such as nuclear receptor co-repressors (NCoR), histone deacetylases (HDAC), and G-protein pathway suppressor 2 (GPS2). The addition of ligand causes dissociation of the corepressor proteins followed by the recruitment of coactivators, such as PPAR coactivator (PGC-1), the histone acetyltransferase p300, and the CREB binding protein (CBP). Formation of the PPAR activation complex leads to histone modification (*e.g.*, through acetylation) and altered expression of genes involved in fatty acid metabolism, lipid homeostasis, and adipocyte differentiation.

Current Concepts in PPAR Activation

Research in the new millennium has revealed new ways that PPARs are activated and affect physiology. Although PPAR is commonly parked on DR-1 with RXR waiting for a ligand to activate it, there appear to be other modes of PPAR action. As with other nuclear receptors, heat shock proteins (Hsp) may facilitate the folding of newly translated PPARs. The association of PPAR with Hsps, and perhaps other proteins, may keep PPAR in the cytoplasm until the appropriate ligand binds the PPAR LBD, leading to protein dissociation and nuclear import of PPAR. In an even simpler scenario, PPAR may remain soluble, presumably in the nucleus. Ligand binding then facilitates the heterodimerization of PPAR with RXR.

Another pattern for PPAR action involves its heterodimerization with a nuclear receptor other than RXR, such as the thyroid hormone receptor (THR). In these cases, the DNA pattern recognized by the heterodimer may vary from the usual DR-1 pattern. Finally, activation of PPAR by its ligand may allow it to associate with other transcription factors, such as p65 or c-jun. The binding of PPAR with p65 will prevent completion of signaling through the NF-κB pathway, and binding with c-jun will interfere with AP-1 signaling. It is not clear how these interactions take place, whether free p65 binds immobilized PPAR-RXR dimers, if free p65 binds free PPAR, or if some other mechanism is involved. In the dynamic world of nuclear transcription, intense competition for limiting molecules of ligand, receptor, or repressor/activator protein can greatly impact the gene expression profile. For example, if inflammation is superimposed on increased fatty acids, then activation of p65 may lead to p65/PPAR dimerization, preventing PPAR-mediated fatty acid oxidation.

Current Concepts on PPAR Effects

Of all of the PPARs, PPARα is best known for driving cholesterol metabolism and fatty acid oxidation in the liver, as well as contributing to adipocyte differentiation. This is the PPAR isoform that best responds to fibrates (*e.g.*, bezafibrate, clofibrate, fenofibrate) in the treatment of cholesterol disorders. The addition of fibrates induces the transcription of many lipid oxidation genes in the peroxisomal, mitochondrial, and CYP450 pathways. PPARα also is known to promote gluconeogenesis, repress genes for amino acid catabolism, and have anti-inflammatory actions. Newer work has shown that PPAR also plays a role in heart hypertrophy through its effects on myocardial fatty acid transport and β-oxidation enzymes. This is particularly important in diabetes. Also relevant to diabetes, PPARα activity is reduced in HIV patients given protease inhibitors, leading to the development of metabolic complications including insulin resistance and hyperlipidemia. Activation of PPARα also has anabolic effects on muscle and bone, and PPARα is activated in chronic renal failure. In its more familiar location (the liver), PPARα activates fibroblast growth factor (FGF) 21 to increase ketogenesis and torpor, as well as gluconeogenesis, while decreasing growth. Finally, recent data suggests that PPARα is constitutively phosphorylated on serines 6, 12, and 21, and that phosphatases can decrease this phosphorylation leading to an increase in activity.

PPARβ/δ has been studied much less than the other PPARs. The synthetic compounds L-165,041 and GW501516 are used as selective agonists and unsaturated fatty acids, particularly from lipoproteins and chylomicrons, are thought to be biological agonists. The actions of PPARβ/δ often oppose those of PPARα and PPARγ, although it's unclear whether this is through an effect on the levels of the other PPARs or through an inhibition of their actions. Activation of PPARβ/δ appears to increase reverse cholesterol transport, stimulate adaptive thermogenesis, and reduce glucose utilization in favor of lipid metabolism as an energy source. Current work considers PPARβ/δ to be anti-apoptotic and potentially important in cancers of the skin, colon, and lung. In vascular smooth muscle, it may stimulate growth as well as inhibit apoptosis and in this way cause hypertrophic vascular remodeling. Also in muscle, activation of PPARβ/δ increases carnitine palmitoyltransferase I, which increases fatty acid uptake into mitochodria. In addition to reducing serum lipid levels, this increases energy production, which may be related to the finding that mice over-expressing this PPAR isoform in skeletal muscles could run twice as long and as far as non-transgenic mice on a treadmill. Importantly, PPARβ/δ can be activated by prostacyclin and its analogs, which may have implications in the use of these products, or their inhibitors, clinically.

Finally, PPARγ is important for adipocyte differentiation and function. It is the target of the thiazolidinediones (*e.g.*, rosiglitazon, troglitazone) class of drugs used for the treatment of insulin resistance in the context of diabetes. Although some fatty acids and eicosanoids (most notably 15-deoxy-$\Delta^{12,14}$-PGJ_2) activate PPARγ *in vitro*, their importance in the body is unclear. Mice lacking PPARγ are not viable because of placental and heart defects,

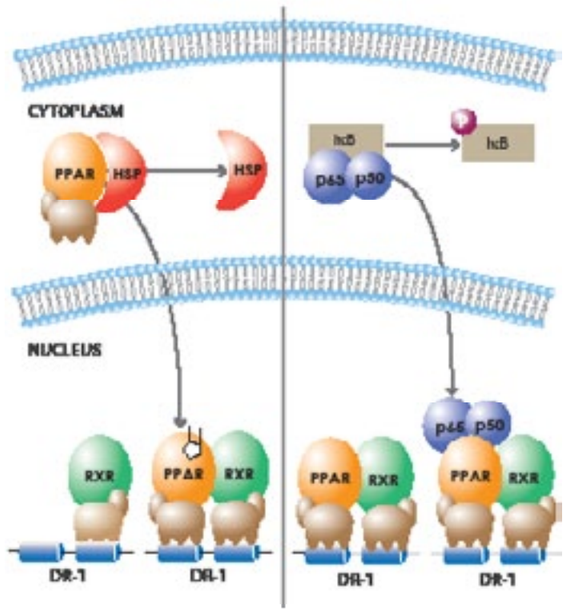

Figure 3. Alternative schemes of PPAR action.

indicating important roles for this PPAR isoform in normal development. PPARγ also suppresses the synthesis of leptin and resistin, adipose-derived hormones that reduce hunger and insulin sensitivity, respectively. Recent studies have suggested that oxidized fatty acids, including 5-oxoETE and 5-oxo-EPA, can potently activate PPARγ, in part because they become covalently bound within the active site of the LBD. PPARγ increases in certain leukocytes as they mature and this is important for their full immunological function. Perhaps linked to this, PPARγ activators reduce colonic inflammation in murine models of colitis as well as inflammation in rheumatoid arthritis. Synthetic PPARγ agonists appear to promote the death of many types of cancer cells, including breast, colon, testicular, and prostate. Additional areas of current interest relevant to PPARγ include bone homeostasis and longevity associated with caloric restriction. Finally, PPARγ can be phosphorylated on serine 112 by MAPK following IFNγ treatment and this affects transcription, cell growth, and differentiation.

Additional information is available in recent reviews.[1-5]

References

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2. Rigamonti, E., Chinetti-Gbaguidi, G., Staels, B. *Arterioscler. Thromb. Vasc. Biol.* **28,** (2008).
3. Sprecher, D.L. *Am. J. Cardiol.* **100,** 20N-24N (2007).
4. Takahashi, S., Tanaka, T., Sakai, *J. Endocr. J.* **54,** 347-357 (2007).
5. Yang, Q., Li, Y. *J. Mol. Med.* **85,** 697-706 (2007).

AcSDKP EIA Kit* 589451

N-Acetyl Ser-Asp-Lys-Pro

Stability: ≥6 months at -20°C

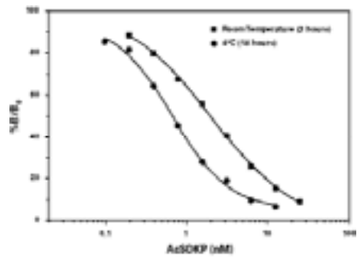
Summary: AcSDKP is a tetrapeptide growth regulatory hormone which inhibits the proliferation of hematopoietic stem cells. The dipeptidase angiotensin converting enzyme (ACE) actively metabolizes circulating AcSDKP, giving it a brief plasma half-life of four to five minutes. ACE inhibition is a major therapeutic end point in the treatment of hypertension. A further consequence of ACE inhibition is the accumulation of AcSDKP in plasma and urine. This accumulation may have physiological effects, which are manifested as the anemia of chronic ACE inhibitor toxicity. More commonly, plasma and urine AcSDKP levels can be used as a biomarker of ACE inhibition and an index of patient compliance with therapy. Measurement of AcSDKP in human urine or plasma can be readily accomplished by EIA.

Sensitivity: 50% B/B_0: 2.0 nM after 3 hour immunological reaction
0.5 nM after 18 hour immunological reaction
80% B/B_0: 0.2 nM after 18 hour immunological reaction

Specificity:

AcSDOrnP	500%
AcSDKP	100%
AcSDRP	6%
SDKP	0.5%
Thymosin B_4	<0.25%
AcSDK	0.03%

96 wells

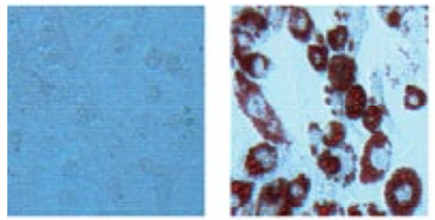


Adipogenesis Assay Kit 10006908

Stability: ≥1 year at 4°C

Summary: Obesity is a growing concern worldwide and has reached epidemic proportions in the United States. It is a risk factor in many major chronic diseases that afflict our society, including cardiovascular disease, diabetes mellitus, and cancer. In recent years, numerous studies have focused on identifying the mechanism of development of obesity, which is a process of either increasing the number of fat cells (fat cell hyperplasia) or enlargement of fat cells with each cell carrying greater amounts of fat (fat cell hypertrophy), or both. The ability to regulate the cell cycle and differentiation of adipocytes are key in the development and physiology of obesity and also in the origin of cancer. Understanding of these processes is critical to a rational approach to the treatment of obesity and cancer. Cayman's Adipogenesis Assay Kit provides the reagents required for studying the induction and inhibition of adipogenesis in the established 3T3-L1 model, using the adipogenesis induction procedure. This kit can also be used to screen drug candidates involved in adipogenesis. The classic Oil Red O staining for lipid droplets is used in this kit as an indicator of the degree of adipogenesis, and can be quantified with a plate reader after the dye is conveniently extracted from the lipid droplet.

1 ea



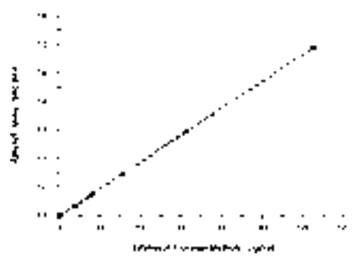
Left panel: Non-differentiated 3T3-L1 cells were not stained by Oil Red O Solution. *Right panel:* More than 80% of preadipocytes were differentiated four days after weaning the cells from induction media to insulin media. Different degrees of lipid droplet accumulation in the differentiated cells can be visualized by Oil Red O Solution staining.

Adipolysis Assay Kit 10009381

Stability: ≥1 year at -20°C

Summary: Cayman's Adipolysis Assay Kit provides an easy to use tool for studying the adipolysis of triglycerides in differentiated 3T3-L1 cells, using a common adipogenesis induction procedure. This kit will allow investigators to screen compounds involved in lipid storage and metabolism. Isoproterenol is included in the kit as a positive control for screening pharmaceuticals that regulate free fatty acid release from adipocytes.

1 ea



Adiponectin

Adiponectin, also known as Acpr30 and GPB-28, is a physiologically-active protein which is specifically and highly expressed from adipose cells. Adipose tissue-expressed levels of adiponectin are inversely related to the degree of obesity and are correlated with insulin resistant states such as those found in obesity and type II diabetes mellitus. Adiponectin increases insulin sensitivity and decreases plasma glucose by increasing fat oxidation. The assay kits listed below are sensitive methods for the quantification of adiponectin from human or murine samples.

Adiponectin (human) EIA Kit* 500641

Stability: ≥6 months at 4°C

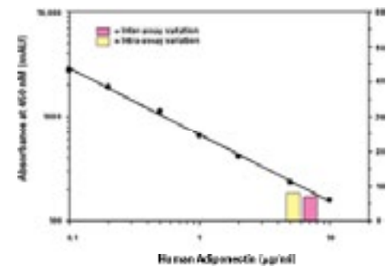
Summary: This EIA is based on the competition between free adiponectin and coated adiponectin in the presence of a fixed quantity of HRP-labeled adiponectin antibody.

Sensitivity: Limit of detection: 0.7 µg/ml

Specificity:

Adiponectin (human)	100%

96 wells



Adiponectin (human) EIA Kit (HS)* 10007619

Stability: ≥6 months at 4°C

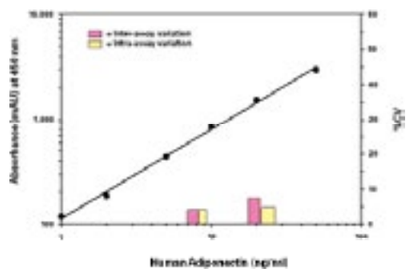
Summary: This EIA is based on a double antibody sandwich technique that is applicable to the quantification of both low molecular weight and high molecular weight polymers of adiponectin, but not adiponectin trimers.

Sensitivity: Limit of detection: 0.5 ng/ml

Specificity:

Adiponectin (human)	100%

96 wells



Adiponectin (murine) EIA Kit* 10007620

Stability: ≥6 months at 4°C

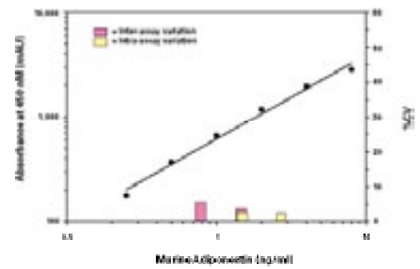
Summary: This EIA is based on a double-antibody sandwich technique which utilizes a murine adiponectin-specific monoclonal capture antibody and a HRP-conjugated polyclonal antibody for detection.

Sensitivity: Limit of detection: 0.1 ng/ml

Specificity:

Human Adiponectin	100%
Recombinant Adiponectin	100%
Rat Adiponectin	<0.03%

96 wells



AFMK 10005254

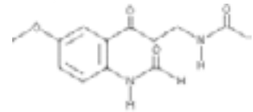
[52450-38-1]

MF: $C_{13}H_{16}N_2O_4$ **FW:** 264.3 **Purity:** ≥98%

A crystalline solid **Stability:** ≥2 years at -20°C

Summary: Melatonin is a neurotransmitter widely distributed in eukaryotes and is closely linked to circadean rhythms in mammals including humans. AFMK is a melatonin metabolite first identified in rat brain. AFMK has antioxidant and free radical scavenging activities in several experimental models. AFMK may also be measured in plasma as an index of melatonin synthesis and metabolism.

1 mg
5 mg
10 mg
50 mg



N-[3-[2-(formylamino)-5-methoxyphenyl]-3-oxypropyl]-acetamide

AgRP (human) EIA Kit* 10007615

Agouti-related protein

Stability: ≥6 months at 4°C

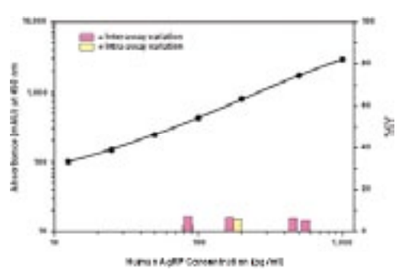
Summary: Human AgRP is a single-chain 14 kDa neuropeptide produced mainly by neurons of the arcuate nucleus, adrenal gland, and subthalamic nucleus. AgRP functions as a selective antagonist of melanocortin receptors MC3R and MC4R thereby acting against the effect of a-melanocyte-stimulating hormone (a-MSH). Studies with model animals indicated that AgRP might play an important role in regulating body weight and feeding behavior.

Sensitivity: Limit of detection: 3.7 pg/ml

Specificity:

AgRP (human)	100%

96 wells



*SPI-BIO Assays are available through Cayman Chemical only within North & South America and Asia; elsewhere contact SPI-BIO.

Aldosterone EIA Kit - Monoclonal 10004377

Stability: ≥6 months at -20°C
Summary: Aldosterone, a steroid hormone secreted by the adrenal cortex, is the principle mineralocorticoid controlling sodium and potassium balance. The primary role of aldosterone is to promote unidirectional salt reabsorption across a variety of epithelial tissues, the salivary gland, intestine, sweat glands, and the kidney. Aldosterone is synthesized from cholesterol in the zona glomerulos of the adrenal cortex. Secretion of aldosterone is complicated, being affected by both hormones and electrolytes. However, the renin-angiotensin system (RAS) is the primary regulator of aldosterone secretion. Angiotensin II and potassium stimulate secretion of aldosterone by increasing the rate of synthesis of the hormone.

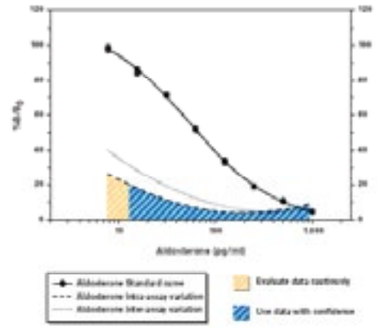
Sensitivity: 50% B/B_0: 65 pg/ml
80% B/B_0: 21 pg/ml
Specificity:

Aldosterone	100%
Aldosterone-21-acetate	7.9%
Corticosterone	1.1%
Androsterone	0.9%
5α-dihydro Testosterone	0.25%
Androstenedione	0.16%
Testosterone	0.1%
11-deoxy Corticosterone	0.09%
DHEA	0.05%
Estrone	0.02%

For a full specificity profile, please go to www.caymanchem.com

96 wells
480 wells

Also Available: *Aldosterone EIA Kit - Monoclonal (Solid Plate) (10004553)*



AM251 71670

[183232-66-8]
MF: $C_{22}H_{21}Cl_2IN_4O$ **FW:** 555.2 **Purity:** ≥98%
A crystalline solid **Stability:** ≥1 year at -20°C
Summary: SR 141716A is a biarylpyrazole compound which has been considered for many years as the prototypical CB receptor antagonist. AM251 is a SR 141716A analog, wherein the *p*-chloro group attached to the phenyl substituent at C-5 of the pyrazole ring is replaced with a *p*-iodo group. The resulting compound exhibits slightly better binding affinity for the CB_1 receptor with a K_i value of 7.5 nM compared to SR 141716A, which has a K_i value of 11.5 nM. AM251 is about two-fold more selective for the CB_1 receptor compared to SR 141716A.

5 mg
10 mg
50 mg
100 mg

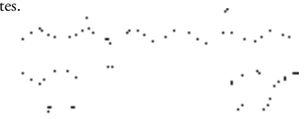
1-(2,4-dichlorophenyl)-5-(4-iodophenyl)-4-methyl-N-1-piperidinyl-1H-pyrazole-3-carboxamide

**SPI-BIO Assays are available through Cayman Chemical only within North & South America and Asia; elsewhere contact SPI-BIO.*

AN-7 10006212

MF: $C_{19}H_{34}N_2O_2S_4$ **FW:** 450.7 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: α-Lipoic acid is a cyclic disulfide antioxidant that interconverts with its reduced dithiol form. It is an essential cofactor for decarboxylation reactions of the citric acid cycle and acts as a general antioxidant. AN-7 is a more lipophilic analog of α-lipoic acid with enhanced potency and 1.5-fold increased maximal capacity to stimulate glucose transport into myocytes. This identifies the analogs of lipoic acid as potential new treatments for diabetes.

5 mg
10 mg
50 mg
100 mg



3-(5-[1,2]dithiolan-3yl-pentanoylamino)-propyl]-amide

Angiotensin II EIA Kit* 589301

Angiotensin II ELISA Kit
Stability: ≥6 months at -20°C
Summary: Angiotensin II is a primary reactive vasoconstrictor, the main stimulus for aldosterone release, and one of the causative factors of chronic hypertension. The active angiotensin II octapeptide is released *via* a tightly controlled series of prohormones and proteases. Normal human plasma angiotensin II levels are 10-30 pg/ml when measured at rest in the supine position; they increase on standing, exercise, dehydration, or sodium depletion. The unique, patented 'Immobilized Antigen' technology of this angiotensin II immunometric assay allows reliable detection of 1-2 pg/ml, or as little as 10% of the normal human plasma concentration.

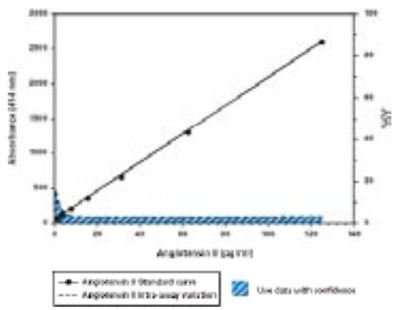
Sensitivity: Limit of detection: 1.5 pg/ml
Specificity:

Angiotensin II	100%
Angiotensin III	36%
Angiotensin 3-8	33%
Angiotensin I	4%
Angiotensin 1-7	0.01%

Homology:

Mammalian Angiotensin II	100%

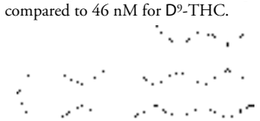
96 wells



Arachidonoyl Ethanolamide 90050

[94421-68-8] AEA, Anandamide
MF: $C_{22}H_{37}NO_2$ **FW:** 347.5 **Purity:** ≥98%
A solution in ethanol **Stability:** ≥1 year at -20°C
Summary: AEA is the ethanolamine amide of arachidonic acid, first isolated from porcine brain. AEA is an endogenous CB neurotransmitter that binds to both CB_1 and CB_2 receptors. AEA inhibits the specific binding of [^{3}H]-HU-243 to synaptosomal membranes with a K_i value of 52 nM, compared to 46 nM for D^9-THC.

5 mg
10 mg
50 mg
100 mg

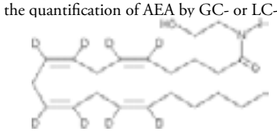


N-(2-hydroxyethyl)-5Z,8Z,11Z,14Z-eicosatetraenamide

Arachidonoyl Ethanolamide-d_8 390050

AEA-d_8, Anandamide-d_8
MF: $C_{22}H_{29}D_8NO_2$ **FW:** 355.6
Chemical Purity: ≥95% **Deuterium Incorporation:** ≤1% d_0
A solution in methyl acetate **Stability:** ≥1 year at -20°C
Summary: An internal standard for the quantification of AEA by GC- or LC-MS

100 µg
500 µg
1 mg
5 mg



N-(2-hydroxyethyl)-5Z,8Z,11Z,14Z-eicosatetraenamide-5,6,8,9,11,12,14,15-d_8

Also Available: *Arachidonoyl Ethanolamide-d_4 (10011178)*

2-Arachidonoyl Glycerol 62160

[53847-30-6] 2-AG
MF: $C_{23}H_{38}O_4$ **FW:** 378.6 **Purity:** ≥95% (as a 9:1 mixture of the 2-AG and 1-AG)
A solution in acetonitrile **Stability:** ≥6 months at -80°C
Summary: 2-AG is an endogenous agonist of the CB_1 receptor. Unlike AEA, 2-AG is present at relatively high levels in the central nervous system; it is the most abundant molecular species of MAG found in rat brain. Formation of 2-AG is calcium-dependent and is mediated by the activities of PLC and DAG lipase. 2-AG acts as a full agonist at the CB_1 receptor. At a concentration of 0.3 nM, 2-AG induces a rapid, transient increase in intracellular free calcium in NG108-15 neuroblastoma X glioma cells through a CB_1 receptor-dependent mechanism. 2-AG is metabolized *in vitro* by MAG lipase and fatty acid amide hydrolase, with MAG lipase being the principle metabolizing enzyme *in vivo*.

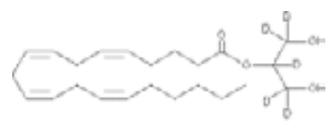
1 mg
5 mg
10 mg
25 mg

5Z,8Z,11Z,14Z-eicosatetraenoic acid, 2-glyceryl ester

2-Arachidonoyl Glycerol-d_5 362162

2-AG-d_5
MF: $C_{23}H_{33}D_5O_4$ **FW:** 383.6
Chemical Purity: ≥95% **Deuterium Incorporation:** ≤1% d_0
A solution in acetonitrile **Stability:** ≥6 months at -80°C
Summary: 2-AG-d_5 contains five deuterium atoms at the 1, 1', 2, 3, and 3' positions of the glycerol moiety. It is intended for use as an internal standard for the quantification of 2-AG by GC- or LC-MS.

50 µg
100 µg
500 µg
1 mg

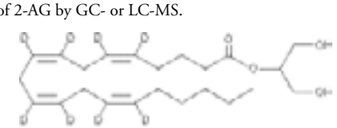


5Z,8Z,11Z,14Z-eicosatetraenoic acid, 2-glycerol-1,1,2,3,3-d_5 ester

2-Arachidonoyl Glycerol-d_8 362160

2-AG-d_8
MF: $C_{23}H_{30}D_8O_4$ **FW:** 386.6
Chemical Purity: ≥95% (as a 9:1 mixture of the 2-AG and 1-AG)
Deuterium Incorporation: ≤1% d_0
A solution in acetonitrile **Stability:** ≥6 months at -80°C
Summary: 2-AG-d_8 contains eight deuterium atoms at the 5, 6, 8, 9, 11, 12, 14, and 15 positions of the arachidonic acid moiety. It is intended for use as an internal standard for the quantification of 2-AG by GC- or LC-MS.

25 µg
50 µg
100 µg
500 µg



5Z,8Z,11Z,14Z-eicosatetraenoic-5,6,8,9,11,12,14,15-d_8 acid, 2-glyceryl ester

NEW Arginine Vasopressin EIA Kit 583951

AVP ELISA Kit
Stability: ≥1 year at -20°C
Summary: AVP, also known as argipressin, antidiuretic hormone (ADH), or simply as vasopressin, is a nine amino acid peptide hormone that plays a primary role in the regulation of renal water excretion and a secondary role in the regulation of cardiovascular function in mammals. AVP acts on epithelial cells of the urinary tract to augment the reabsorption of water, resulting in concentration of urine and dilution of blood serum. It also stimulates the constriction of capillaries and arterioles, elevating blood pressure. Normal levels of AVP in serum are 0.4-5.2 pg/ml. Plasma levels of AVP are elevated in patients with major and also anxious-retarded depression, as well as in patients with congestive heart failure. Cayman's AVP EIA is a competitive assay that can be used for the measurement of AVP from plasma and serum.

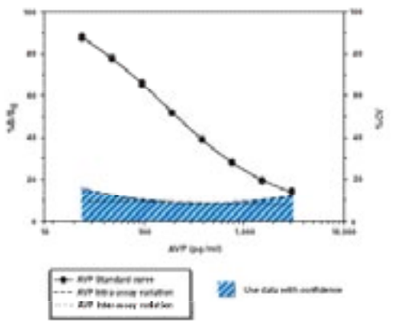
Sensitivity: 50% B/B_0: ~220-380 pg/ml
80% B/B_0: ~45-60 pg/ml
Specificity:

Arg-Vasopressin	100%
Arg-Vasotocin	100%
Dynorphin A	1.6%
Met-Enkephalin	0.08%

For a full specificity profile, please go to www.caymanchem.com

96 wells
480 wells

Also Available: *Arginine Vasopressin EIA Kit (Solid Plate) (10009345)*



Atriopeptin (rat) EIA Kit* 589401

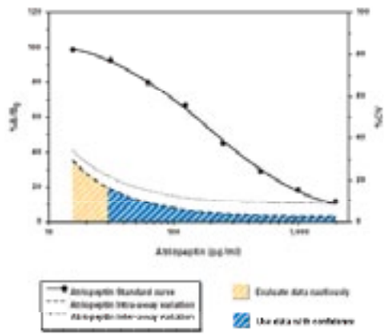
Atriopeptin (rat) ELISA Kit
Stability: ≥6 months at -20°C
Summary: Atriopeptin is a 28 amino acid peptide synthesized primarily in cardiac atria. This peptide hormone acts in opposition to angiotensin II in regulating renal, hemodynamic, and endocrine function. Atriopeptin is released in response to the increased pressure and mechanical stretch of the right atrium due to blood volume overload. Atriopeptin then acts at the nephron to increase salt and water excretion, lowering blood volume and blood pressure. Elevated plasma atriopeptin levels may be produced in experimental models by volume expansion, high salt diets, and in response to vasoconstrictors. Increased plasma concentrations have also been reported in various pathological conditions such as renal disease, congestive heart failure, and paroxysmal atrial tachycardia.

Sensitivity: 50% B/B_0: 190 pg/ml
80% B/B_0: 60 pg/ml
Specificity:

Rat Atriopeptin 24	100%
Atrial Natriuretic Peptide (8-33)	100%
Rat Atrial Natriuretic Peptide	100%
Human Atrial Natriuretic Peptide	100%
Atrial Natriuretic Peptide (18-28)	60%
Human β Atrial Natriuretic Peptide	50%
Human 6 Atrial Natriuretic Peptide	40%
Auriculin A	10%
Rat Atriopeptin II	5%
Rat Atrial Natriuretic Peptide (13-28)	1%

For a full specificity profile, please go to www.caymanchem.com

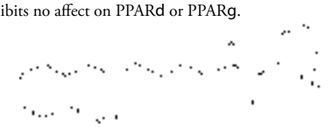
96 wells



AUDA 10007927

[479413-70-2]
MF: $C_{23}H_{40}N_2O_3$ **FW:** 392.6 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: AUDA is an inhibitor of sEH exhibiting IC_{50} values of 18 and 69 nM for the murine and human enzymes, respectively. In angiotensin-infused rats, a dose of 25 mg/l AUDA administered in drinking water decreased mean arterial blood pressure from 161 ±4 mmHg to 140 ±5 mmHg. This hypotensive effect was accompanied by an increase in urinary epoxide-to-diol ratios. AUDA activates PPARa 3-fold at a concentration of 10 µM but exhibits no affect on PPARd or PPARg.

5 mg
10 mg
50 mg
100 mg



12-[[(tricyclo[3.3.1.13,7]dec-1-ylamino)carbonyl]amino]-dodecanoic acid

NEW AVE-1625 10009021

[358970-97-5]
MF: $C_{23}H_{20}Cl_2F_2N_2O_2S$ **FW:** 497.4 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: The central cannabinoid (CB_1) receptor is a GPCR that is widely distributed in the CNS and several peripheral tissues and binds the active component of cannabis, Δ9-THC. Signaling through the CB_1 receptor is implicated in attentional and working memory deficits as well as obesity. AVE-1625 is a highly potent, selective antagonist for the CB_1 receptor with K_i values of 0.16-0.44 nM. At 1-3 mg/kg, AVE-1625 significantly improves the performance of rodents in working memory tasks. At 30 mg/kg, AVE-1625 reduces caloric intake by more than 50% of controls and significantly increases lipolysis from fat tissues and reduces hepatic glycogen levels in rodents.

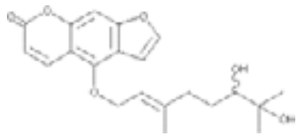
1 mg
5 mg
10 mg
50 mg

N-[1-[bis(4-chlorophenyl)methyl]-3-azetidinyl]-N-(3,5-difluorophenyl)-methanesulfonamide

6',7'-dihydroxy Bergamottin 10009598

6',7'-DHB
MF: $C_{21}H_{24}O_6$ **FW:** 372.4 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: 6',7'-DHB is a potent inhibitor of CYP3A4 (IC_{50} = 25 µM). It appears to be the primary compound in grapefruit juice that is responsible for inhibition of testosterone 6b-hydrolase activity. Ingestion of grapefruit juice during treatment regimes with drugs normally metabolized by CYP450 enzymes of the CYP3A subfamily results in a substantial increase in plasma concentration of these agents. However, giving a patient grapefruit juice or just 6',7'-DHB could be advantageous in cases where a drug is metabolized too quickly by CYP3A4.

1 mg
5 mg
10 mg
100 mg

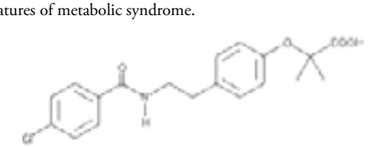


4-[[(2E)-6,7-dihydroxy-3,7-dimethyl-2-octenyl]oxy]-7H-fuoro[3,2-g][1]benzopyran-7-one

Bezafibrate 10009145

[41859-67-0] Benzofibrate, BM 15075, Bezalip, Bezatrol, Difaterol
MF: $C_{19}H_{20}N_4ClNO_4$ **FW:** 361.8 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: Bezafibrate is a well established pan-PPAR activator. The fibrate class of drugs are generally known as PPARa agonists, but bezafibrate appears to activate PPARd and PPARg as well. Bezafibrate activates human PPARa, PPARd, and PPARg with EC_{50} values of 50, 20, and 60 µM, respectively, in a cell-based transcription assay. Bezafibrate is used to treat hyperlipidemia. It helps lower LDL cholesterol and triglycerides while raising HDL cholesterol levels. It also improves insulin sensitivity and reduces blood glucose levels, which in combination with the cholesterol effects significantly lowers the incidence of cardiovascular events and development of diabetes in patients with features of metabolic syndrome.

500 mg
1 g
5 g
10 g



2-[4-[2-[(4-chlorobenzoyl)amino]ethyl]phenoxy]-2-methyl-propanoic acid

**SPI-BIO Assays are available through Cayman Chemical only within North & South America and Asia; elsewhere contact SPI-BIO.*

tetrahydro-L-Biopterin (dihydrochloride) 81880

[69056-38-8] BH_4 (dihydrochloride), Schircks 11.212
MF: $C_9H_{15}N_5O_3$ • 2HCl **FW:** 314.2 **Purity:** ≥99%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: BH_4 is a required cofactor for all NOS isoforms. It binds to the enzyme at a ratio of 1:1 BH_4/subunit.

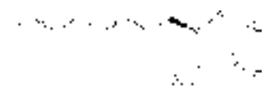
5 mg
10 mg
50 mg
100 mg

2-amino-6R-(1R,2S-dihydroxypropyl)-5,6,7,8-tetrahydro-4(1H)-pteridinone, dihydrochloride

C75 10005270

[191282-48-1]
MF: $C_{14}H_{22}O_4$ **FW:** 254.3 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: Inhibition of FAS by the irreversible inhibitor cerulenin leads to cytotoxicity and apoptosis in human cancer cell lines. C75 is a more stable inhibitor of FAS than cerulenin that leads to profound weight loss and feeding inhibition in both high-fat diet wild type obese and leptin-deficient *ob/ob* mice. C75 is also cytotoxic to many human cancer cell lines, an effect believed to be mediated by the accumulation of malonyl-coenzyme A in cells with an upregulated FAS pathway.

1 mg
5 mg
10 mg
50 mg



tetrahydro-4-methylene-2R-octyl-5-oxo-3S-furancarboxylic acid

Calcitriol 71820

[32222-06-3] 1α,25-dihydroxy Vitamin D_3
MF: $C_{27}H_{44}O_3$ **FW:** 416.6 **Purity:** ≥97%
A solution in ethanol **Stability:** ≥1 year at -80°C
Summary: Calcitriol is synthesized from 7-dehydrocholesterol in humans *via* a non-enzymatic photochemical reaction with 290-310 nm UV light in the skin. Hydroxylation of the resulting cholecalciferol in the liver produces 25-hydroxy vitamin D_3, the principal circulating form of vitamin D. A second, tightly regulated hydroxylation in the kidney produces calcitriol. Plasma calcitriol levels range from 10-70 pg/ml and are influenced by numerous dietary and hormonal factors. The main physiologic effects of calcitriol are to increase the absorption of calcium at the level of the intestinal epithelium, and to increase the mineralization of bone *via* the direct stimulation of osteoblasts.

50 µg
100 µg
500 µg
1 mg

9,10-secocholesta-5Z,7E,10(19)-triene-1a,3b,25-triol

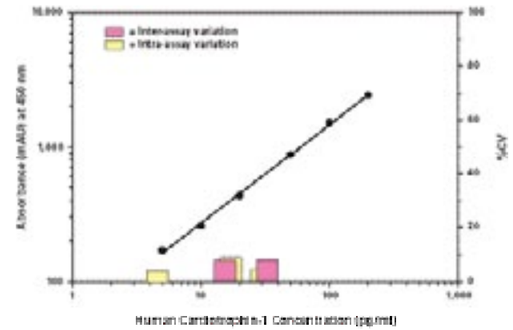
Cardiotrophin-1 (human) EIA Kit* 10007616

CT-1
Stability: ≥6 months at 4°C
Summary: CT-1 is a member of the IL-6 superfamily. It activates gp130-dependent signalling and stimulates the JAK/STAT pathway to transduce hyperttrophic and cytoprotective signals in cardiac myocytes. CT-1 also has a neurotrophic function and is a hepatocyte survival factor. CT-1 induces expression of the protective heat shock proteins in cardiac cells and increases ventricular expression of ANP, brain natriuretic peptide (BNP), and angiotensinogen mRNA. CT-1 levels are significantly elevated in patients with heart failure, patients with dilatative cardiomyopathy, stable and unstable angina, and after acute myocardial infarction.

Sensitivity: Limit of detection: 1 pg/ml
Specificity:

Cardiotrophin-1 (human)	100%

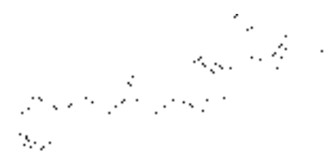
96 wells



CAY10499 10007875

[359714-55-9]
MF: $C_{18}H_{17}N_3O_5$ **FW:** 355.3 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: Hormone sensitive lipase (HSL) catalyzes the hydrolysis of tri-, di-, and monoacylglycerols, as well as cholesterol esters, thus mobilizing fatty acids as a primary source of energy in mammals. The enzyme is highly expressed in adipose tissue and steroidogenic tissues, and less abundantly in skeletal muscle, heart, brain, pancreatic beta cells, adrenal gland, ovaries, testes, and macrophages. Its presence in various tissues indicates the enzyme plays diverse roles including those in steroidogenesis and spermatogenesis, foam cell formation in atherosclerosis, and diabetes. CAY10499 is a potent inhibitor of human HSL exhibiting an IC_{50} value of 90 nM for the recombinant enzyme. The *in vivo* pharmacological efficacy of CAY10499 has not been reported.

1 mg
5 mg
50 mg
100 mg



[4-(5-methoxy-2-oxo-1,3,4-oxadiazol-3(2H)-yl)-2-methylphenyl]-carbamic acid, phenylmethyl ester

Olivia May, Ph.D.

Diabetes and Insulin Signaling

A New Strategy to Promote Pancreatic β Cell Survival

It's such a sweet name, Diabetes mellitus (which translates "to siphon honey"), for a disease that is increasingly common, afflicting over 200 million people worldwide. Type 2 diabetes is characterized by excessive hepatic glucose in response to deficiencies in insulin production by pancreatic β cells or insulin resistance in tissues that rely on insulin for glucose uptake. The resulting chronically elevated levels of glucose eventually become toxic to pancreatic islets, provoking β cell death through apoptosis. Insulin deficiency in type 1 diabetics arises because pancreatic β cells are directly targeted for destruction by either the immune system or other unknown effectors that lead to β cell death. Thus, halting the loss of insulin-producing β cells is a key tactic for contending with both types of the disease. Strategies for maintaining pancreatic β cell survival are becoming evident to scientists through examining the intricate phosphatidylinositol 3-kinase (PI3K) pathway, which is known to control glucose homeostasis *via* insulin signaling. Coincidently, promoting pancreatic β cell survival, through regulating protein translation, is also mediated by PI3K signaling in response to levels of available nutrients. This review will give some detail as to how effectors of protein translation intersect with a nutrient-hormonal signaling network that, if not closely regulated, results in the onset of diabetes.

Insulin Signaling

Binding of insulin (or insulin-like growth factors) to the insulin receptor on adipocytes and muscle cells triggers the recruitment and phosphorylation of insulin receptor substrate (IRS), which forms a docking site for PI3K at the membrane. When docked, PI3K is positioned to phosphorylate the lipid phosphatidylinositol 4,5-bisphosphate (PIP_2) - a reaction that yields phosphatidylinositol 3,4,5-trisphosphate (PIP_3), a second messenger that activates phosphoinositide-dependent protein kinase 1 (PDK) and recruits Akt (also known as protein kinase B) to the cell membrane. PDK1 mediates the phosphorylation of both Akt at Thr^{308} (one of two key residues required for activation) and ribosomal protein 70 kDa S6 kinase 1 ($p70^{s6k}$) through separate, parallel pathways (although $p70^{s6k}$ does not require PIP_3 binding to PDK1 to be phosphorylated[1]). Akt phosphorylation of the Rab GTPase-activating protein AS160 causes it to dissociate from the insulin-responsive isoform of the glucose transporter, GLUT4, located in intracellular storage vesicles. Thus, Akt phosphorylation of AS160 facilitates glucose uptake in adipocytes and muscle cells by allowing the translocation of GLUT4 to the plasma membrane. Concomitantly, through $p70^{s6k}$ activation, protein synthesis is initiated by $p70^{s6k}$ phosphorylation of the ribosomal S6 protein. This stimulates translation of select proteins that increase cell growth and survival. However, $p70^{s6k}$ also directly phosphorylates IRS, which inhibits IRS activity, providing negative feedback that shuts down Akt activity. Persistent phosphorylation (and inhibition) of IRS could potentially contribute to insulin resistance.

Overactive mammalian target of rapamycin (mTOR) activity also has implications in obesity and insulin resistance. mTOR is a key regulator of cell growth that phosphorylates and activates both Akt and $p70^{s6k}$ individually and exists in two distinct multi-protein complexes to serve this function. mTOR Complex1 (mTORC1) is rapamycin-sensitive and its signaling is facilitated by raptor, an adaptor protein that recognizes the TOR signaling motifs of its downstream substrates. The GTPase RAS homolog enriched in brain (Rheb) is thought to trigger mTORC1 signaling. When activated, mTORC1 phosphorylates $p70^{s6k}$ at Thr^{389}. This initiates $p70^{s6k}$ phosphorylation of IRS, which inhibits insulin/PI3K signaling. Also, mTORC1 phosphorylates initiation factor 4E binding proteins (4E-BPs) which prevents the association of 4E-BP with the eukaryotic initiation factor (eIF) 4E. This enables the activation of eIF4E cap-dependent translation of many target mRNAs that control cell survival and growth.

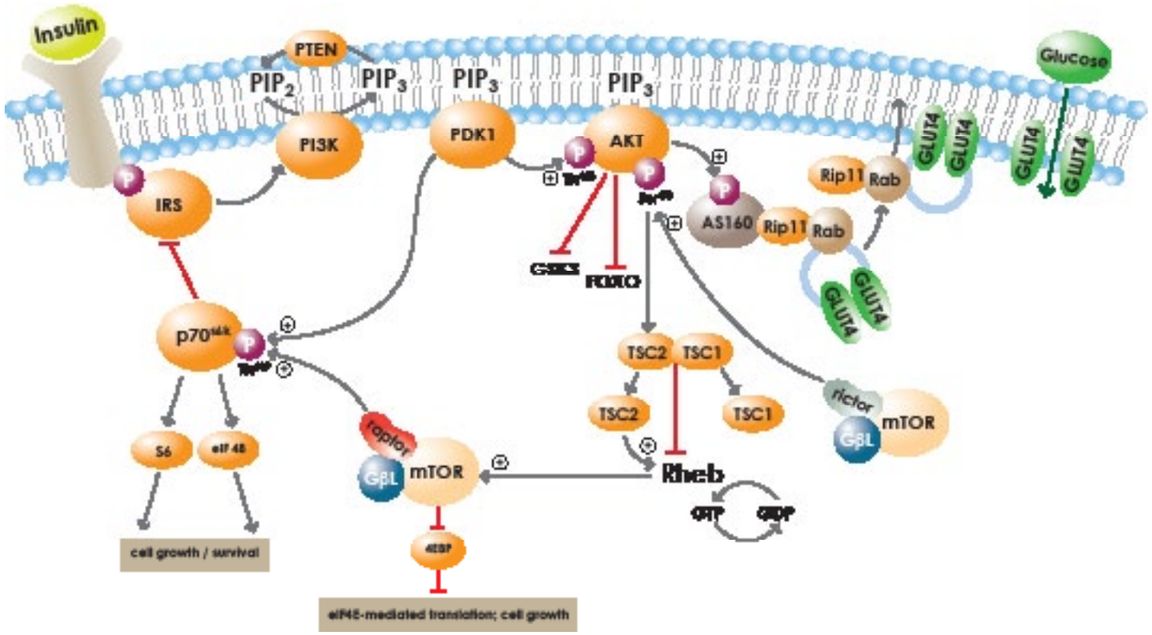


Figure 1. Insulin signaling pathway mediates glucose uptake, protein translation, and cell growth.

Increased expression of one such set of these mRNAs encoding the adipocyte differentiation transcription factors, CCAAT/enhancer binding protein α (C/EBPα), C/EBPδ, and PPARγ, results in adipogenesis[2]-an event that if not regulated can lead to obesity and insulin resistance.

mTOR Complex2 (mTORC2) for the most part is rapamycin-resistant and mediates its signaling with the rictor adaptor protein to phosphorylate Akt at S473 (the other key residue necessary for Akt activation). However, the mechanisms of activation of mTORC2 are not yet known. Activated Akt has several downstream substrates, one of which is tuberous sclerosis protein 2 (TSC2) from the TSC1/TSC2 heterodimer. When bound together TSC1/TSC2 antagonizes the mTOR/$p70^{s6k}$/4E-BP signaling pathway by stimulating GTP hydrolysis of Rheb. Once phosphorylated, TSC2 dissociates from TSC1 releasing its inhibition of Rheb. Rheb in turn activates mTORC1 signaling to its downstream substrates. Interestingly, this places Akt and mTORC2 upstream of its rapamycin-sensitive counterpart-mTORC1. Additional targets of Akt include glycogen synthase kinase-3 (GSK3) and forkhead box sub-group O (FOXO) transcription factors. Akt phosphorylation inactivates constitutive GSK3 activity, which consequently leads to an increase in the synthesis of glycogen, a storehouse for glucose. Akt phosphorylation also inhibits FOXO-mediated transcription of target genes that promote apoptosis, cell-cycle arrest, and other processes that control the production of pancreatic β cells. Thus, Akt activation plays a critical role in maintaining glucose homeostasis.

Therapeutic Targets for Intervention

All individuals diagnosed with diabetes share reduced PI3K activity. Current research seeks to ameliorate insulin resistance by finding ways to increase PI3K/Akt activity and restore insulin sensitivity. One possible target is the lipid phosphatase PTEN (phosphatase and tensin homolog) which dephosphorylates PIP_3, making less PIP_3 available to recruit AKT to the membrane and thereby interfering with the uptake of glucose. Indeed, highly potent and specific inhibitors of PTEN have been indentified that increase levels of PIP_3, phosphorylation of Akt, and glucose uptake in adipocytes.[3] However, if the tumor suppressor activity of PTEN is held in check, pan-inhibition of PTEN could accelerate cancer development. Thus, in order to reverse insulin resistance, tissue-specific PTEN inhibitors would have to be targeted directly to pancreatic β cells, adipocytes, or muscle. Recent reports demonstrate that PTEN loss in pancreatic β cells or selective PTEN deletion in skeletal muscle prevents insulin resistance without causing malignant cell growth.[4,5] Alternatively, inhibition of rapamycin-sensitive mTOR and its downstream substrate $p70^{s6k}$ seems a viable therapeutic strategy to prevent the downregulation of IRS and reduced Akt activity that leads to insulin resistance. While *in vitro* studies suggest treatment with rapamycin increases insulin-induced Akt phosphorylation, the prognosis is not as favorable in an *in vivo* diabetic model where rapamycin treatment unexpectedly increases insulin-resistance.[6] It is possible that rapamycin also targets other related effectors (*e.g.*, mTORC2 and GSK3) of Akt phosphorylation.[7,8] However further downstream of mTOR, 4E-BPs may be effective drug targets to regulate adipogenesis and insulin sensitivity. Mice that lack both 4E-BP1 and 4E-BP2 have increased insulin resistance associated with increased $p70^{s6k}$ activity and impaired Akt signaling.[2] Given the complexity of the insulin signaling pathway, careful consideration of the downstream factors must be weighed before intervening with any critical factors of insulin signaling.

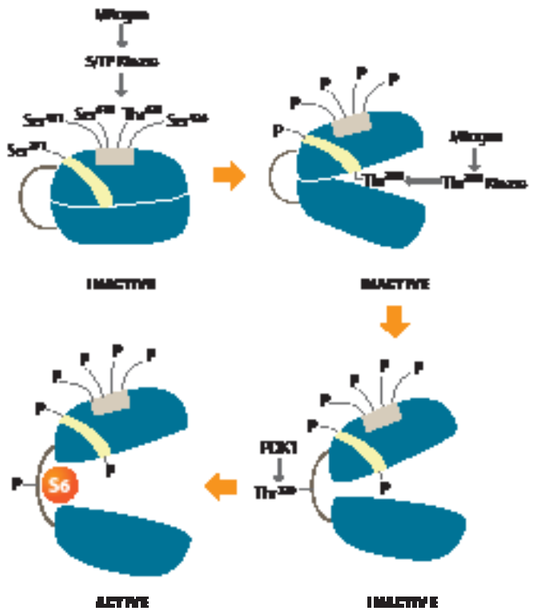


Figure 2. Mechanism of $p70^{s6k}$ Activation: Kinase activation of $p70^{s6k}$ involves the hierarchical phosphorylation of four serine and threonine sites (Ser^{411}, Ser^{418}, Thr^{421}, Ser^{424}), which reside in a distinct auto-inhibitory domain. This event, in combination with phosphorylation of Ser^{371} in the linker domain, facilitates Thr^{389} phosphorylation, which also resides in the linker domain, and provides a docking site for PDK1. PDK1 docks on Thr^{389} and phosphorylates Thr^{229} in the activation loop of the kinase, leading to kinase activation. The critical event in activating $p70^{s6k}$ is phosphorylation of Thr^{389}. In addition to PDK1, mTOR is also a potent Thr^{389} kinase. (Note that a $p70^{s6k}$ isoform $p85^{s6k}$ can also phosphorylate S6. In contrast to $p70^{s6k}$, $p85^{s6k}$ has a 23-amino acid extension at the amino terminus, which apparently targets it to the nucleus where it is phosphorylated in response to mitogens.)

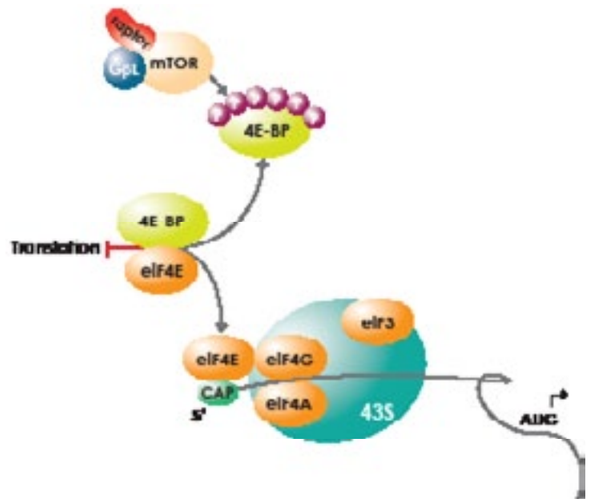


Figure 3. 4E-BP1 inactivation enables protein synthesis: Various stimuli, including insulin and nutrients, trigger a phosphorylation cascade that sequentially activates PI3K, PDK1, Akt, and mTORC1. When activated, mTORC1 phosphorylates 4E-Binding Protein 1 (4E-BP1), a 12.4 kDa protein that prevents the initiation of mRNA translation by binding to eukaryotic initiation factor (eIF) 4E. 4E-BP1 binding blocks the association of eIF4E with the 5′ cap structure present on mRNA. The sequential phosphorylation of 4E-BP1 at six key serine and threonine sites (Thr^{37}, Thr^{46}, Ser^{65}, Thr^{70}, Ser^{83}, and Ser^{112}) reduces its affinity for eIF4E. This allows eIF4E to associate with initiation factors eIF4G and eIF4A and form the eIF4F complex, which recruits mRNA to the 43S complex to commence the translation of transcripts that encode components of protein synthesis and contribute to cell growth.

References

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2. Le Bacquer, O., Petroulakis, E., Paglialinga, S., *et al. J. Clin. Invest.* **117(2),** 387-396 (2007).
3. Rosivatz, E., Matthews, J.G., McDonald, N.Q. , *et al. ACS Chemical Biology.* **1(12),** 780-790 (2006).
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5. Wijesekara, N., Konrad, D., Eweida, M., *et al. Mol. Cell. Biol.* **25(3),** 1135-1145 (2005).
6. Fraenkel, M., Ketzinel-Gilad, M., Ariav, Y., *et al. Diabetes* **57,** 945-957 (2008).
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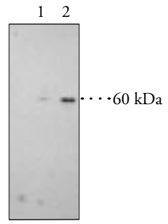
CB_1 Receptor Polyclonal Antibody 101500

Peptide affinity-purified IgG **Stability:** ≥1 year at -20°C
Summary: Antigen: human, rat, and murine CB_1 receptor amino acids 1-14 • Host: rabbit • Application: WB (does not work for IHC-frozen-tissue-sections); other applications not tested • The CB_1 receptor is a GPCR that binds the active component of cannabis, D^9-THC, as well as AEA and 2-AG which are endogenous CB receptor ligands. This antibody has been raised against the N-terminal extracellular region of the of the CB_1 receptor.

1 ea



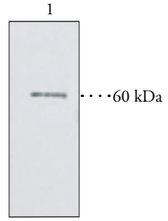
Lane 1: *Rat brain homogenate (50 µg)*
Lane 2: *Rat brain homogenate (100 µg)*

Also Available: *CB_1 Receptor Blocking Peptide (301500)* *200 µg*

CB_1 Receptor (C-Term) Polyclonal Antibody 10006590

Peptide affinity-purified IgG **Stability:** ≥1 year at -20°C
Summary: Antigen: human CB_1 receptor amino acids 461-472 • Host: rabbit • Cross-reactivity: human, rat, and murine CB_1 receptor; other species not tested • Applications: WB and IHC (paraffin-embedded sections); other applications not tested • The CB_1 receptor is a GPCR that binds the active component of cannabis, D^9-THC, as well as AEA and 2-AG which are endogenous CB receptor ligands. This antibody has been raised against the C-terminal (amino acids 461-472) intracellular region of the human CB_1 receptor.

1 ea



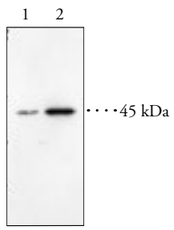
Lane 1: *Human cerebellum (30 µg)*

Also Available: *CB_1 Receptor (C-Term) Blocking Peptide (10006591)* *200 µg*

CB_2 Receptor Polyclonal Antibody 101550

Peptide affinity-purified IgG **Stability:** ≥1 year at -20°C
Summary: Antigen: human CB_2 receptor amino acids 20-33 • Host: rabbit • Applications: WB and IHC; other applications not tested • The CB_2 receptor is a GPCR that binds the active component of cannabis, D^9-THC, as well as AEA and 2-AG which are endogenous CB receptor ligands. The CB_2 receptor is localized predominantly in peripheral tissues, including the spleen and hemopoietic cells.

1 ea



Lane 1: *Jurkat (human T-cell Leukemia) lysate (50 µg)*
Lane 2: *Jurkat (human T-cell Leukemia) lysate (100 µg)*

Also Available: *CB_2 Receptor Blocking Peptide (301550)* *200 µg*
Also Available: *CB_2 Receptor Polyclonal FITC Antibody (10010712)* *1 ea*

α-CEHC 10007705

MF: $C_{16}H_{22}O_4$ **FW:** 278.3 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: α-CEHC is the major urinary metabolite of α-tocopherol following vitamin E supplementation. The concentration of α-CEHC in human serum is in the range of 5-10 pmol/ml but increases significantly up to 200 pmol/ml upon supplementation with RRR-α-tocopherol. α-CEHC is only excreted when a threshold concentration of 7-9 µmol α-tocopherol/g total lipid in plasma is exceeded. Therefore, excretion of α-CEHC may be considered to be a marker of optimum vitamin E intake.

1 mg
5 mg
10 mg
25 mg

3,4-dihydro-6-hydroxy-2,5,7,8-tetramethyl-2H-1-benzopyran-2-propanoic acid

δ-CEHC 10007706

MF: $C_{14}H_{18}O_4$ **FW:** 250.3 **Purity:** ≥95%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: δ-CEHC is a major β-oxidation metabolite of δ-tocopherol. Approximately 50% of [^{3}H]-δ-tocopherol given as an intraperitoneal dose in rat is recovered in the urine as δ-CEHC, indicating this is the major route of metabolism.

1 mg
5 mg
10 mg
25 mg

3,4-dihydro-6-hydroxy-2,8-dimethyl-2H-1-benzopyran-2-propanoic acid

γ-CEHC 89630

[178167-75-4] GTM, 2,7,8-trimethyl-2-(β-carboxy-ethyl)-6-Hydroxychroman, γ-Tocopherol Metabolite
MF: $C_{15}H_{20}O_4$ **FW:** 264.3 **Purity:** ≥98%
A crystalline solid **Stability:** ≥1 year at -20°C
Summary: γ-CEHC is a β-oxidized metabolite of dietary γ-tocopherol that functions as a natriuretic hormone. It was initially purified and characterized from the urine of uremic patients, but it has since been found in urine from both control patients and those with congestive heart failure. γ-CEHC is also anti-inflammatory, reducing 8-*iso* PGF_{2a} and inflammatory eicosanoid synthesis in rat models.

1 mg
5 mg
10 mg
100 mg

3,4-dihydro-6-hydroxy-2,7,8-trimethyl-2H-1-benzopyran-2-propanoic acid

Cetaben 10007171

[55986-43-1] Hexadecylamino-p-amino Benzoic Acid
MF: $C_{23}H_{39}NO_2$ **FW:** 361.6 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: Cetaben is a unique, PPARα-independent peroxisome proliferator with hypolipidemic activity, characterized by reduction in serum TG and cholesterol concentrations in rats. In male wistar rats, cetaben increased the activity of all peroxisomal enzymes examined in liver and kidney, whereas clofibrate showed a varied regulatory pattern. In addition to its effects on peroxisomes, cetaben inhibits cholesterol synthesis in human hepatoma HepG2 cells resulting in reversible changes in Golgi morphology. It also blocked TG synthesis by 99% and reduced cholesterol ester synthesis by >70% at a concentration of 50 µM in these same cells.

5 mg
10 mg
50 mg
100 mg

4-(hexadecylamino)-benzoic acid

CGRP

CGRP is a 37 amino acid peptide synthesized in the central and peripheral nervous system from a calcitonin/CGRP gene complex. Two isoforms have been described which differ by three amino acids and display similar biological activities: CGRP-α, which is produced by alternative splicing of a calcitonin gene transcript, and CGRP-β, the product of a separate gene. In the CNS, CGRP acts as a neurotransmitter that is released from a subset of small sensory neurons that transmit pain information. In the circulation, CGRP is one of the most potent vasodilators known and may function as a regulator of blood flow. When administered systemically, CGRP causes hypotension in several species, including humans. Intradermal administration of CGRP at femtomole doses produces increased blood flow and persistent reddening.

CGRP (human) EIA Kit* 589101

Calcitonin Gene-related Peptide
Stability: ≥6 months at -20°C
Summary: This EIA is based on a double-antibody sandwich technique that permits measurement of CGRP within the range of 0-1,000 pg/ml, with a detection limit of <5 pg/ml. This assay provides a method for the sensitive, specific analysis of CGRP in a variety of samples including plasma, serum, nervous tissue, CSF, and culture media.

Limit of detection: <5 pg/ml
Specificity:

Rat CGRP-α	120%
Rat CGRP-β	120%
Human CGRP-α	100%
Human CGRP-β	100%

For a full specificity profile, please go to www.caymanchem.com

96 wells

Also Available: *CGRP Affinity Sorbent* (489009)* *1 ml*

CGRP (rat) EIA Kit* 589001

Calcitonin Gene-related Peptide
Stability: ≥6 months at -20°C
Summary: This EIA is based on a double-antibody sandwich technique that permits measurement of CGRP within the range of 0-500 pg/ml, with a detection limit of <1 pg/ml. This assay provides a method for the sensitive, specific analysis of CGRP in a variety of samples including plasma, serum, nervous tissue, CSF, and culture media.

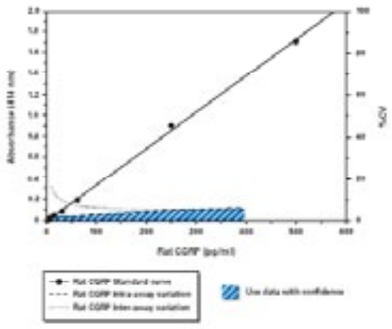
Limit of detection: <1 pg/ml
Specificity:

Human CGRP-α	100%
Human CGRP-β	100%
Rat CGRP-α	83%
Rat CGRP-β	83%

For a full specificity profile, please go to www.caymanchem.com

96 wells

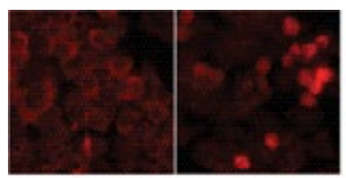
Also Available: *CGRP Affinity Sorbent* (489009)* *1 ml*



ChREBP Cell-Based Translocation Assay Kit 10010060

Carbohydrate Response Element-binding Protein
Stability: ≥6 months at -20°C
Summary: The ChREBP is a transcription factor that plays a critical role in the nutrient and hormonal regulation of genes encoding enzymes of glucose metabolism and lipogenesis. Under conditions of low glucose, ChREBP is phosphorylated, which sequesters the transcription factor in the cytoplasm. Upon stimulation with glucose the protein is dephosphorylated at Ser^{196} and then translocated to the nucleus. The activation of ChREBP has been proposed as a potential mechanism for reducing obesity and improving glucose tolerance. Thus, identification of ChREBP activators is of great interest for drug discovery. The distinct translocation of the protein from the cytoplasm to the nucleus during activation makes it possible to study modulators of ChREBP through sub-cellular localization of the protein using conventional immunocytochemical staining with a specific antibody. Cayman's ChREBP Cell-Based Translocation Assay provides a highly specific ChREBP primary antibody together with a Dylight™ (product of Pierce Biotechnology Inc.) conjugated secondary antibody in a ready to use format.

100 tests



Translocation of ChREBP into nuclei induced by 10 mg/ml sucrose. HepG2 cells were seeded in a 96-well plate at a density of 3 x 10^4 cells/well and cultured overnight. The next day, cells were treated with PBS (vehicle) or 10 mg/ml sucrose in PBS for 24 hours. *Left panel:* Cells treated with PBS alone demonstrate cytoplasmic localization of ChREBP, indicating that most of cells have inactive protein. *Right panel:* Sucrose treatment for 24 hours induces ChREBP translocation into the nuclei, indicating activation of the protein.

**SPI-BIO Assays are available through Cayman Chemical only within North & South America and Asia; elsewhere contact SPI-BIO.*

ChREBP DBD (human recombinant) 10009524

Carbohydrate Response Element-binding Protein, DNA Binding Domain, ChREBP DNA Binding Domain, Williams Beuren Syndrome Chromosome Region 14, WS-bHLH
Purity: ≥85% by SDS-PAGE
A solution in 50 mM sodium phosphae pH 7.2, 100 mM NaCl, 1 mM DTT, and 40% glycerol **Stability:** ≥6 months at -80°C
Summary: Source: human recombinant N-terminal GST-tagged protein expressed in *E. coli* • M_r: ~38.3 kDa • The ChREBP is a transcription factor that plays a critical role in the nutrient and hormonal regulation of genes encoding enzymes of glucose metabolism and lipogenesis.

5 µg
10 µg
25 µg

ChREBP DBD Western Ready Control 10009753

Carbohydrate Response Element-binding Protein DNA Binding Domain , ChREBP DNA Binding Domain, Williams Beuren Syndrome Chromosome Region 14, WS-bHLH
Purity: Whole cell lysate
Stability: ≥6 months at -20°C
Summary: Source: human recombinant GST-tagged ChREBP amino acids 648-741 expressed in *E. coli* • Application: Positive control for WB

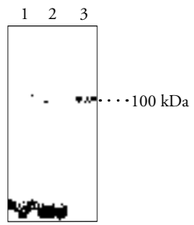
1 ea

Also Available: *Transcription Factor ChREBP Positive Control (10008861) 1 ea*

ChREBP Polyclonal Antibody 10006789

Carbohydrate Response Element-binding Protein DNA Binding Domain, Williams Beuren Syndrome Chromosome Region 14, WS-bHLH
Peptide affinity-purified IgG **Stability:** ≥1 year at -20°C
Summary: Antigen: Murine ChREBP amino acids 715-733 • Host: rabbit • Cross-reactivity: (+) human, murine, and rat ChREBP; other species not tested • Applications: WB and ICC; other applications not tested • ChREBP is a transcription factor playing a critical role in the nutrient and hormonal regulation of genes encoding enzymes of glucose metabolism and lipogenesis pathways.

1 ea



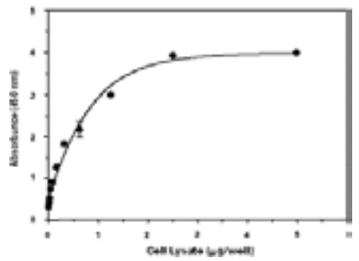
Lane 1: *HepG2 cell lysate (60 µg)*
Lane 2: *Human liver microsome (60 µg)*
Lane 3: *Murine liver homogenate (60 µg)*

Also Available: *ChREBP Blocking Peptide (10006790) 200 µg*

ChREBP Transcription Factor Assay Kit 10006909

Carbohydrate Response Element-binding Protein, DNA Binding Domain, Williams Beuren Syndrome Chromosome Region 14, WS-bHLH
Stability: ≥6 months at -20°C
Summary: ChREBP is a transcription factor playing a critical role in the nutrient and hormonal regulation of genes encoding enzymes of glucose metabolism and lipogenesis pathways. Cayman's ChREBP Transcription Factor Assay is a non-radioactive, sensitive method for detecting specific transcription factor DNA binding activity in nuclear extracts and whole cell lysates. A specific double stranded DNA (dsDNA) sequence containing the ChREBP response element is immobilized onto the wells of a 96-well plate. ChREBP contained in a nuclear extract binds specifically to the ChREBP response element. ChREBP is detected by addition of specific primary antibody directed against ChREBP. A secondary antibody conjugated to HRP is added to provide a sensitive colorimetric readout at 450 nm.

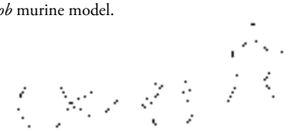
96 wells



Ciglitazone 71730

[74772-77-3] ADD 3878, U-63287
MF: $C_{18}H_{23}NO_3S$ **FW:** 333.4 **Purity:** ≥98%
A crystalline solid **Stability:** ≥1 year at -20°C
Summary: Ciglitazone is an antidiabetic drug of the thiazolidinedione structural class that acts as a potent and selective PPARγ ligand. It binds to the PPARγ ligand-binding domain with an EC_{50} value of 3.0 µM. Ciglitazone is active *in vivo* as an anti-hyperglycemic agent in the *ob/ob* murine model.

1 mg
5 mg
10 mg
50 mg

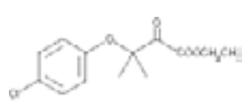


5-[[4-[(1-methylcyclohexyl)methoxy]phenyl]methyl]-2,4-thiazolidinedione

Clofibrate 10005745

[637-07-0]
MF: $C_{12}H_{15}ClO_3$ **FW:** 242.7 **Purity:** ≥98%
A colorless liquid **Stability:** ≥1 year at -20°C
Summary: Clofibrate is PPARα agonist and a member of a class of hypolipidemic drugs that includes fenofibrate and benzafibrate, which have been used clinically to treat dyslipidemia and cardiovascular disease. In a transactivation assay, clofibrate exhibits EC_{50} values of 50 and 55 µM for murine and human PPARα, respectively. It also binds to PPARγ, but with 10-fold less affinity and is inactive at PPARδ at concentrations up to 100 µM.

500 µl
1 ml
5 ml
10 ml



2-(4-chlorophenoxy)-2-methyl-propanoic acid, ethyl ester

CMPF 10007133

[86879-39-2]
MF: $C_{12}H_{16}O_5$ **FW:** 240.3 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: Furan fatty acids are unique, naturally occurring lipids that are found in significant amounts in dietary phospholipids, such as in salmon roe. CMPF is an endogenous metabolite of furan fatty acids in humans. CMPF is highly albumin-bound and accumulates in the serum of uremic patients to concentrations in excess of 0.2 mM. Its primary effect is to inhibit cellular transport and subsequent deiodination of thyroxine (T4). CMPF is tightly bound to albumin but only moderately inhibits T4 binding in a direct manner (10-14% at 0.3 mM). However, CMPF effectively displaces competitive T4 binding molecules from albumin, such as acidic drugs and free fatty acids. Therefore, CMPF may indirectly influence T4 binding to albumin by increasing the serum concentration of competitive binding molecules, particularly free fatty acids such as oleic acid.

1 mg
5 mg
10 mg
50 mg

3-carboxy-4-methyl-5-propyl-2-furanpropanoic acid

Corticosterone EIA Kit 500651

Stability: ≥1 year at -20°C
Summary: Corticosterone is a glucocorticoid produced by the adrenal cortex in response to adrenocorticotropic hormone (ACTH), and is the precursor to aldosterone. The production of glucorcorticoids is increased by stress; therefore, corticosterone can be used as a biomarker of stress. Biologists often measure corticosterone in fecal material of the species they are studying. This non-invasive sample collection procedure has the advantage of not itself causing stress, and thereby increasing corticosterone levels, a common problem where samples for measurement of corticosterone are collected by more invasive means. Plasma corticosterone levels have a circadian variation, and may be important in the regulation of the sleep-wake cycle. Cayman's corticosterone EIA is a competitive assay that permits corticosterone measurements within the range of 11.5 - 10,000 pg/ml, typically with a detection limit (defined as 80% B/B_0) of 24 pg/ml. The assay can be performed using incubation and development times of only two hours and one hour, respectively, and has been validated for the measurement of corticosterone from plasma and fecal samples.

Sensitivity: 50% B/B_0: 232 pg/ml
80% B/B_0: 24 pg/ml

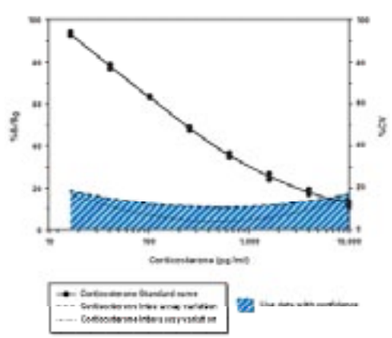
Specificity:

Corticosterone	100%
11-deoxy Corticosterone	19.6%
Progesterone	1.01%
Aldosterone	0.25%
Androstenedione	0.24%
Cortisol	0.18%
Testosterone	0.18%
5α-DHT	0.03%
Cortisone	0.02%

For a full specificity profile, please go to www.caymanchem.com

96 wells
480 wells

Also Available: *Corticosterone EIA Kit (Solid Plate) (10005590)*



Cortisol

Cortisol is a glucocorticoid produced by the adrenal cortex in response to adrenocorticotropic hormone (ACTH). It is secreted with a circadian periodicity, and peaks just prior to waking in the morning. Cortisol is often elevated in major depressive disorder, certain forms of hypertension, stress, AIDS, and in the visceral fat of obese individuals. Cortisol can be measured in many matrices including blood, urine, and saliva. In serum, approximately 90-95% of cortisol is bound to proteins. Urinary cortisol is not bound to proteins, but its levels are dependent on glomerular and tubular function. In saliva, approximately 67% of cortisol is unbound. There is generally good correlation between cortisol measurements in saliva and serum.

Cortisol EIA Kit 582121

Stability: ≥1 year at -20°C
Summary: Cayman's Cortisol EIA is a competitive assay that provides accurate measurements of cortisol within the range of 7.9-1,000 pg/ml

Sensitivity: 50% B/B_0: 70 pg/ml
80% B/B_0: 12 pg/ml

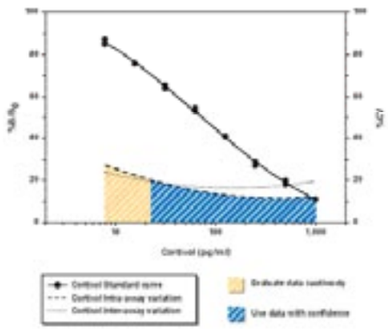
Specificity:

Cortisol	100%
Prednisolone	22%
Cortexolone	6.1%
Cortisone	2.0%
Corticosterone	1.3%
DOC	0.2%
17-hydroxy Progesterone	0.2%

For a full specificity profile, please go to www.caymanchem.com

96 wells
480 wells

Also Available: *Cortisol EIA Kit (Solid Plate) (582121.1)*



Cortisol Products Continued on Next Page

Continued From Previous Page

Cortisol Express EIA Kit 10006791

Stability: ≥1 year at -20°C

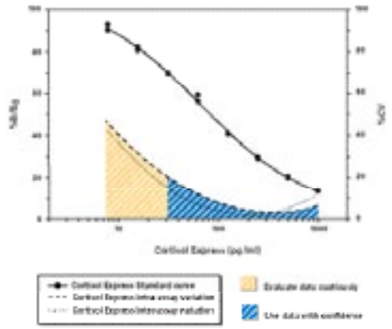
Summary: Cayman's cortisol express EIA is a competitive assay that permits the rapid measurement of cortisol from biological samples, requiring only a two hour incubation and one hour development times. This EIA offers the convenience of a fast assay while still achieving an IC_{50} value of approximately 80 pg/ml and a detection limit (80%B/B_0) of approximately 17 pg/ml.

Sensitivity: 50% B/B_0: 80 pg/ml
80% B/B_0: 17 pg/ml

Specificity:
Please see Cortisol EIA Kit (Catalog No. 582121)
For a full specificity profile, please go to www.caymanchem.com

96 wells
480 wells

Also Available: *Cortisol Express EIA Kit (Solid Plate) (10007337)*



CP 55,940 90084

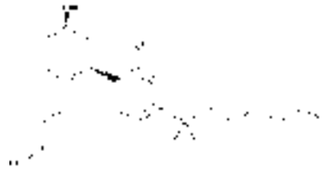
[83002-04-4]

MF: $C_{24}H_{40}O_3$ **FW:** 376.6 **Purity:** ≥98%

A crystalline solid **Stability:** ≥2 years at -20°C

Summary: CP 55,940 is a potent, non-selective CB receptor agonist with K_i values of 0.58 and 0.69 nM for human recombinant CB_1 and CB_2, respectively. It is a commonly used reference molecule in CB research and is considerably more potent than D^9-THC in both behavioral tests and in receptor binding assays.

5 mg
10 mg
25 mg
50 mg



5-(1,1-dimethylheptyl)-2-[(1R,2R,5R)-5-hydroxy-2-(3-hydroxypropyl)cyclohexyl]-phenol

CUDA 10007923

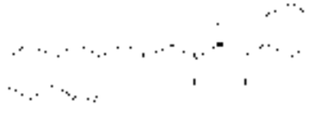
[479413-68-8]

MF: $C_{19}H_{36}N_2O_3$ **FW:** 340.5 **Purity:** ≥98%

A crystalline solid **Stability:** ≥2 years at -20°C

Summary: CUDA is an inhibitor of sEH exhibiting IC_{50} values of 11.1 nM and 112 nM for the murine and human enzymes, respectively. In COS-7 cells, 10 µM CUDA blocks conversion of 1 µM 14,15-EET to 14,15-DHET by 94%. CUDA activates PPARα 8-fold at a concentration of 10 µM but exhibits no affect on PPARδ or PPARγ.

5 mg
10 mg
50 mg
100 mg



12-[[(cyclohexylamino)carbonyl]amino]-dodecanoic acid

Cyclic AMP EIA Kit 581001

Adenosine 3',5'-cyclic mononucleotide, Adenosine 3',5'-cyclic monophosphate

Stability: ≥1 year at -20°C

Summary: cAMP is a ubiquitous cellular second messenger that is a critical component of a signal transduction pathway linking membrane receptors and their ligands to the activation of internal cellular enzymatic activity and gene expression. cAMP is synthesized from ATP by membrane-bound adenylate cyclase. Binding of certain ligands or hormones to their specific GPCRs activates GTP binding proteins (G_s or G_i) which either stimulate or inhibit adenylate cyclase. cAMP activates or inhibits various enzymes or cascade of enzymes by promoting their phosphorylation or dephosphorylation. The cAMP signal is neutralized by hydrolysis of cAMP to AMP by phosphodiesterases. Therefore, the concentration of cAMP in a cell is a function of the ratio of the rate of synthesis from ATP by adenylate cyclase and its rate of breakdown to AMP by specific phosphodiesterases.

Sensitivity: 50% B/B_0: 20.4 pmol/ml (non-acetylated)
0.5 pmol/ml (acetylated)
80% B/B_0: 3.1 pmol/ml (non-acetylated)
0.1 pmol/ml (acetylated)

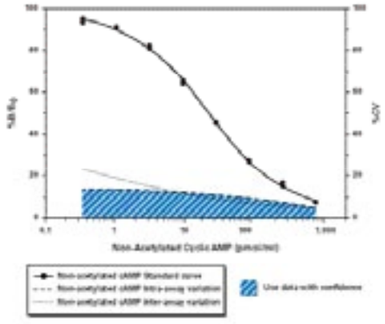
Specificity:

Acetylated cAMP	100%
cAMP	3%
Dibutyryl cAMP	0.8%
Acetylated cGMP	0.05%

For a full specificity profile, please go to www.caymanchem.com

96 wells
480 wells

Also Available: *Cyclic AMP EIA Kit (Solid Plate) (581001.1)*



Cyclic GMP EIA Kit 581021

Guanosine 3',5'-cyclic mononucleotide, Guanosine 3',5'-cyclic monophosphate

Stability: ≥1 year at -20°C

Summary: Cayman's cGMP Assay is a competitive EIA that can be used for quantification of cGMP directly obtained from cell lysates, tissue homogenates, plasma, or urine. The EIA typically displays an IC_{50} (50% B/B_0) of approximately 5 pmol/ml and a detection limit (80% B/B_0) of less than 1 pmol/ml. Since the antibody used in this assay was prepared against a cGMP-carrier protein conjugate, antibody binding is increased if an acetyl group is present on the 2' hydroxyl group of the cGMP. The optional acetylation procedure for both samples and standards increases the sensitivity of the assay approximately 10-fold. A protocol for acetylating both the standards and samples prior to performing the assay is provided. Basal levels of cGMP in cell lysates can often be measured without acetylation, but results will depend on the type and number of cells being utilized. Platelets produce approximately 1.5-2.5 pmol cGMP/109 platelets under basal conditions. Cells such as NG108-15 cells and monocytes produce considerably more cGMP than platelets (approximately 0.1-1 pmol/106 cells).

Sensitivity: 50% B/B_0: 4.6 pmol/ml (non-acetylated)
0.46 pmol/ml (acetylated)
80% B/B_0: 1 pmol/ml (non-acetylated)
0.1 pmol/ml (acetylated)

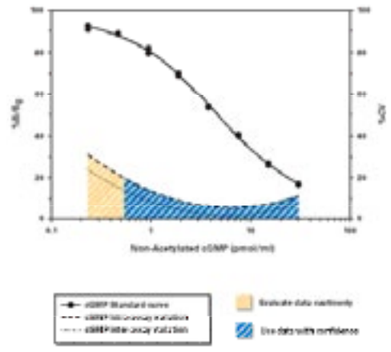
Specificity:

Acetylated cGMP	100%
cGMP	9%
Dibutyryl cGMP	0.8%
Acetylated cAMP	0.05%

For a full specificity profile, please go to www.caymanchem.com

96 wells
480 wells

Also Available: *Cyclic GMP EIA Kit (Solid Plate) (581021.1)*



14,15-EEZE 10004946

[519038-92-7]

MF: $C_{20}H_{36}O_3$ **FW:** 324.5 **Purity:** ≥98%

A solution in ethanol **Stability:** ≥1 year at -20°C

Summary: Epoxyeicosatrienoic acids (EpETrEs; EETs), such as 11(12)-EpETrE and 14(15)-EpETrE, are CYP450 metabolites of arachidonic acid that have been identified as endothelium-derived hyperpolarizing factors with vasodilator activity. 14,15-EEZE is a structural analog of 14(15)-EpETrE that antagonizes EpETrE-induced relaxation of vascular smooth muscle. Relaxation of U46619-constricted bovine arteries by 14,15-EpETrE could be inhibited approximately 80% by 14,15-EEZE at a concentration of 10 µM. 14,15-EEZE does not appear to antagonize NO- or iloprost-mediated vascular relaxation.

25 µg
50 µg
100 µg
500 µg

14(15)-epoxy-5Z-eicosaenoic acid

Endothelin EIA Kit 583151

ET

Stability: ≥6 months at -20°C

Summary: The endothelin peptide family consists of three isoforms, ET-1 (corresponding to the initially isolated and most predominant isoform), ET-2, and ET-3. ET-1 is a 21 amino acid peptide and is one of the most potent vasoconstrictors currently known. ET-2 displays similar pharmacology to ET-1, whereas ET-3 is a weak vasoconstrictor but more potent inhibitor of platelet aggregation. Cayman's endothelin assay is an immunometric (*i.e.,* sandwich) EIA that permits endothelin measurements within the range of 0-250 pg/ml, typically with a limit of detection of 1.5 pg/ml. Inter- and intra-assay CV's of less than 10% may be achieved at most concentrations. This assay offers sensitive and specific analysis of endothelin in serum, plasma, urine, or cell culture media.

Sensitivity: Limit of detection: 1.5 pg/ml

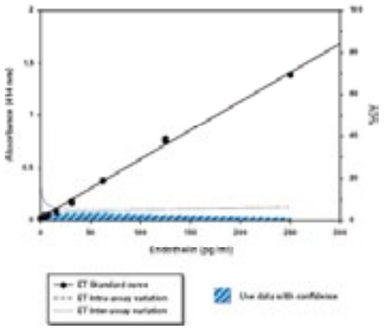
Specificity:

Endothelin-1	100%
Endothelin-2	100%
Endothelin-3	100%
VIC	100%
Big Endothelin	100%

Homology:

Mammalian Endothelin-1	100%

96 wells
480 wells



Tom Brock, Ph.D.

Sex and the Obesity

Leptin and Ghrelin

Weight gain is essential for any growing mammal. The rate and timing of that gain are carefully orchestrated to allow a full commitment to sex and reproduction with the best odds of success. Obesity may be viewed as an error in the trajectory of that growth curve, caused when an abundance of nutrients is allowed to shift the body mass index of the animal to a fatty phenotype. The fascinating thing about obesity is that it not only impacts the cardiovascular health and glucose metabolism of the animal, it also has a negative influence on ovulation and pregnancy. Obesity can best be labeled a disease because it not only causes chronic health issues for people, but it also inhibits successful sex and reproduction – which was exactly the reason to be hungry and growing in the first place. And the inquisitive scientist would certainly like to know how, physiologically, hunger intersects with sex.

Leptin and Ghrelin at the Hypothalamus

A strain of mice that is extremely obese, but only when homozygous (termed *ob/ob*), was first isolated in the 1950s. These *ob/ob* mice were described as 'hyperphagic' because they ate continuously, as they lacked a physiological signal to stop. It was not until 1994 that leptin was identified as the protein made by the *ob* gene. This breakthrough was very exciting because it raised the hope that leptin could be used as an appetite suppressant. Shortly thereafter, mice that were obese and spontaneously diabetic (termed *db/db*) were identified as lacking a functional leptin receptor, again linking lack of leptin signaling with obesity. However, about the same time, overexpression of the *ob* gene was found in human obese subjects,[1] indicating that leptin insensitivity could occur. Another important finding was that *ob/ob* mice gained weight even when their diet was restricted to match that which produced lean wild type mice. These results and others underlined the importance of leptin in suppressing appetite and limiting weight gain, while indicating that the actions of leptin are complex and balanced by other appetite hormones.

Leptin is a 16 kD protein, best known as a product of white adipose tissue, with circulating levels of leptin roughly proportional to body fat. Conversely, plasma leptin levels fall with dieting and are very low in malnourished individuals. The effects of leptin are mediated by leptin receptors (LepR), of which there are six isoforms, designated a-f. Only the b isoform (LepRb) is full length and provides complete intracellular signaling. LepRb is most abundant in the hypothalamus. Interaction of leptin with LepRb activates the intraneuronal Jak-Stat pathway, inhibiting the activity of neurons that contain neuropeptide Y (NPY) and agouti-related protein (AgRP), two peptides which act to increase food intake. Leptin also stimulates the activity of proopiomelanocortin (POMC) neurons to increase α-melanocyte-stimulating hormone (α-MSH), which suppresses appetite. Leptin signaling also reduces the production of endocannabinoids. Altogether, the net effect of neuronal activation by leptin is a suppression of appetite.

Ghrelin is a peptide hormone that stimulates hunger and is often described as the counterbalance to leptin, although its story is more recent and quite different from that for leptin. Ghrelin was first described in 1999 as a biological agonist for the orphan receptor that stimulated the secretion of growth hormone, known as the growth hormone secretagogue receptor (GHSR). This receptor, like the leptin receptor, is abundant in the hypothalamic feeding center of the brain, as well as in the pituitary, heart, and adipose tissue. Contrary to the leptin receptor, activation of GHSR in the arcuate nucleus increases the activity of NPY and AgRP neurons, stimulating food intake. The responsiveness of NPY/AgRP neurons is also sensitive to both leptin and insulin levels.

Ghrelin, itself, is synthesized as a preprohormone, designated GHRL, primarily in the p/D1 cells lining the fundus of the stomach but also in lesser amounts in the hypothalamus, pituitary, placenta, and kidney. The preprohormone is cleaved to yield two biologically active peptides. One, which will be ghrelin, is 28 amino acids in length; post-translational addition of *n*-octanoic acid to Ser[3] is needed for some effects (GH release, appetite increase) but not others. Intriguingly, the second peptide, which is known as obestatin, acts as an appetite suppressant. Ghrelin levels in the circulation rise dramatically before meals and drop precipitously after eating. Individuals with Prader-Willi syndrome (which includes hyperphagia as a symptom) have high fasting levels of ghrelin. Gastric bypass surgery can dramatically reduce ghrelin levels and this helps suppress the urge to eat. It has been possible to immunize rats against ghrelin: this antibody-based method to reduce circulating ghrelin levels diminished weight gain and lowered adipose fat levels, although it did not reduce food consumption. This indicated that ghrelin, like other obesity hormones, have multiple points of action.

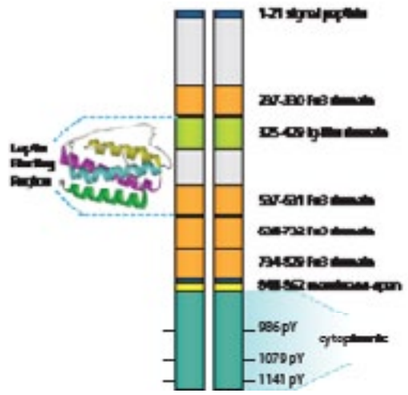


Figure 1. Leptin structure and leptin receptor (LepRb) domains: Fibronectin type III (Fn3) and Ig-like domains mediate protein-protein interactions and facilitate dimerization. Phosphorylation on Y986, Y1079, and Y1141 mediates ERK, STAT5, and STAT3 signaling, respectively.

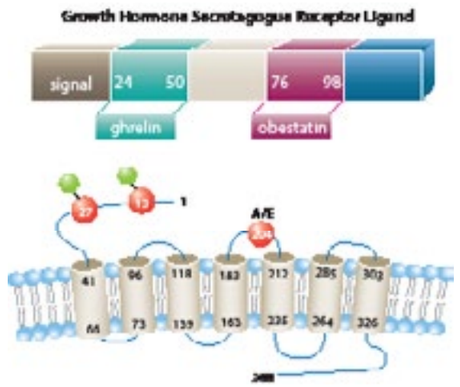


Figure 2. Ghrelin peptide relative to the preprohormone that also is the source for obestatin (upper), and growth hormone secretagogue receptor (GHSR; ghrelin receptor) domains (lower): This Gα11-coupled receptor is activated by GH releasing peptides (ghrelin, met-enkephalin, GHRP-6) and non-peptide secretagogues (L-692,429, MK-0677, adenosine). Glycosylation occurs on residues 13 and 27. The natural mutation Ala204Glu causes idiopathic short stature in humans but does not alter ghrelin binding or activation.[7]

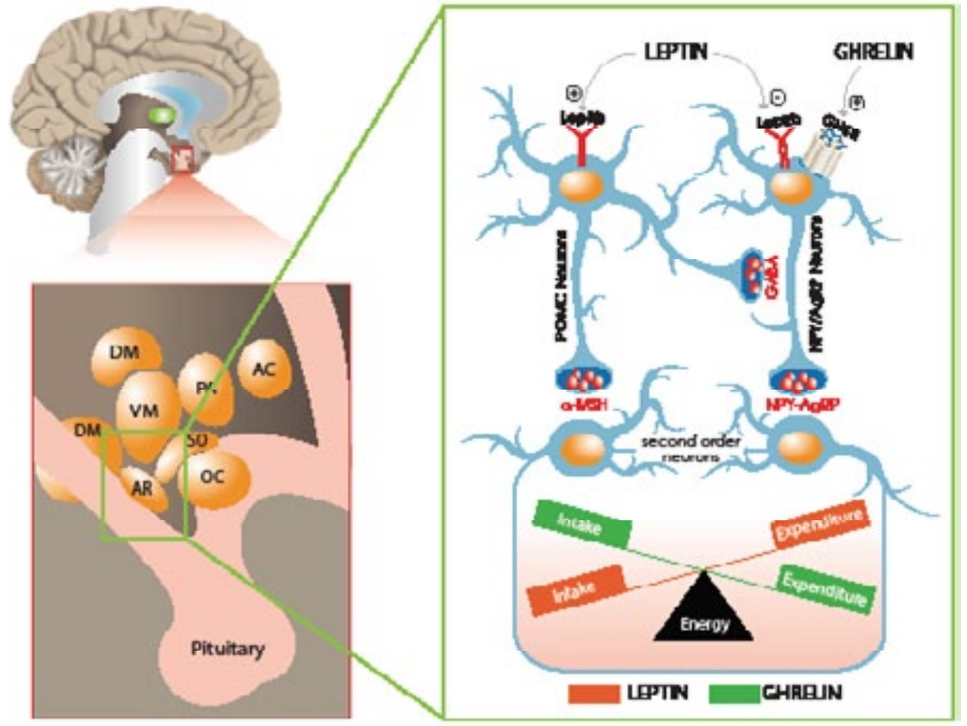


Figure 3. Leptin and ghrelin signaling at the hypothalamus: Receptors for leptin (LepRb) and ghrelin (GHSR) are abundant in the arcuate nucleus of the hypothalamus. Abbreviations: AC, anterior commissure; AR, arcuate nucleus; DM, dorsomedial nucleus; OC, optic chiasm; PA, paraventricular nucleus; SO, supraoptic nucleus; VM, ventromedial nucleus.

Leptin and Ghrelin in Fertility

Adult female leptin-deficient *ob/ob* mice are infertile. Technically, *ob/ob* females lack corpora lutea, their ovaries have very few primary or secondary follicles, estrus is absent or reduced, the mammary ductal tree fails to develop, and the vaginal opening is very small compared to wild type mice. This means that the reason for their infertility was a failure to develop the reproductive system, essentially failing to enter puberty. Males are marginally more fortunate: in spite of reduced testis weight, some are able to sire a litter. The leptin receptor-deficient *db/db* female mice also are infertile because they do not develop sexually. Also, the sexual development of *ob/ob* mice could be stimulated by the administration of leptin. These findings link leptin signaling through its receptor with sexual development. It is interesting that extremely lean women (athletes, dieters, malnourished) commonly have menstrual/fertility problems, and leptin could in part explain this problem. In a comparison of female athletes, amenorrheic elite athletes had significantly less circulating leptin than cyclic elite athletes, who in turn had less leptin than recreational athletes.[2] Hypoleptinemia was correlated with reductions in insulin and thyroid hormones. Leptin therapy is being tested, with some success, for stimulating menstruation and ovulation in lean, hypoleptinemic women.

As discussed above, leptin modulates appetite by activating receptors at the hypothalamus. The hypothalamus, with the pituitary, is also important for gonadal maturation and function. Evidence suggests that leptin, through its receptor, suppresses NPY, which modulates the release of gonadotropin releasing hormone (GnRH1) from the hypothalamus. GnRH1, in turn, controls the secretion of follicle stimulating hormone (FSH) and luteinizing hormone (LH) from the pituitary, and these hormones play central roles in reproduction. Consistent with this model, in the *db/db* mice selective transgene expression of LepRb in neurons (using neuron specific promoters) completely rescued sexual development, as it normalized neuronal AgRP, NPY, and POMC expression.[3] Also, in *ob/ob* mice deletion of the NPY receptor 4 was sufficient to increase GnRH1 expression, mammary gland development, and fertility.[4] While these findings provide a model for how leptin modulates sexual maturation, there are other important actions of leptin in other sites in the body in other reproductive processes.[5]

The effects of ghrelin on reproduction were recently reviewed.[6] Ghrelin can suppress serum LH, FSH, and testosterone levels when injected into rodents. In addition, ghrelin can be made in the testis and the ovaries, and its receptor, GHSR, is present in these tissues. However, initial reports from labs that have produced ghrelin deficient mice indicate that there are no obvious effects of ghrelin deficiency on mouse fertility. Apparently, ghrelin actions do not complement those of leptin when it comes to fertility or reproductive development.

References

1. Lönnqvist, F., Arner., Nordfors, L., *et al. Nat. Med.* **1,** 950-953 (1995).
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3. de Luca, C., Kowalski, T.J., Zhang, Y., *et al. J. Clin. Invest.* **115** (12), 3484-3493 (2005).
4. Sainsbury, A., Schwarzer, C., Couzens, M., *et al. Genes Dev.* **16,** 1077-1088 (2002).
5. Cervero, A., Dominguez, F., Horcajadas, J.A., *et al. Curr. Opin. Obstet. Gynecol.* **18,** 297-303 (2006).
6. García, M.C., Lopéz, M., Alvarez, C.V., *et al. Reproduction* **133,** 531-540 (2007).
7. Pantel, J., Legendre, M., Cabrol, S., *et al. J. Clin. Invest.* **116** (3), 760-768 (2006).

Enterolactone EIA Kit 500520

Stability: ≥1 year at -20°C
Summary: Enterolactone is a mammalian lignan with an estrogen-like diphenolic structure. It is produced by intestinal bacteria from two plant precursors (matairesinol and secoisolariciresinol) obtained in the diet. Enterolactone and other lignans and phytoestrogens have been associated with a reduced risk of acute coronary events, hormone-dependent cancers, and possibly osteoporosis. Several studies have suggested that serum enterolactone may serve as a biomarker of a healthy, high-fiber diet.

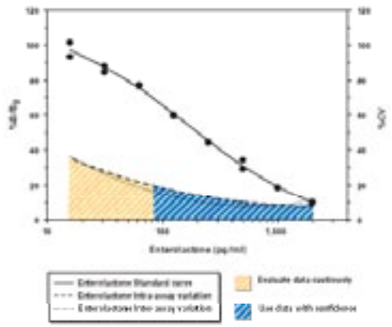
Sensitivity: 50% B/B_0: 240 pg/ml
80% B/B_0: 70 pg/ml
Specificity:

Enterolactone	100%
Enterodiol	0.05%

For a full specificity profile, please go to www.caymanchem.com

96 wells
480 wells

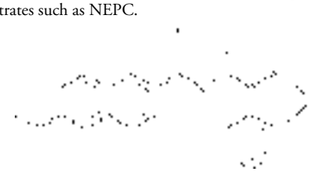
Also Available: *Enterolactone EIA Kit (Solid Plate) (10006647)*



Epoxy Fluor 7 10008610

[863223-43-2]
MF: $C_{23}H_{19}NO_5$ **FW:** 389.4 **Purity:** ≥98%
A crystalline solid **Stability:** ≥1 year at -20°C
Summary: Epoxy fluor 7 is a sensitive fluorescent substrate for sEH that can be used to monitor the activity of both human and murine enzymes. Hydrolysis of the substrate epoxide yields a highly fluorescent product that can be monitored at excitation and emission wavelengths of 330 and 465 nm, respectively. Epoxy fluor 7 is more stable in aqueous solution and offers about 2-fold better sensitivity than previously used colorimetric substrates such as NEPC.

1 mg
5 mg
10 mg
50 mg

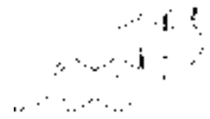


cyano(6-methoxy-2-napthalenyl)methyl[(2,3)-3-phenyloxiranyl]methyl ester, carbonic acid

Estradiol 10006315

[50-28-2] β-Estradiol, 17β-Estradiol, 17β-Oestradiol
MF: $C_{18}H_{24}O_2$ **FW:** 272.4 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: Estradiol is the major estrogen secreted by the premenopausal ovary. It is synthesized from testosterone primarily in the ovarian granulosa cells and placenta, but small amounts can be produced in the adrenal gland. Plasma estradiol levels increase gradually between days 1-7 of the menstrual cycle followed by a sharp increase to a peak value of about 300 pg/ml on day 12, just prior to ovulation.

500 mg
1 g
5 g
10 g

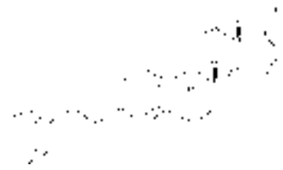


estra-1,3,5(10)-triene-3,17β-diol

Estradiol Benzoate 10006487

[50-50-0] β-Estradiol benzoate, 17β-Estradiol 3-benzoate
MF: $C_{25}H_{28}O_3$ **FW:** 376.5 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: Estradiol benzoate is an estradiol analog which contains a benzyl ester at the C-3 position. It is often used in combination with a progestin to induce estrus in domestic livestock. Estradiol benzoate binds to the human and murine estrogen receptor a (ERa), and chicken ER with IC_{50} values in the range of 22-28 nM. This reflects a 6-10 fold reduction in binding affinity compared to estradiol.

100 mg
500 mg
1 g
5 g



estra-1,3,5(10)-triene-3,17β-diol 3 benzoate

Estradiol EIA Kit 582251

β-Estradiol, 17β-Estradiol, β-Oestradiol
Stability: ≥1 year at -20°C
Summary: Estradiol is the major estrogen secreted by the premenopausal ovary. Estrogens direct the development of the female genotype in embryogenesis and at puberty. In addition, estradiol is an important luteolytic agent in humans. Estradiol is synthesized from testosterone primarily in the ovarian granulosa cells and placenta, but small amounts can be produced in the adrenal gland. The conversion of testosterone to estradiol is accomplished by the aromatase system, which consists of 3 enzyme activities localized to the endoplasmic reticulum of the cells in these tissues. Plasma estradiol levels increase gradually between days 1-7 of the menstrual cycle followed by a sharp increase to a peak value of about 300 pg/ml on day 12 just prior to ovulation.

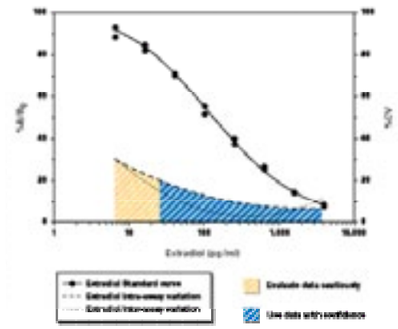
Sensitivity: 50% B/B_0: 129 pg/ml
80% B/B_0: 19 pg/ml
Specificity:

Estradiol	100%
Estradiol-3-glucuronide	14%
Estrone	12%
Estradiol-17-glucuronide	10%
Estriol	0.30%
5α-dihydro Testosterone	0.06%
Ethinyl Estradiol	0.05%
5-Androstan-17b-ol-3-one	0.02%
Androstenediol	0.02%

For a full specificity profile, please go to www.caymanchem.com

96 wells
480 wells

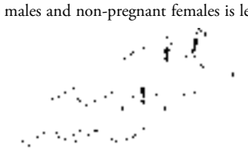
Also Available: *Estradiol EIA Kit (Solid Plate) (582251.1)*



Estriol 10006484

[50-27-1]
MF: $C_{18}H_{24}O_3$ **FW:** 288.4 **Purity:** ≥95%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: Estriol is a metabolite of estradiol and a major estrogen produced in the later stages of pregnancy. In a longitudinal study in healthy pregnant women, total plasma estriol levels increased from <10 ng/ml at 8-10 weeks gestation to approximately 150 ng/ml at week 38. The majority of the estriol synthesized in the later stages of pregnancy originates from fetal dehydroepiandrosterone sulfate (DHEAS) and serves as a direct marker of fetal adrenal gland activity. Saliva contains primarily unbound and unconjugated estriol and is commonly used for monitoring estriol levels. Plasma levels of estriol in males and non-pregnant females is less than 2 ng/ml.

100 mg
500 mg
1 g
5 g



estra-1,3,5(10)-triene-3,16α,17β-triol

Estriol EIA Kit 582281

Stability: ≥1 year at -20°C
Summary: Estriol, a metabolite of 17b-estradiol and a major estrogen produced during pregnancy, has historically been used as an indicator of fetal well-being. In the final weeks before parturition, estriol levels increase significantly. In a longitudinal study in healthy pregnant women, total plasma estriol levels increased from <10 ng/ml at 8-10 weeks gestation to approximately 150 ng/ml at week 38. The majority of the estriol synthesized in the later stages of pregnancy originates from fetal dehydroepiandrosterone sulfate (DHEAS) and serves as a direct marker of fetal adrenal gland activity. In the 1960s and 1970s plasma and urine were used to measure estriol. However, saliva contains primarily unbound and unconjugated estriol, the biologically active form of the hormone, and therefore is currently a commonly used biological fluid for monitoring estriol levels. Plasma levels of estriol in males and non-pregnant females is less than 2 ng/ml.

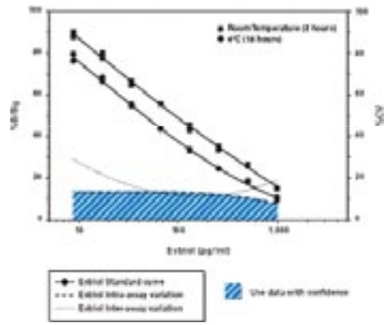
Sensitivity: 50% B/B_0: 43 pg/ml (4°C - 18 hours incubation)
95 pg/ml (room temperature - 2 hour incubation)
80% B/B_0: 8 pg/ml (4°C - 18 hours incubation)
14 pg/ml (room temperature - 2 hour incubation)
Specificity:

Estriol	100%
Estriol-3-glucuronide	6%
Estriol-16-glucuronide	1.2%
Estradiol	0.6%
Estrone	0.02%

For a full specificity profile, please go to www.caymanchem.com

96 wells
480 wells

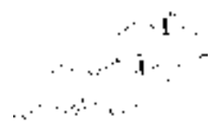
Also Available: *Estriol EIA Kit (Solid Plate) (582281.1)*



Estrone 10006485

[53-16-7] E_1
MF: $C_{18}H_{22}O_2$ **FW:** 270.4 **Purity:** ≥95%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: Estrone is one of the three naturally occurring estrogens, the others being estradiol and estriol. Estrone is synthesized from androstenedione by the aromatase enzyme system in the ovaries and placenta, and is also synthesized from estradiol by 17-hydroxy steroid dehydrogenase in the liver. Serum concentrations of estrone in premenopausal women fluctuate according to the menstral cycle and becomes the most predominant estrogen in postmenopausal women. The binding affinities of estrone to the estrogen receptors a and b (ERa and ERb) are approximately 60% and 37% relative to estradiol.

500 mg
1 g
5 g
10 g



3-hydroxy-estra-1,3,5(10)-trien-17-one

Estrone EIA Kit 582301

Stability: ≥6 months at -20°C
Summary: Estrone is an endogenous steroidal hormone, which together with estradiol and estriol belongs to the group of hormones called estrogens. Estrone levels in plasma are 15-200 pg/ml with daily production between 30 to 350 µg. The mean level of estrone in urine of postmenopausal women was found to be 2 µg/24 hr. Cayman's Estrone EIA is a competitive assay that provides accurate measurements of estrone within the standard curve range of 3.3-2,000 pg/ml. Since the antiserum used in this kit exhibits 100% cross reactivity with estrone sulfate and estrone glucuronide, the values obtained in plasma and urine using this kit will reflect the total amount of estrone in the sample.

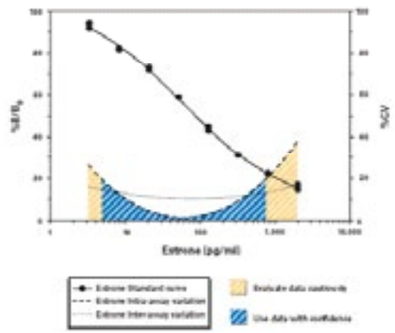
Sensitivity: 50% B/B_0: 85 pg/ml
80% B/B_0: 10 pg/ml
Specificity:

Estrone	100%
Estrone sulfate	100%
Estrone glucuronide	100%

For a full specificity profile, please go to www.caymanchem.com

96 wells
480 wells

Also Available: *Estrone EIA Kit (Solid Plate) (582301.1)*



Ethynyl Estradiol 10006486

[57-63-6]
MF: $C_{20}H_{24}O_2$ **FW:** 296.4 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: Ethynyl estradiol is a synthetic analog of estradiol used commonly as an oral contraceptive, often in combination with a progestin such as norgestrel/levonorgestrel or desogestrel. Efficacy of oral administration of ethynyl estradiol is facilitated by the ethynyl substitution at the C-17 position, which inhibits first pass hepatic metabolism. Ethynyl estradiol is also rapidly and almost completely absorbed from the gastrointestinal tract.

100 mg
500 mg
1 g
5 g

19-norpregna-1,3,5(10)-trien-20-yne-3,17α-diol

FABP1 (human recombinant) 10009547

L-FABP, Liver-FABP
Purity: ≥90% **Stability:** ≥6 months at -80°C
A solution in 50 mM sodium phosphate, pH 7.2, containing 25% glycerol and 100 mM sodium chloride **Stability:** ≥6 months at -80°C
Summary: Source: recombinant N-terminal His-tagged protein expressed in *E. coli* • M_r: 18.3 kDa

25 µg
50 µg
100 µg

FABP1 (rat recombinant) 10005200

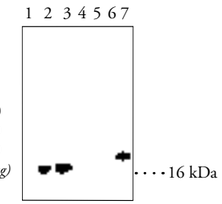
L-FABP, Liver-FABP
Purity: ≥95%
A solution in 50 mM sodium phosphate, pH 7.2, containing 20% glycerol and 150 mM sodium chloride **Stability:** ≥6 months at -80°C
Summary: Source: recombinant N-terminal His-tagged protein expressed in *E. coli* • M_r: 18.3 kDa

25 µg
50 µg
100 µg

FABP2 Polyclonal Antibody 10010019

I-FABP, Intestinal-FABP
Peptide affinity-purified IgG **Stability:** ≥1 year at -20°C
Summary: Antigen: human FABP2 amino acids 33-40 • Host: rabbit • Cross-reactivity: (+) human and rat FABP2; but also expected to work with murine and bovine; (-) recombinant FABP1, 3, 4, and 5 • Application: WB; other applications not tested

1 ea



Lane 1: *Rat recombinant FABP1 (0.4 µg)*
Lane 2: *Rat recombinant FABP2 (0.025 µg)*
Lane 3: *Rat recombinant FABP2 (0.050 µg)*
Lane 4: *Human recombinant FABP3 (0.4 µg)*
Lane 5: *Murine recombinant FABP4 (0.4 µg)*
Lane 6: *Murine recombinant FABP5 (0.4 µg)*
Lane 7: *Human duodenum homogenate (30 µg)*

Also Available: FABP2 Blocking Peptide (10010020) *200 µg*

FABP2 (rat recombinant) 10007938

I-FABP, Intestinal-FABP
Purity: ≥95%
A solution in 50 mM sodium phosphate, pH 7.2, containing 20% glycerol, 100 mM sodium chloride, and 1 mM DTT **Stability:** ≥6 months at -80°C
Summary: Source: recombinant N-terminal His-tagged protein expressed in *E. coli* • M_r: 19.3 kDa

25 µg
50 µg
100 µg

FABP3 (human recombinant) 10007432

H-FABP, Heart-FABP
Purity: ≥95%
A solution in 50 mM sodium phosphate, pH 7.2, containing 20% glycerol and 150 mM sodium chloride **Stability:** ≥6 months at -80°C
Summary: Source: recombinant N-terminal His-tagged protein expressed in *E. coli* • M_r: 19 kDa

25 µg
50 µg
100 µg

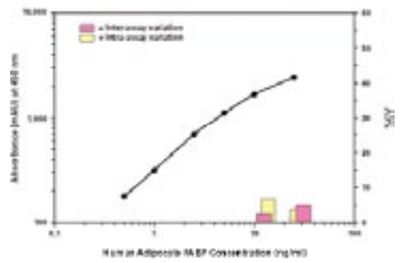
FABP4 (human) EIA Kit* 10007614

A-FABP, Adipocyte-FABP, ALBP, aP2
Stability: ≥6 months at 4°C
Summary: FAPB4 is a 15 kDa member of the intracellular FABP family, which is known for the ability to bind fatty acids and related compounds (bile acids or retinoids). FABP4 is expressed in a differentiation-dependent fashion in adipocytes and is a critical gene in the regulation of the biological function of these cells. In mice, targeted mutations in the FABP4 gene provides significant protection from hyperinsulinemia and insulin resistance in the context of both dietary and genetic obesity. FABP4 is also expressed in macrophages where it modulates inflammatory responses and cholesterol ester accumulation. Total or macrophage-specific FABP deficiency confers dramatic protection against atherosclerosis in $apoE^{-/-}$ mice. These results indicate a central role for FABP4 in development of metabolic diseases through its distinct actions in adipocytes and macrophages.

Specificity:

FABP4 (human)	100%

96 wells



FABP4 (human recombinant) 10009549

A-FABP, Adipocyte-FABP, ALBP, aP2
Purity: ≥90%
A solution in 50 mM of sodium phosphate, pH 7.2, containing 150 mM sodium chloride, and 20% glycerol **Stability:** ≥6 months at -80°C
Summary: Source: human recombinant His-tagged protein expressed in *E. coli* • M_r: 18.8 kDa

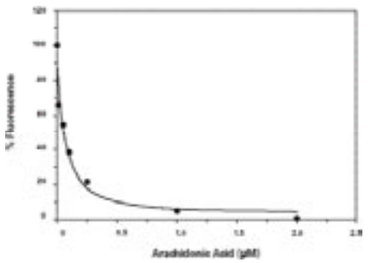
25 µg
50 µg
100 µg

**SPI-BIO Assays are available through Cayman Chemical only within North & South America and Asia; elsewhere contact SPI-BIO.*

FABP4 Inhibitor/Ligand Screening Assay Kit 10010231

A-FABP, Adipocyte-FABP, ALBP, aP2
Stability: ≥6 months at -80°C
Summary: FABP4 is one of nine known cytosolic FABPs ranging in size from 14-15 kDa containing 127-132 amino acids. FABP4 is highly expressed in adipocytes and is regulated by PPARg agonists, insulin, and fatty acids. Recent studies using FABP4 gene deletion in mice indicate a dominant role for FABP4 in several chronic metabolic diseases. Therefore, inhibiting the function of FABP4 is a potential mechanism for the treatment of metabolic diseases like diabetes and atherosclerosis. Cayman's FABP4 Ligand Binding Assay provides a simple, reproducible, and sensitive tool for the identification of FABP4 ligands. The assay makes use of a detection reagent that exhibits increased fluorescence at 500 nm when bound to FABP4. Any strong ligand and/or inhibitor of FABP4 will displace the detection reagent thereby reducing the fluorescence. FABP4 is provided in high purity and in sufficient quantity for 100 tests.

96 wells



FABP4 (murine recombinant) 10005191

A-FABP, Adipocyte-FABP, ALBP, aP2
Purity: ≥95%
A solution in 50 mM sodium phosphate, pH 7.2, containing 20% glycerol and 150 mM sodium chloride **Stability:** ≥6 months at -80°C
Summary: Source: murine recombinant N-terminal His-tagged protein expressed in *E. coli* • M_r: 19.5 kDa

25 µg
50 µg
100 µg

FABP4 (murine recombinant) Western Ready Control 10009676

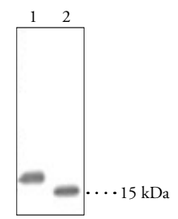
A-FABP, Adipocyte-FABP, ALBP, aP2
Purity: 18 kDa (His-tagged), 15 kDa (native)
Stability: ≥6 months at -20°C
Summary: Source: murine recombinant His-tagged protein expressed in *E. coli* • Application: Positive control for WB

1 ea

FABP4 Polyclonal Antibody 10004944

A-FABP, Adipocyte-FABP, ALBP, aP2
Peptide affinity-purified IgG **Stability:** ≥1 year at -20°C
Summary: Antigen: human FABP4 amino acids 103-118 • Host: rabbit • Cross-reactivity: (+) human, murine, and rat FABP4; other species not tested • Applications: WB and ICC; other applications not tested

1 ea



Lane 1: *His-tagged recombinant rat FABP4 lysate (1 µg)*
Lane 2: *Rat brown fat (30 µg)*

Also Available: FABP4 Blocking Peptide (10006248) *200 µg*

FABP4 Western Ready Control 10010463

A-FABP, Adipocyte-FABP, ALBP, aP2
Purity: 18.8 kDa (His-tagged), 16 kDa (native)
Stability: ≥1 year at -20°C
Summary: Source: human recombinant N-terminal His-tagged protein expressed in *E. coli* • Application: Positive control for WB

1 ea

FABP5 (human recombinant) 10010364

DA11 FABP, E-FABP, Epidermal-FABP, Keratinocyte FABP, Psoriasis-Associated FABP
Purity: ≥95%
A solution in 50 mM sodium phosphate, pH 7.2, containing 20% glycerol and 100 mM sodium chloride **Stability:** ≥6 months at -80°C
Summary: Source: recombinant N-terminal His-tagged protein expressed in *E. coli* • M_r: 18 kDa

25 µg
50 µg
100 µg

FABP5 (murine recombinant) 10007433

DA11 FABP, E-FABP, Epidermal-FABP, Keratinocyte FABP, Psoriasis-Associated FABP
Purity: ≥95%
A solution in 50 mM sodium phosphate, pH 7.2, containing 20% glycerol and 150 mM sodium chloride **Stability:** ≥6 months at -80°C
Summary: Source: recombinant N-terminal His-tagged protein expressed in *E. coli* • M_r: 19.3 kDa

25 µg
50 µg
100 µg

FABP7 (human recombinant) 10009551

B-FABP, Brain-FABP
Purity: ≥90%
A solution in 50 mM sodium phosphate, pH 7.2, containing 20% glycerol and 100 mM sodium chloride **Stability:** ≥6 months at -80°C
Summary: Source: recombinant N-terminal His-tagged protein expressed in *E. coli* • M_r: 19 kDa

25 µg
50 µg
100 µg

Fenofibrate 10005368

[49562-28-9]
MF: $C_{20}H_{21}ClO_4$ **FW:** 360.8 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: Fenofibrate is a PPARα agonist and a member of a class of hypolipidemic drugs that includes clofibrate and benzafibrate, which have been used clinically to treat dyslipidemia and cardiovascular disease. In a transactivation assay, fenofibrate exhibits EC_{50} values of 18 and 30 µM for murine and human PPARα, respectively. It also binds to PPARγ, but with at least 10-fold less affinity and is inactive at PPARδ at concentrations up to 100 µM.

1 g
5 g
10 g
50 g

2-[4-(4-chlorobenzoyl)phenoxy]-2-methyl-propanoic acid, 1-methylethyl ester

G-1 10008933

MF: $C_{21}H_{18}BrNO_3$ **FW:** 412.3 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: GPR30 is a transmembrane GPCR localized to endoplasmic reticulum (ER) that binds estradiol with high affinity, activating multiple intracellular signaling pathways. G-1 is a nonsteroidal, high-affinity, selective agonist of GPR30 that binds with a K_i value of 11 nM. Competitive binding studies in ERα- and ERβ-expressing cells yielded K_i values for estradiol of 0.30 and 0.38 nM, respectively, with no substantial binding of G-1 at 1 µM. The discovery of G-1, a compound that does not bind classical ERs, should facilitate further physiological experiments to define the role of GPR30 *in vivo*.

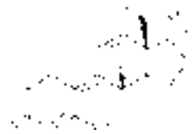
1 mg
5 mg
10 mg
50 mg

1-[4-(6-bromo-benzo[1,3]dioxol-5-yl)-3a,4,5,9b-tetrahydro-3H-cyclopenta[c]quinolin-8-yl]-ethanone

Gestrinone 10006488

[16320-04-0]
MF: $C_{21}H_{24}O_2$ **FW:** 308.4 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: Gestrinone is a synthetic steroid used occasionally to treat endometriosis. It acts centrally on the hypothalamic-pituitary system to suppress release of lutenizing hormone (LH) and follicle-stimulating hormone (FSH), thus reducing estrogen synthesis. It also binds to androgen (AR), progesterone (PR), and estrogen (ER) receptors in the human endometrial tissue but not to steroid hormone binding globulin or corticord-binding globulin. Gestrinone binds to AR and PR with EC_{50} values of approximately 20 and 30 nM, respectively. These values reflect approximately 5-6-fold lower affinity than testosterone and progesterone, the natural AR and PR ligands, for these receptors.

100 mg
500 mg
1 g
5 g



13-ethyl-17α-hydroxy-18,19-dinorpregna-4,9,11-trien-20-yn-3-one

Ghrelin

Ghrelin, an endogenous ligand for the growth hormone secretagogue receptor, is synthesized principally in the stomach. It stimulates food intake and transduces signals to the hypothalamic regulatory nuclei that control energy homeostasis. The peptide consists of 28 amino acids with an octanoylation site at the serine-3 residue. Ghrelin is present in the peripheral circulation in acylated (octanoylated) and non-acylated forms in which the acylated form is biologically active. All of the kits below are based on a double-antibody sandwich technique designed to measure either the acylated or non-acylated forms of the peptide.

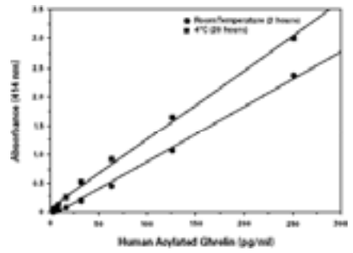
Ghrelin (human acylated) EIA Kit* 10006306

Stability: ≥6 months at -20°C
Summary: This EIA kit specifically measures the acylated form of ghrelin.

Limit of Detection: 1.5 pg/ml after 20 hour immunological incubation
4 pg/ml after 3 hour immunological incubation

Specificity:
Ghrelin (rat) 118%
For a full specificity profile, please go to www.caymanchem.com

96 wells



Also Available: *Ghrelin (human unacylated) EIA Kit* (10008952)*

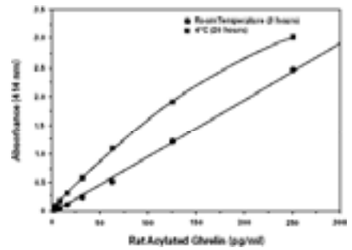
Ghrelin (rat acylated) EIA Kit* 10006307

Stability: ≥6 months at -20°C
Summary: This EIA kit specifically measures the acylated form of ghrelin.

Limit of Detection: 1 pg/ml after 20 hour immunological incubation
3.5 pg/ml after 3 hour immunological incubation

Specificity:
Ghrelin (rat) 118%
For a full specificity profile, please go to www.caymanchem.com

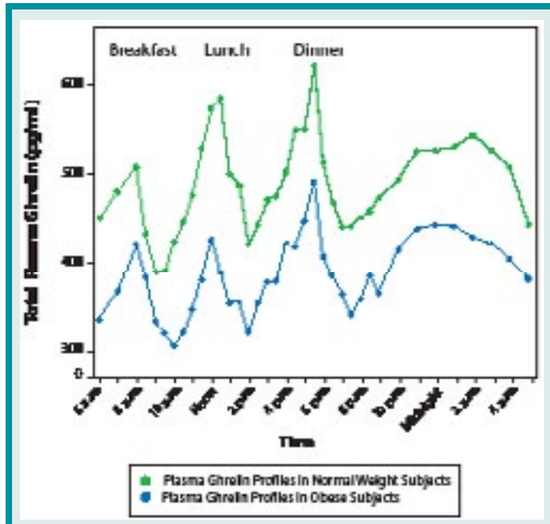
96 wells



Also Available: *Ghrelin (rat unacylated) EIA Kit* (10008953)*

†Biosense antibodies are available through Cayman Chemical only within North & South America; elsewhere contact Biosense.

**SPI-BIO Assays are available through Cayman Chemical only within North & South America and Asia; elsewhere contact SPI-BIO.*

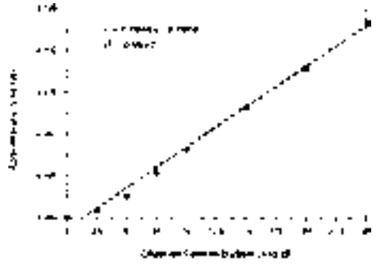


Plasma levels of ghrelin increase before and fall after feeding.

Glucose Assay Kit 10009582

Stability: ≥6 months at -20°C
Summary: Cayman's Glucose Assay Kit provides a simple, reproducible, and sensitive tool for assaying glucose in plasma, serum, and urine. The glucose assay uses the glucose oxidase-peroxide reaction for the determination of glucose concentrations. In this assay, glucose is oxidized to d-gluconolactone with concomitant reduction of the flavin adenine dinucleotide (FAD)-dependent enzyme glucose oxidase. The reduced form of glucose oxidase is regenerated to its oxidized form by molecular oxygen to produce hydrogen peroxide. Finally, with HRP as a catalyst, hydrogen peroxide reacts with 3,5-dichloro-2-hydroxybenzenesulfonic acid and 4-aminoantipyrine to generate a pink dye with an optimal absorption at 514 nm.

192 wells



GnRHa Polyclonal Antibody† 10008856

Gonadotropin-Releasing Hormone
Peptide affinity-purified IgG **Stability:** ≥6 months at 4°C
Summary: Antigen: GnRH analog • Host: hen • Application: ELISA

200 µl

GPR40 Polyclonal Antibody 10007205

FFAR1, Free Fatty Acid Receptor, G Protein-Coupled Receptor 40
Peptide affinity-purified IgG **Stability:** ≥1 year at -20°C
Summary: Antigen: murine GPR40 amino acids 210-222 • Host: rabbit • Cross-reactivity: (+) human GPR40; other species not tested • Application: IHC; other applications not tested. GPR40 is a seven transmembrane GPCR that mediates the signaling of medium- and long-chain fatty acids.

1 ea

Also Available: *GPR40 Blocking Peptide (10007206)* *200 µg*

Growth Hormone (rat) EIA Kit* 589601

GH

Stability: ≥6 months at -20°C

Summary: GH is a polypeptide hormone with a molecular weight of 23 kDa released from somatotropes of the anterior pituitary. It is regulated by several neurotransmitters and neuropeptides. Among other functions it plays an essential role in regulating body growth. Plasma GH levels in humans are markedly elevated in the perinatal period, in the range of 50 ng/ml, but decline to near-adult levels of 0.5-1.0 ng/ml within a few weeks. GH levels are slightly higher in women than in men, and are increased in both sexes in response to exercise.

Sensitivity: 50% B/B_0: 3 ng/ml
80% B/B_0: 0.5 ng/ml

Specificity:

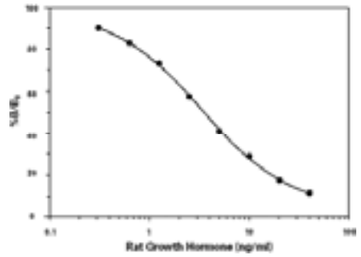
Rat Growth Hormone	100%
Rat Prolactin	<1%

For a full specificity profile, please go to www.caymanchem.com

Homology:

Murine Growth Hormone	91%
Human Growth Hormone	<0.1%

96 wells



GW 0742 10006798

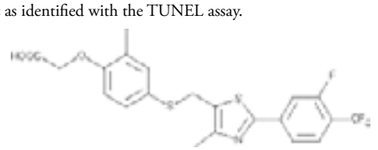
[317318-84-6]

MF: $C_{21}H_{17}F_4NO_3S_2$ **FW:** 471.5 **Purity:** ≥98%

A crystalline solid **Stability:** ≥2 years at -20°C

Summary: GW 0742 is a selective PPARd agonist (EC_{50} = 1.1 nM) that exhibits 1,000-fold selectivity over the other human PPAR subtypes. GW 0742 exhibits time-dependent neuroprotection in low KCl-induced apoptosis in cerebellar granule neuronal cultures. Despite the neuroprotective properties observed, prolonged (48h) incubation with GW 0742 produced significant inherent toxicity. This cell death was determined to be apoptotic as identified with the TUNEL assay.

5 mg
10 mg
25 mg
50 mg



[4-[[[2-[3-fluoro-4-(trifluoromethyl)phenyl]-4-methyl-5-thiazolyl] methyl]thio]-2-methyl phenoxy]-acetic acid

*SPI-BIO Assays are available through Cayman Chemical only within North & South America and Asia; elsewhere contact SPI-BIO.

GW 7647 10008613

[265129-71-3]

MF: $C_{29}H_{46}N_2O_3S$ **FW:** 502.8 **Purity:** ≥98%

A crystalline solid **Stability:** ≥2 years at -20°C

Summary: GW 7647 is a potent, selective agonist of human and murine PPARa. It activates human PPARa, PPARg, and PPARd with EC_{50} values of 0.006, 1.1, and 6.2 µM, respectively, in a GAL4-PPAR binding assay. Similar EC_{50} values of 0.001, 1.3, and 2.9 were observed with the murine receptors. GW 7647 lowered triglycerides 93% and 60% in fat-fed hamsters and rats, respectively, at a dose of 3 mg/kg.

1 mg
5 mg
10 mg
25 mg

2-methyl-2-[[4-[2-[[(cyclohexylamino)carbonyl](4-cyclohexylbutyl)amino]ethyl]phenyl] thio]-propanoic acid

GW 9508 10008907

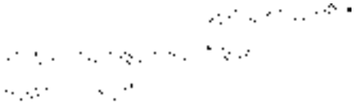
[885101-89-3]

MF: $C_{22}H_{21}NO_3$ **FW:** 347.4 **Purity:** ≥98%

A solution in methyl acetate **Stability:** ≥1 year at -20°C

Summary: GPR40 and GPR120 are GPCRs that are activated by medium and long-chain fatty acids. In addition, there is evidence of a link between GPR40 and the ability of fatty acids to acutely potentiate insulin secretion. GW 9508 is a small-molecule agonist of GPR40 and GPR120. Stimulation of intracellular Ca^{2+} mobilization by GW 9508 in human embryonic kidney (HEK) 293 cells expressing GPR40 and GPR120 was observed with EC_{50} values of 47 nM and 2.2 µM, respectively. GW9508 dose dependently potentiates glucose-stimulated insulin secretion and the KCl-mediated increase in insulin secretion in MIN6 cells.

10 mg
50 mg
100 mg
500 mg



4-[[(3-phenyoxyphenyl)methyl]amino]-benzenepropanoic acid

GW 9662 70785

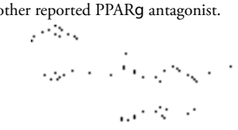
[22978-25-2]

MF: $C_{13}H_9ClN_2O_3$ **FW:** 276.7 **Purity:** ≥98%

A crystalline solid **Stability:** ≥2 years at -20°C

Summary: GW 9662 blocks the PPARg-induced differentiation of monocytes to osteoclasts by >90% at a dose of 0.1 µM. It is therefore a much more potent antagonist than BADGE, which is another reported PPARg antagonist.

1 mg
5 mg
10 mg
50 mg



2-chloro-5-nitrobenzanilide

GW 590735 10009880

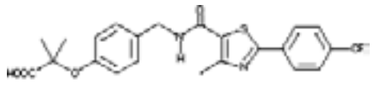
[622402-22-6]

MF: $C_{23}H_{21}F_3N_2O_4S$ **FW:** 478.5 **Purity:** ≥98%

A crystalline solid **Stability:** ≥2 years at -20°C

Summary: GW 590735 is a potent and selective agonist of PPARa with an EC_{50} value of 4 nM for the expression of a GAL4-responsive reporter gene. It exhibits at least 500-fold selectivity for PPARa *versus* PPARg and PPARd.

1 mg
5 mg
10 mg
50 mg



2-methyl-2-(4-((4-methyl-2-(4-(trifluoromethyl)phenyl)thiazole-5-carboxamido)methyl) phenoxy)propanoic acid

Harmine 10010324

[442-51-3]

MF: $C_{13}H_{12}N_2O$ **FW:** 212.1 **Purity:** ≥98%

A crystalline solid **Stability:** ≥2 years at -20°C

Summary: Harmine is a b-carboline alkaloid that was first isolated from seeds of *P. harmala* (Syrian rue) and *B. caapi*. Recent work indicates that harmine is a unique regulator of PPARg expression that acts by inhibiting the Wnt signalling pathway in a cell-specific manner. Administration of harmine (30 mg/kg) to obese *db/db* mice resulted in reduced blood glucose, free fatty acids, and triglyceride levels, delayed hyperglycemia, and improved insulin sensitivity. Harmine also attenuates inflammatory gene expression (TNFa, IL-1b, iNOS) and macrophage accumulation in adipose tissue.

250 mg
500 mg
1 g
5 mg

7-methoxy-1-methyl-9H-pyrido[3,4-b]indole

HU-210 (DEA Schedule I Regulated Compound) 90082

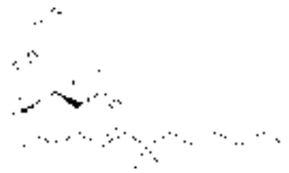
[112830-95-2]

MF: $C_{25}H_{38}O_3$ **FW:** 386.6 **Purity:** ≥98%

A crystalline solid **Stability:** ≥2 years at -20°C

Summary: HU-210 is a synthetic agonist analog of D9-THC, which is the primary psychoactive component of marijuana. HU-210 is a potent CB_1 and CB_2 receptor agonist. It binds to neuroblastoma cell membrane CB_1 receptors with about the same affinity as CP-55940. In murine behavior models (hypothermia, analgesia, hypoactivity, catalepsy) the ED_{50} is 5-20 µg/kg.

1 mg
5 mg
10 mg
25 mg



(6aR,10aR)-3-(1,1'-dimethylheptyl)-6a,7,10,10a-tetrahydro-1-hydroxy-6,6-dimethyl-6H-dibenzo[b,d]pyran-9-methanol

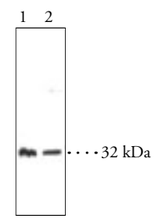
11β-Hydroxysteroid Dehydrogenase (Type 1) Polyclonal Antibody 10004303

Corticosteroid 11β-Dehydrogenase Isozyme 1, 11β-HSD1

Peptide affinity-purified IgG **Stability:** ≥1 year at -20°C

Summary: Antigen: human 11β-HSD1 amino acids 77-92 • Host: rabbit • Cross-reactivity: (+) human, murine, and rat 11β-HSD1; other species not tested • Applications: WB and IHC (paraffin-embedded sections); other applications not tested • 11b-HSD1 catalyzes the conversion of inactive cortisone to active cortisol in adipose tissue.

1 ea



Lane 1: *Rat liver microsomes (50 µg)*
Lane 2: *Murine liver microsomes (50 µg)*

Also Available: *11β-Hydroxysteroid Dehdyrogenase (Type 1) Blocking Peptide (10005729)* *200 µg*

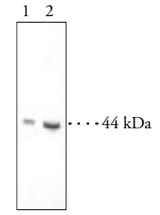
11β-Hydroxysteroid Dehydrogenase (Type 2) Polyclonal Antibody 10004549

Corticosteroid 11β-Dehydrogenase Isozyme 2, 11β-HSD2

Peptide affinity-purified IgG **Stability:** ≥1 year at -20°C

Summary: Antigen: human 11b-HSD2 amino acids 25-40 • Host: rabbit • Cross-reactivity: (+) human, murine, and rat 11b-HSD2; other species not tested • Applications: WB and ICC; other applications not tested • 11b-HSD2 plays a critical role in normal physiology in the corticosteroid regulation of sodium homeostasis and the pathophysiology of hypertension by converting active cortisol to inactive cortisone.

1 ea



Lane 1: *Murine kidney 100,000 x g pellet resuspension (22.5 µg)*
Lane 2: *Murine kidney 100,000 x g pellet resuspension (45 µg)*

Hyperforin 75650

[11079-53-1]

MF: $C_{35}H_{52}O_4$ **FW:** 536.8 **Purity:** ≥90%

A solution in methanol **Stability:** ≥1 year at -20°C

Summary: St. John's wort is a widely consumed herbal preparation which has been claimed to have a number of medicinal properties. It contains a number of known lipid signaling mediators, including chlorogenic acid, hypericin, hyperforin, and I3,II8-biapigenin. Hyperforin exhibits two activities which may alter the action of other concurrent medications. It inhibits the activity of several CYP450 enzymes, with CYP2D6 being the most sensitive with an IC_{50} value of about 10 µg/ml. Hyperforin is also a ligand for the steroid X receptor (SXR). Since one activity of this receptor is the induction of CYP450 expression, the exact nature of hyperforin's drug-drug interactions must be evaluated on a case-by-case basis. However, these interactions certainly complicate its use as a human therapeutic.

25 µg
50 µg
100 µg
1 mg

5-hydroxy-6R-methyl-1R,3,7S-tris(3-methyl-2-butenyl)-5S-(2-methyl-1-oxopropyl)-6R-(4-methyl-3-pentenyl)-bicyclo[3.3.1]non-3-ene-2,9-dione

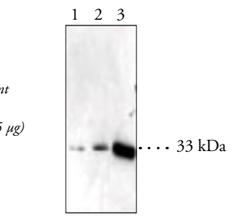
IGFBP5 Polyclonal Antibody 10008207

IBP-5, IGF-Binding Protein 5, Insulin-like Growth Factor Binding Protein 5

Peptide affinity-purified IgG **Stability:** ≥1 year at -20°C

Summary: Antigen: human IGFBP5 amino acids 192-206 • Host: rabbit • Cross-reactivity: (+) murine and rat IGFBP5; other species not tested • Application: WB • IGFBP5 is a secreted protein that binds IGF-1 and restricts it from accessing its cell-surface receptor (IGF-1R).

1 ea



Lane 1: *Murine skeletal muscle supernatant (25 µg)*
Lane 2: *Murine kidney supernatant (25 µg)*
Lane 3: *Rat heart supernatant (25 µg)*

Also Available: *IGFBP5 Blocking Peptide (10008206)* *200 µg*

vol. 2
En

Tom Brock, Ph.D.

Cannabinoid Signaling

The Original Retrograde Signaling Pathway

The bioactive agent from *C. sativa*, Δ^9-THC, produces a variety of well-known effects on mood, appetite, and memory. Early questions that interested physiologists centered on whether Δ^9-THC, an aromatic terpenoid with low solubility in water, produced its effects by causing general disturbances in membranes, or if it mimicked a natural, endogenous molecule, perhaps having receptor-mediated effects. More contemporary questions, in our era focused on therapeutics, center on how the CB signaling pathway can be tweaked to benefit patients. This article touches on each of these topics.

Endogenously-produced CBs

Intuitively, one might imagine that, if our bodies were producing Δ^9-THC-like chemicals, then more people would have the stereotypical symptoms of the Cannabis user. Surprisingly, your body does make a variety of endocannabinoids, including AEA and 2-arachidonoyl glycerol (2-AG), albeit at low levels. These are small, lipophilic molecules secreted by cells in the brain and immune system. These intercellular messengers are not stored in vesicles but are synthesized "on demand," *via* enzymatic pathways triggered by a rapid rise in intracellular calcium through cell depolarization or receptor activation. AEA may be synthesized from N-arachidonoyl phosphatidylethanolamine by either a PLC- or PLD-dependent pathway, while 2-AG is synthesized from DAG by a DAG lipase that is selective for the *sn*-1 position. While it is known that these metabolic pathways are activated *via* glutamate receptors and in particular the metabotropic glutamate receptors, the ways that individual pathway enzymes are regulated (*e.g.*, by transcriptional or post-translational modulation) is less clear. As a result, little is known about why the different endoCBs might be over- or under-produced in different individuals.

Retrograde Neuronal Signals

Perhaps one of the more interesting aspects of endocannabinoids centers on their mode of action. All CBs activate two specific GPCRs known as the CB receptors CB_1 and CB_2. The CB_1 receptor is abundant throughout the CNS and is particularly abundant in specific regions of the brain. The CB_2 receptor is found on leukocytes and in the spleen, thymus, bone marrow, and other tissues associated with immune functions. As with other G_i-linked receptors, the activation of CB_1 or CB_2 typically blocks the activation of adenylate cyclase, preventing signaling through cyclic AMP. In the neuronal synapse, endocannabinoids like 2-AG act in a retrograde fashion. That is, 2-AG is synthesized and secreted by post-synaptic neurons and activate CB_1 receptors at the presynaptic axon terminal. Activation of CB_1 then modulates signaling within the presynapse, producing either a transient or prolonged reduction in the release of neurotransmitters. For example, in the hippocampus, CB_1 receptors are more abundant on inhibitory γ-aminobutyric acid (GABA) terminals than on excitatory glutamate terminals. Activation of CB_1 by 2-AG on pre-synaptic terminals strongly decreases the release of the inhibitory neurotransmitter GABA and less effectively reduces the release of the stimulating glutamate. Partial inhibition of glutamate signaling is sufficient to effectively limit the synthesis of new 2-AG while old 2-AG is inactivated by MAGL. Breakdown of AEA as well as 2-AG can also be achieved by FAAH. Stronger inhibition of glutamate signaling, as may occur with overproduction of endocannabinoids (or excessive intake), may impair hippocampus-dependent learning and memory. Through its many variable effects on several different types of neurotransmitters, CB_1 signaling confers additional plasticity in neuronal signaling.

Drugs that Interfere with CB Receptors

Perhaps not surprisingly, given the distribution of CB_1 and CB_2, endoCBs have recognized roles in the CNS, in energy metabolism, and in immunity. Importantly, dysregulation of endoCB signaling can contribute to such diverse problems as obesity, movement and mental disorders, anxiety-like behaviors, muscle spasticity, nausea, insomnia, hypertension, and atherosclerosis. This suggests that therapeutic modulation may have many important applications. In animal models, CB_1 antagonists reduce caloric intake and body weight in diet-induced or genetic obesity models and $CB_1^{-/-}$ mice weighed less and had less adipose tissue mass than their wild type littermates, indicating that blockade of CB_1 can be used to fight obesity. The drug rimonabant, a selective CB_1 antagonist, was shown in early (2004) clinical trials by Sanofi-Aventis to significantly reduce weight, decrease waist size, increase HDL-cholesterol (good cholesterol), decrease triglycerides, and improve glucose tolerance and insulin levels. Thus, it improved cardiovascular risk factors as well as reduced weight. Additional testing of the drug, trademarked in France as Acomplia™, suggested that it was effective at reducing food cravings and could also help in smoking cessation. In 2006, Acomplia™ was approved for use in Europe for weight loss (but not smoking cessation), despite concerns that weight loss was less significant at lower doses and complicated by side effects at higher, effective doses. Concern over potential side effects was heightened by the finding that weight lost during Acomplia™ use was regained when Acomplia™ was discontinued, suggesting the need for protracted use. In the United States, FDA concern centered on Acomplia's™ "psychiatric adverse effects", including anxiety, depression, suicide, and seizures. In addition, one in eight patients taking Acomplia™ stopped taking the drug due to adverse side effects, including nausea. rimonabant/Acomplia™, trademarked by Sanofi-Aventis as Zimulti™ in the U.S., has been pulled from FDA consideration. Merck is testing Taranabant,[1] a selective CB_1 inverse agonist (which means it induces a response that is opposite that of an agonist, instead of simply inhibiting receptor activation). Taranabant appears to have problems that might prevent its approval as a broadly used weight loss medication. Cayman Chemical also has a potent and selective CB_1 inverse agonist (CAY10508) and antagonist (AVE-1625) available for research purposes.

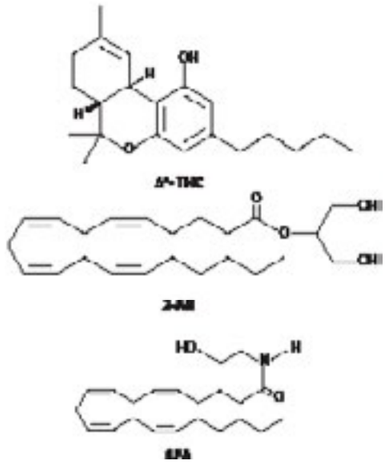


Figure 1. Structures of Δ^9-THC and 2 endocannabinoids, 2-AG, and AEA.

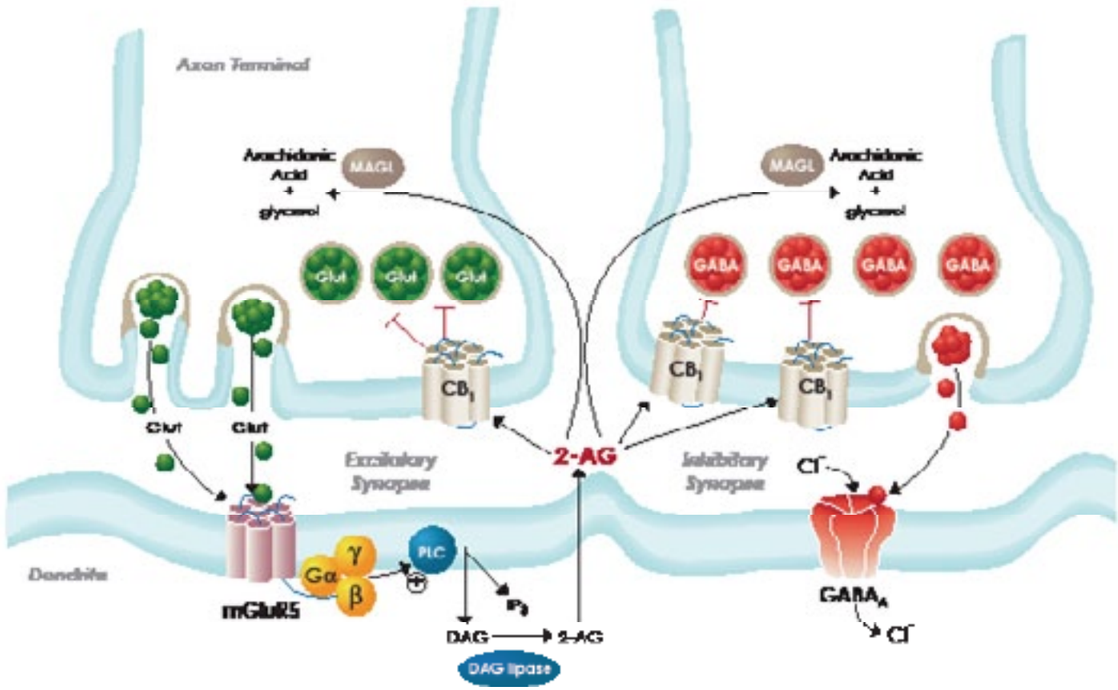
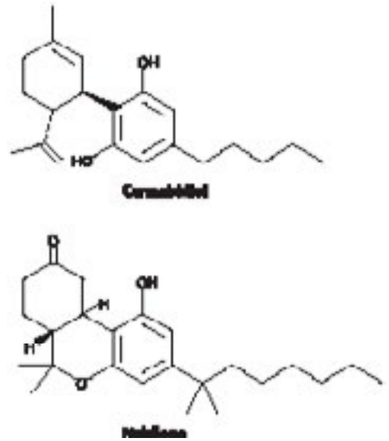


Figure 2. Retrograde signaling by the endocannabinoid 2-AG at the neuronal synapse

CB Mimetics and Related Compounds

Chemicals that affect CB receptors continue to be developed for applications ranging from basic research into the realms of mind and memory to therapeutics treating pain, spasticity, nausea, and cancer. As an example of the latter, GW Pharmaceuticals, based in the United Kingdom, has developed Sativex®, a cannabidiol/Δ^9-THC mixture extracted from *C. sativa*. Cannabidiol does not bind CB_1 or CB_2 but ameliorates the psychotropic effects of Δ^9-THC. This combination has been approved for use in Canada and effectively treats neuropathic pain and spasticity in multiple sclerosis, as well as cancer pain. Synthetic Δ^9-THC, called dronabinol and marketed as Marinol® by Solvay, has been approved for use as an appetite stimulant, for the treatment of nausea and, in Canada, for AIDS-related anorexia. Nabilone is a synthetic CB that is structurally similar to Δ^9-THC. It is marketed as Cesamet® by Valeant Pharmaceuticals and is approved for the treatment of nausea and vomiting in patients undergoing chemotherapy for cancer. Safety information included with Cesamet® reports that virtually all patients experience at least one adverse reaction, including drowsiness, vertigo, dry mouth, euphoria, ataxia, headache, and concentration difficulties. Additional information regarding pharmaceutical drugs based on CBs is available at http://www.medicalmarijuanaprocon.org.

In addition, there is interest in non-CB compounds that affect the CB system. For example, there are non-CB agonists like WIN 55212-2, which activates both CB receptors, and JWH 015, which is a selective CB_2 agonist. Alternatively, there are many molecules that inhibit the breakdown of endocannabinoids, increasing their effective concentration. These include inhibitors of MAGL, like URB602, as well as reversible and irreversible inhibitors of fatty acid amide hydrolase (FAAH). Cayman carries a large selection of antibodies (CB_1, CB_2, MAGL, FAAH), agonists and inhibitors for research related to CB signaling.



Much more is known about the endoCB system; recent reviews are available.[2-4] Current information regarding rimonabant and related anti-obesity drugs is available at www.acompliareport.com. As selective CB_1 blockers have diverse effects, they may find use in treating type 2 diabetes[5] and cardiovascular disease.[6,7] Therapeutics that modulate other steps in endocannabinoid synthesis, action, or breakdown are also being developed.

References

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2. Lambert, D.M. and Muccioli, G.G. *Curr. Opin. Nutr. Metab. Care* **10,** 735-744 (2007).
3. Murray, R.M., Morrison, P.D., Henquet, C., *et al. Nat. Rev. Neurosci.* **8,** 885-895 (2007).
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5. Wang, J. and Ueda, N. *Curr. Opin. Nephrol. Hypertens.* **17,** 1-10 (2008).
6. Aronne, L.J. and Isoldi, K.K. *Am. J. Cardiol.* **100 (12A),** 18P-26P (2007).
7. Bellocchio, L., Vicennati, V., Cervino, C., *et al. Am. J. Cardiol.* **100 (12A),** 7P-17P (2007).

IMMA 70275

BML-190, Indomethacin morpholinylamide
MF: $C_{23}H_{23}ClN_2O_4$ **FW:** 426.9 **Purity:** ≥98%
A crystalline solid **Stability:** ≥1 year at -20°C
Summary: IMMA is a selective CB_2 receptor agonist. The binding constant for the CB_2 receptor is 435 nM compared to >20,000 nM for the CB_1 receptor.

5 mg
10 mg
50 mg
100 mg

1-(4-chlorobenzoyl)-5-methoxy-2-methyl-1H-indole-3-acetic acid, morpholineamide

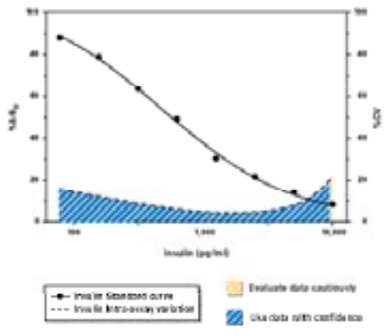
Insulin (rat) EIA Kit* 589501

Stability: ≥6 months at -20°C
Summary: Insulin is a polypeptide hormone with a molecular weight of 6 kDa, composed of two peptides chains, A and B, cross-linked by two disulfide bonds and synthesized by the β cells of the islets of Langherans of the pancreas. Insulin influences many metabolic functions of the body. Its best known action is to lower the blood glucose concentration by increasing the rate at which glucose is converted to glycogen in the liver and muscle, and to fat in adipose tissue, by stimulating the rate of glucose metabolism, and by depressing gluconeogenesis.

Sensitivity: 50% B/B_0: 0.5-0.76 ng/ml
Homology:

Rat Insulin	100%
Hamster Insulin	100%
Human Insulin	100%
Murine Insulin	100%
Ovine Insulin	100%
Porcine Insulin	100%

96 wells



JWH 015 10009018

[155471-08-2]
MF: $C_{23}H_{21}NO$ **FW:** 327.4 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: JWH 015 is a selective aminoalkylindole CB_2 receptor agonist with K_i values of 13.8 and 383 nM for human recombinant CB_2 and CB_1 receptors, respectively. Using Theiler's murine encephalomyelitis virus as a model for human multiple sclerosis (MS), treatment with WIN 55212-2, ACEA, and JWH 015 significantly improved the neurological deficit of established disease. JWH 015 was shown to reduce microglial activation, abrogate antigen expression, and decrease the number of CD^{4+} infiltrating T-cells in the spinal cord. In addition, JWH 015 reduces IFN-γ-induced up-regulation of CD40 expression in murine microglial cells by interfering with the JAK/STAT1 pathway.

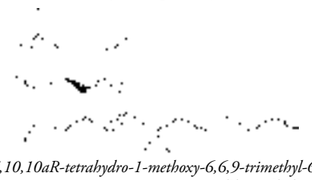
1 mg
5 mg
10 mg
25 mg

(2-methyl-1-propyl-1H-indol-3-yl)-1-naphthalenyl-methanone

L-759,633 10009280

[174627-50-0]
MF: $C_{26}H_{40}O_2$ **FW:** 384.6 **Purity:** ≥98%
A solution in methyl acetate **Stability:** ≥1 year at -20°C
Summary: L-759,633 is a high-affinity CB_2-selective agonist with K_i values of 6.4 and 1043 nM for CB_2 and CB_1 receptors, respectively. L-759,633 inhibits forskolin-stimulated cyclic AMP production in CHO cells transfected with CB_2 or CB_1 receptors with IC_{50} values of 8.1 nM and 10 µM, respectively.

1 mg
5 mg
10 mg
50 mg



3-(1,1-dimethylheptyl)-6aR,7,10,10aR-tetrahydro-1-methoxy-6,6,9-trimethyl-6H-dibenzo[b,d]pyran

Leptin

Leptin is a 16 kDa protein hormone encoded by the obese (*ob*) gene with important effects in metabolism and regulating body weight. Leptin has dual actions, decreasing appetite and increasing energy consumption. The primary effect of leptin appears to be mediated by leptin receptors expressed mainly in the hypothalamus. Mutations in the *ob* gene or leptin receptor gene causes hyperphagia, reduced energy expenditure, and severe obesity. The assays listed below are based on a double-antibody sandwich technique for sensitive measurement of leptin or leptin receptor

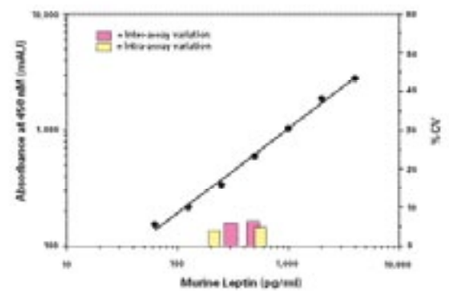
Leptin (murine/rat) EIA Kit* 10007609

Stability: ≥6 months at 4°C
Summary: This EIA utilizes plates coated with a polyclonal antibody specific for murine/rat leptin. A biotin-labeled polyclonal antibody and streptavidin-HRP are used for detection.

Limit of Detection: 50 pg/ml
Homology:

Murine Leptin	100%
Rat Leptin	100%

96 wells



Leptin Receptor (human) EIA Kit* 10007608

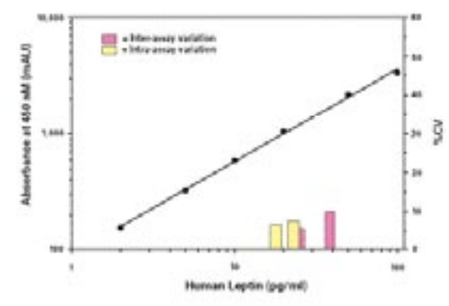
Stability: ≥6 months at 4°C
Summary: The assay utilizes plates coated with HRP-conjugated monoclonal antibody for detection.

Limit of Detection: 0.4 ng/ml
Homology:

Human Leptin	100%

For a full specificity profile, please go to www.caymanchem.com

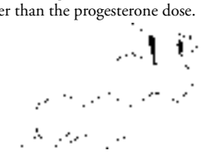
96 wells



Levonorgestrel 10006318

[797-63-7] Norplant
MF: $C_{21}H_{28}O_2$ **FW:** 312.5 **Purity:** ≥95%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: Levonorgestrel is a synthetic progesterone analog (*i.e.*, a progestin) and the biologically active component of norgestrel, which is a racemic mixture. Levonorgestrel prevents pregnancy by inhibiting ovulation and by causing the cervical mucous to thicken, which makes it harder for sperm to move toward the uterus. Levonorgestrel exhibits approximately three-times higher binding affinity than progesterone for the progesterone receptor. A dose of approximately 60 µg is sufficient to prevent ovulation and a therapeutic dose of 0.15-0.5 mg is used in hormone replacement therapy, which is about 1,000-times lower than the progesterone dose.

100 mg
500 mg
1 g
5 g

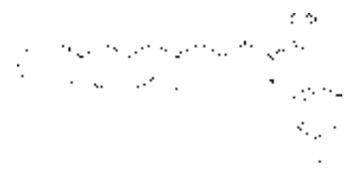


13-ethyl-17α-hydroxy-18,19-dinorpregn-4-en-20-yn-3-one

N-(α-Linolenoyl) Tyrosine 10032

[259143-19-6] NALT
MF: $C_{27}H_{39}NO_4$ **FW:** 441.6 **Purity:** ≥98%
A solution in ethanol **Stability:** ≥1 year at -20°C
Summary: NALT is a simple α-amide conjugate between the ω-3 essential fatty acid α-linolenate and the amino acid tyrosine. α-Linolenate is an important precursor to docosahexaenoic acid (DHA), a prominent brain PUFA, while tyrosine is the metabolic precursor for neuronal dopamine synthesis. NALT was prepared as a method for enhancing CNS dopamine content by facilitated transport of the tyrosine precursor across the blood-brain barrier. In experimental rat models of dopamine insufficiency, NALT increased CNS dopamine levels and exhibited an activity profile consistent with an anti-Parkinson's therapeutic agent.

5 mg
10 mg
50 mg
100 mg



N(L-tyrosine)-9Z,12Z,15Z-octadecatrienamide

Maturation-Inducing Steroid (salmonid) EIA Antiserum 498502

MIS, 17α,20β-dihydroxy-4-Pregnen-3-one
Stability: ≥1 year at -20°C
Summary: MIS; 17α,20β-dihydroxy-4-pregnen-3-one is one of the key mediators for oocyte maturation in fish. Several different names are synonymous with this molecule including maturation inducing hormone (MIH), fish maturation hormone (FMH), and 17α,20β-dihydroxy progesterone (17α,20β-DiOH-P). MIS is produced in ovarian follicular cells and acts directly on the oocyte *via* a specific receptor to cause oocyte maturation. Cayman's MIS EIA tracer, antiserum, and standard are designed for the measurement of MIS in a standard solid-phase EIA format.

100 dtn
500 dtn

Also Available: *Maturation-Inducing Steroid (salmonid) AChE Tracer (498500)* — *100 dtn, 500 dtn*
Also Available: *Maturation-Inducing Steroid (salmonid) EIA Standard (498504)* — *1 ea*

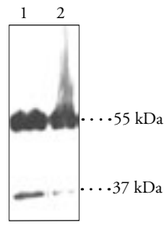
**SPI-BIO Assays are available through Cayman Chemical only within North & South America and Asia; elsewhere contact SPI-BIO.*

**SPI-BIO Assays are available through Cayman Chemical only within North & South America and Asia; elsewhere contact SPI-BIO.*

Melanocortin-4 Receptor Polyclonal Antibody 10006355

MC4R
Peptide affinity-purified IgG **Stability:** ≥1 year at -20°C
Summary: Antigen: murine MC4R amino acids 21-33 • Host: rabbit • Cross-reactivity: (+) human, murine, and rat MC4R; other species not tested • Applications: WB and IHC (paraffin-embedded sections); other applications not tested • The MC4R is a GPCR that plays a critical role in appetite regulation.

1 ea



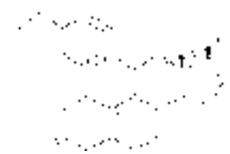
Lane 1: *Human cerebella cortex pellet (30 µg)*
Lane 2: *Human hippocampus homogenate (30 µg)*

Also Available: *Melanocortin-4 Receptor Blocking Peptide (10006356)* *200 µg*

Mifepristone 10006317

[84371-65-3] RU-486
MF: $C_{29}H_{35}NO_2$ **FW:** 429.6 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: Mifepristone is a potent progesterone receptor (PR) and glucocorticoid receptor (GR) antagonist with K_i values of approximately 1 nM. It is used in combination with misoprostol for the oral induction of first trimester abortions. Mifepristone promotes efficient binding of PR to hormone response elements (HRE) on DNA, but prevents transcriptional activation of the receptor. The IC_{50} value of mifepristone for PR dimerization and activation is 0.6 nM; the IC_{50} for mifepristone-induced competitive binding of wild-type PR with a constitutively active PR for HRE is 0.01 nM. In anti-estrogen resistant breast cancer cells, mifepristone induces growth arrest, caspase activation, and cell death, indicating the effectiveness of PR antagonism as a novel approach to treatment of select cancers.

100 mg
500 mg
1 g
5 g



11β-[4-(dimethylamino)phenyl]-17β-hydroxy-17-(1-propynyl)-estra-4,9-dien-3-one

MS-PPOH 75770

[206052-02-0]
MF: $C_{16}H_{21}NO_4S$ **FW:** 323.4 **Purity:** ≥96%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: MS-PPOH is a selective inhibitor of the epoxygenation reactions catalyzed by specific CYP450 isozymes. MS-PPOH inhibits the formation of arachidonate 11,12-epoxides by CYP4A2 and CYP4A3 enzymes with an IC_{50} value of 13 µM, but has no effect on the formation of 20-HETE, the ω-hydroxylation product of CYP4A1.

1 mg
5 mg
10 mg
50 mg

N-(methylsulfonyl)-2-(2-propynyloxy)-benzenehexanamide

S-NEPC 10008609

MF: $C_{16}H_{13}NO_6$ **FW:** 315.3 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: S-NEPC is a colorimetric substrate used to measure sEH activity. It also is a substrate for glutathione S-transferase, microsomal epoxide hydrolase and porcine liver carboxylesterase. Hydrolysis of S-NEPC by sEH yields 4-nitrophenol which can be quantified spectrophotometrically at 405 nm. S-NEPC is adaptable for use in 96-well plate readers.

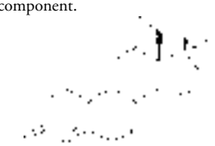
1 mg
5 mg
10 mg
50 mg

4-nitrophenyl-2S,3S-epoxy-3-phenylpropyl carbonate

Norgestrel 10006319

[6533-00-2] Ovrette
MF: $C_{21}H_{28}O_2$ **FW:** 312.5 **Purity:** ≥90%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: Norgestrel is a synthetic progesterone analog (*i.e.,* a progestin) used as an oral contraceptive, either alone (sold under the trade name Ovrette), or in combination with estrogens such as ethinyl estradiol. It is a racemic mixture of which levonorgestrel is the biologically active component.

100 mg
500 mg
1 g
5 g

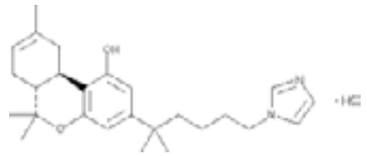


(±)-13-ethyl-17α-hydroxy-18,19-dinorpregn-4-en-20-yn-3-one

O-2545 10009195

MF: $C_{26}H_{36}N_2O_2$ • HCl **FW:** 445.0 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: O-2545 is a potent water-soluble agonist of CB_1 and CB_2 receptors with K_i values of 1.5 and 0.32 nM, respectively. When dissolved in saline, O-2545 was highly efficacious in murine behavioral models when administered either intravenously or intracerebroventricularly.

1 mg
5 mg
10 mg
50 mg

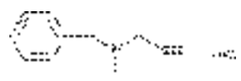


6a,7,10,10a-tetrahydro-3-[5-(1H-imidazol-1-yl)-1,1-dimethylpentyl]-6,6,9-trimethyl-6H-dibenzo[b,d]pyran-1-ol, monohydrochloride

Pargyline (hydrochloride) 10007852

[306-07-0]
MF: $C_{11}H_{13}N$ • HCl **FW:** 195.7 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: Pargyline is an irreversible inhibitor of monoamine oxidase (MAO) that is used clinically to treat moderate hypertension. At 10 mg/kg intravenously, pargyline induces a moderate decrease of systolic blood pressure in unanaesthetized hypertensive rats but not normotensive WKR or Sprague-Daley rats. The correlation between the fall of blood pressure and the inhibition of brain MAO suggests that the accumulation of amine in brain is responsible for the fall in pressure. Reactive oxygen species-mediated monocyte hypertrophy is prevented by pargyline at a concentration of 10 µM.

100 mg
500 mg
1 g
5 g



N-methyl-N-2-propynyl-benzenemethanamine, monohydrochloride

NEW PEPCK Polyclonal Antibody 10004943

Pck1, PEPCK-c, Phosphoenolpyruvate carboxykinase
Peptide affinity-purified IgG **Stability:** ≥1 year at -20°C
Summary: Antigen: murine and rat PEPCK protein amino acids 5-17 • Host: rabbit • Cross-reactivity: (+) murine and rat PEPCK protein; other species not tested • Application: WB; other applications not tested • PEPCK is a hormonally regulated enzyme responsible for the first committed step in gluconeogenesis, catalyzing the conversion of oxaloacetate to phosphoenolpyruvate.

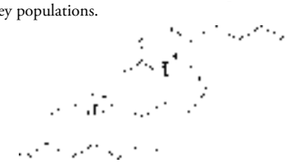
1 ea

Also Available: *PEPCK Blocking Peptide (10007475)* *200 µg*

Petromyzonol 98250

[28979-29-5]
MF: $C_{24}H_{42}O_4$ **FW:** 394.6 **Purity:** ≥98%
A crystalline solid **Stability:** ≥1 year at room temperature
Summary: Petromyzonol is a tetrahydroxy stearol which serves as the primary spawning pheromone in adult sea lamprey. It is produced in the bile of sea lamprey larvae from the bile acid precursor allocholic acid. While the adult sea lamprey is relatively insensitive to petromyzonol itself, the C-24 sulfate ester (petromyzonol sulfate) is a pheromone and a spawning chemoattractant which can be detected at very low concentrations by lamprey olfactory chemoreceptors. Petromyzonol, petromyzonol sulfate, and allocholic acid are all found in water samples from fresh water streams bearing larval lamprey populations.

1 mg
5 mg
10 mg
50 mg



3α,7α,12α,24-tetrahydroxy-5α-cholane

3-keto Petromyzonol 10007055

[359436-56-9]
MF: $C_{24}H_{40}O_4$ **FW:** 392.6 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: 3-keto Petromyzonol is a synthetic intermediate useful for pharmaceutical synthesis.

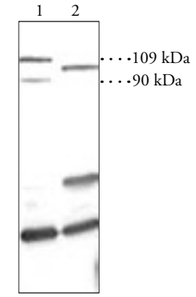
1 mg
5 mg
10 mg
50 mg

7α,12α,24-trihydroxy-5α-cholane-3-one

PGC-1 Polyclonal Antibody 101707

PPARγ Coactivator 1
Peptide affinity-purified IgG **Stability:** ≥1 year at -20°C
Summary: Antigen: human PGC-1α amino acids 75-90 • Host: rabbit • Cross-reactivity: (+) human, murine, and rat PGC-1α and PGC-1β • Applications: WB and IHC (paraffin-embedded sections); other applications not tested • PPARγ coactivator (PGC-1a) plays a key role in energy metabolism, hepatic gluconeogenesis, and cholesterol homoeostasis. PGC-1b is also thought to activate oxidative metabolism in tissues.

1 ea



Lane 1: *HEK293 cell lysate (40 µg)*
Lane 2: *Murine kidney 100,000 x g pellet resuspension (40 µg)*

Also Available: *PGC-1 Blocking Peptide (301707)* *200 µg*

PHOME 10009134

MF: $C_{23}H_{19}NO_4$ **FW:** 373.4 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: PHOME is a fluorogenic substrate for human sEH which displays good aqueous stability and solubility making it ideal for high throughput screening (HTS) programs. Hydrolysis of the substrate yields a highly fluorescent product that can be monitored at excitation and emission wavelengths of 330 and 465 nm, respectively. This fluorescent assay has a sensitivity that is 100 times greater than previously used spectrophotometric assays.

1 mg
5 mg
10 mg
50 mg

(3-phenyl-oxiranyl)-acetic acid cyano-(6-methoxy-naphthalen-2-yl)-methyl ester

Tom Brock, Ph.D.

Estrogen Receptors

Model Nuclear Receptors

The nuclear hormone receptors are a superfamily of transcription factors that play important roles in both physiology and disease. In humans, there are some 48 nuclear receptors and many remain "orphans" in that their endogenous ligands are unknown. Research on their roles has been limited largely to the use of synthetic agonists, as well as genetic approaches to alter expression. This contrasts with the estrogen receptors (ERα and ERβ), which have been extensively studied (reviewed in reference 1). These receptors remain at the center of cutting edge research, as outlined below, and these results provide a model for how other nuclear receptors may act.

The estrogens are a group of steroid hormones produced by enzymatic modification of cholesterol. The primary estrogen of the reproductive years is 17β-estradiol (estradiol), which is derived from testosterone by aromatase activity. In fact, there is a wide range of natural and synthetic molecules that can activate ERα and ERβ. Natural estrogens include those produced by plants (phytoestrogens) and fungi (mycoestrogens). Synthetic ER activators include those intentionally produced for use in humans as well as chemicals targeted for other uses (*e.g.*, insecticides) that have ER-modulating activities. Identifying chemicals in this latter group is now the focus of both multinational organizations and governmental agencies (see below).

Estrogen Receptor-DNA Binding

Recent work at the molecular level has revealed interesting details about how the ERs, and perhaps nuclear receptors in general, work. These studies used the newer ChIP-chip and ChIP-PET approaches (reviewed in reference 2). Both of these use chromatin immunoprecipitation (ChIP) as an initial step to isolate DNA bound by ER. In this approach, test and control cells are first treated with a fixative to cross-link proteins in place so that any proteins associated with DNA remain fixed to that DNA. The cells are then lysed and the DNA sheared to generate pieces of DNA with associated protein. DNA that is fixed to a specific protein (*e.g.*, ERα) is then pulled down by immunoprecipitation of the target protein (all other DNA is discarded). After reversal of cross-linking followed by protein degradation, the remaining pieces of DNA can then be analyzed to determine what sequences were associated with the target protein.

In the ChIP-chip approach, DNA recovered from the first ChIP step is fluorescently end-tagged and then used to probe a microarray. Older microarrays contained pieces of DNA attached to the chip; these pieces were typically complementary to specific mRNAs (expressed exons) of interest. Newer arrays, called "tiling arrays", have sequences built directly on a surface at high density. Tiling arrays are often built to contain whole genes or genomes and thus provide an unbiased approach to finding, for example, potential protein binding sites.

The ChIP-PET technique involves inserting the many different DNA pieces obtained from ChIP into special plasmids that contain restriction sites at both ends of the inserted DNA segment. As a result, when the restriction sites are cut, the different released DNA segments will all have the same known sequence, or tag, marking each end. These tags thus demarcate the beginnings and ends of segments. The released pieces of DNA are now paired-end di-tagged DNA (PETs). Several PETs will then be concatenated and inserted into new plasmids to produce a ChIP-PET library. After high-throughput sequencing, the sequences are then mapped, by computer, back to the genome.

Using a ChIP-PET approach, Lin, *et al.*, studied the DNA sites that were bound by ERα in the human breast cancer MCF-7 line.[3] This approach, which allows computational mapping of ER-binding sites across the entire human genome, found 1,234 high confidence ERα binding sites. A common assumption has been that transcription regulators, like ER, act primarily upstream of the transcriptional start site (TSS). However, they found that only 5% of the ER binding sites mapped within 0-5 kb upstream of the TSS! Most (38%) ER binding sites mapped to intragenic regions of transcripts and were localized to introns, with 23% within 100 kb of 5' start sites and 19% within 100 kb of the 3' polyadenylation sites. Remarkably, 20% of the high confidence sites were in gene deserts where the nearest known gene is >100 kb away. These results indicate that ERα regulates transcription by binding to sites throughout the genome, with the vast majority not found immediately upstream of the TSS. This finding most likely will apply to other nuclear receptors.

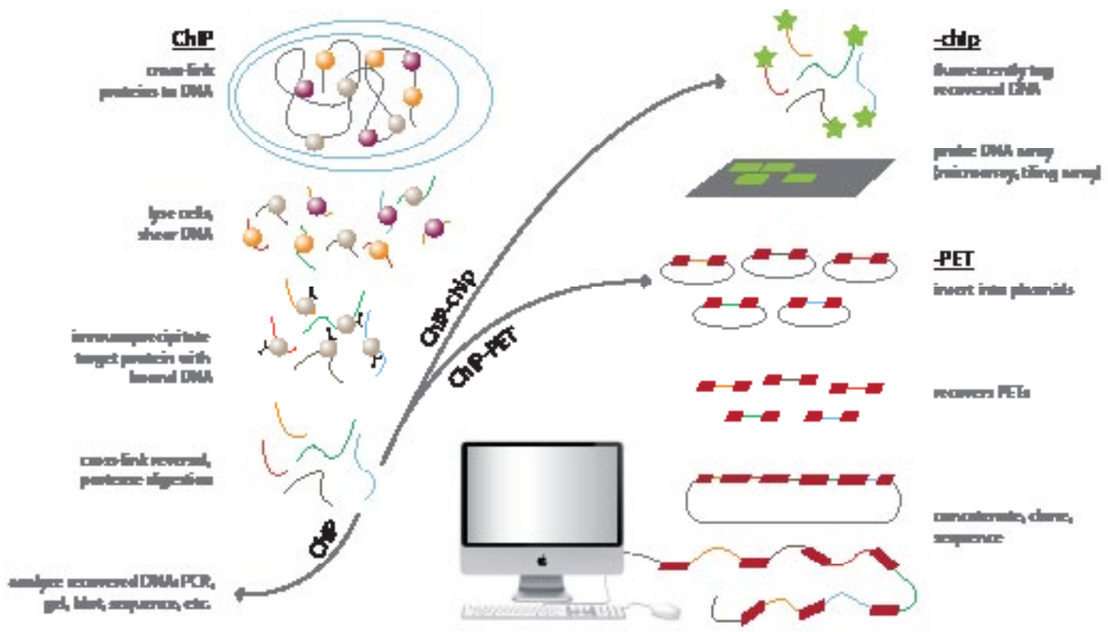


Figure 1. Scheme for identifying protein/DNA interactions by ChIP, ChIP-chip, and ChIP-PET.

More recently, the ChIP-chip approach was used to study the relationship between ERα and ERβ binding.[4] Here, MCF-7 cells were engineered so that the expression of ERβ was inducible. In this way, the influence of ERβ on ERα binding could be assessed. In addition, it would become clear whether there are unique sites for either ERα or ERβ. Tiling arrays containing probes for seven entire human chromosomes were probed. The analysis identified 875 distinct sites, of which 19% were unique to ERα and 14% were unique to ERβ. This suggests that, while the majority of sites are promiscuous for ER isoforms, about a third are selective. Moreover, 8% of the ERα sites were bound only in the presence of ERβ, indicating that direct or indirect interactions involving ERβ make those sites available for ERα.

Finally, both studies analyzed the regions adjacent to ER binding sites and found motifs for other transcription factors. These and other studies find that other transcription factors can affect the binding of the ER isoforms, much like ERβ can facilitate ERα binding. To date, there is evidence that binding of Sp1 and FOXA1 can modulate ER binding to neighboring sites. However, just as ER can affect transcription from relatively distant sites, it remains likely that apparently distant transcription factors will be found to affect ER binding.

The ER – It's Not Just for Sex

New, unexpected physiological roles for the ERs are being discovered. For example, just when you thought you knew that the purpose of estrogen receptors was to control sexual development and reproduction, something like this comes up. Sergei Musatov, and colleagues,[5] silenced the expression of ERα in the ventromedial nucleus of the hypothalamus of mice and rats using an RNA interference approach. The result was a remarkable change in metabolism. Mice with silenced ERα became obese, with a profound increase in visceral fat. This occurred whether the mice previously had their ovaries (a primary estrogen source) removed or not. Weight gain was due only in part to an increase in food intake. Perhaps contributing more to the weight gain, ERα-knockdown mice had reduced tolerance to glucose and diminished energy expenditure, compared to control mice. Similar changes occurred in rats. On the one hand, these results suggest that ER signaling in this specific region of the brain may play a role in the weight gain and increased metabolic syndrome in women following menopause. On the other hand, this study, as well as other studies like it, underscores the multifunctionality of nuclear receptors. Each receptor isoform can control a diverse set of effects at distinct sites throughout the body. This has important implications for therapeutic modalities that act at these receptors.

Environmental ER Agonists/Antagonists

Endocrine disruption refers to the harm caused by incidental exposure to environmental pesticides, industrial chemicals, or synthetic hormones which specifically target and interact with the normal endocrine hormonal system of the exposed organism. Because compelling evidence has demonstrated that the endocrine systems of fish and wildlife have been affected by chemical contaminants, Congress passed the Food Quality Protection Act in 1996. This required that the EPA initiate the Endocrine Disruptor Screening Program (EDSP; go to www.epa.gov/endo/) to screen pesticide chemicals and environmental contaminants for their potential to affect the endocrine systems of humans and wildlife.

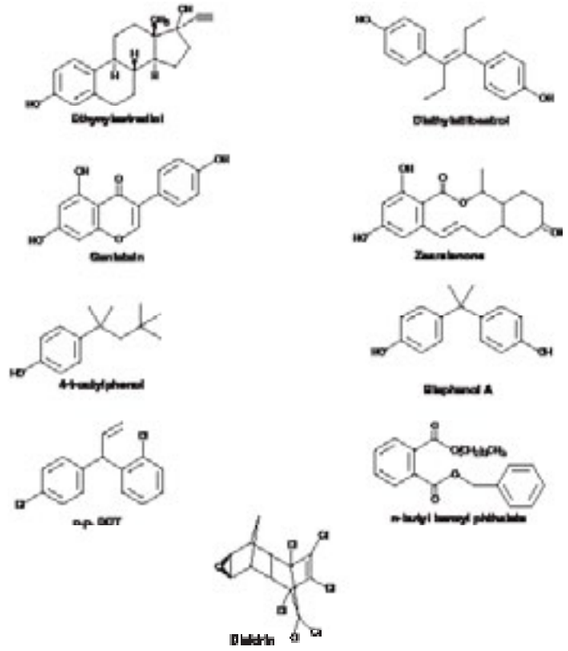


Figure 2. Examples of reported estrogen mimics: pharmaceuticals (ethynyl estradiol and diethyl-*no*-stilbestrol), phytoestrogens (genistein), mycoestrogens (zearalenone), industrial compounds (bisphenol A, 4-t-octylphenol and n-butyl benzyl phthalate), and pesticides (o,p'-DDT and dieldrin).

In March of 2008, the EPA reviewed several potential screening approaches for evaluating the effects of compounds on the hypothalamus-pituitary-gonadal (HPG) or hypothalamus-pituitary-thyroid (HPT) axes. These assays were:

- Adult and pubertal rat assays for HPG and HPT systems
- Fish screen, short-term reproduction for HPG axis
- Amphibian metamorphosis assay, for HPT axis
- *In vitro* androgen receptor binding assay
- *In vitro* placental aromatase assay (estrogen synthesis assay)

Of these assays, the fish screen stood out as an established, informative, and reproducible test for disruptors of the hypothalamus-pituitary-gonadal axis. A key component of the fish screen is the analysis of Vtg in the plasma of male fish. The synthesis of Vtg, a yolk precursor protein, is regulated by estrogen through ER. Importantly, the induction of Vtg is a direct physiological response to an exposure, rather than the mere presence of a chemical, and will thus take into account both bioavailability and the complex toxicokinetics and toxicodynamics that occur in animals. The fish screen, including the Vtg analysis, is also being utilized by the multinational Organization for Economic Co-Operation and Development for Endocrine Disrupter Testing and Assessment.

References

1. Heldring, N., Pike, A., Andersson, S., *et al. Physiol. Rev.* **87,** 905-931 (2007).
2. Hudson, M.E., Snyder, M. *Biotechniques* **41 (6),** 673-681 (2006).
3. Lin, C.-Y., Vega, V.B., Thomsen, J.S., Zhang, T., *et al. PLoS Genet.* **3 (6),** 867-885 (2007).
4. Liu, Y., Gao, H., Marstrand, T.T., *et al. Proc. Natl. Acad. Sci. USA* **105 (7),** 2604-2609 (2008).
5. Musatov, S., Chen, W., Pfaff, D.W., *et al. Proc. Natl. Acad. Sci. USA* **104 (7),** 2501-2506 (2007).

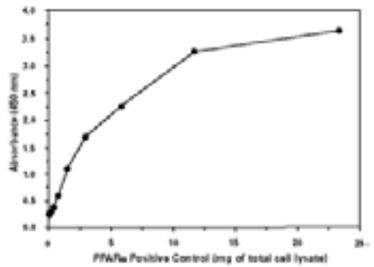
PPAR Transcription Factor Assay Kits

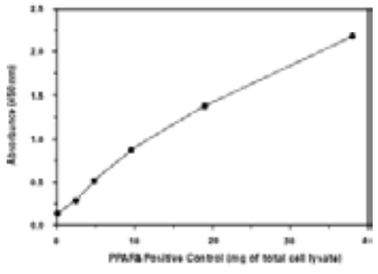
PPARs are ligand-activated transcription factors belonging to the large superfamily of nuclear receptors. PPARα primarily activates genes encoding proteins involved in fatty acid oxidation, while PPARγ primarily activates genes directly involved in lipogenic pathway and insulin signaling. Members of the PPAR family are important direct targets of many antidiabetic and hypolipidemic drugs. Cayman's PPAR Transcription Factor Assays are a non-radioactive, sensitive method for detecting specific transcription factor DNA binding activity in nuclear extracts and whole cell lysates. A 96-well ELISA replaces the cumbersome radioactive EMSA. A specific double-stranded DNA (dsDNA) sequence containing the PPRE is immobilized onto the bottom of wells of a 96-well plate. PPARs contained in a nuclear extract, bind specifically to the PPRE. PPARα, δ, or γ are detected by addition of specific primary antibodies directed against the individual PPARs. A secondary antibody conjugated to HRP is added to provide a sensitive colorimetric readout at 450 nm.

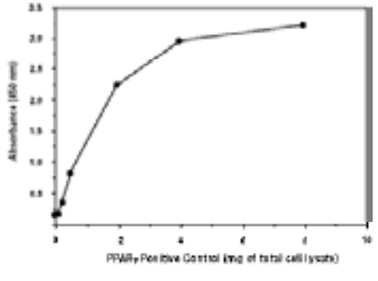
PPARα, δ, γ Complete Transcription Factor Assay Kit 10008878

Stability: ≥6 months at -20°C

96 wells



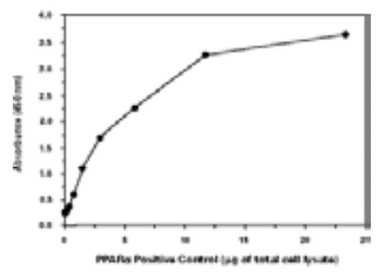




PPARα Transcription Factor Assay Kit 10006915

Stability: ≥6 months at -20°C

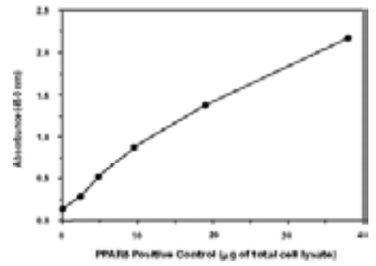
96 wells



PPARδ Transcription Factor Assay Kit 10006914

Stability: ≥6 months at -20°C

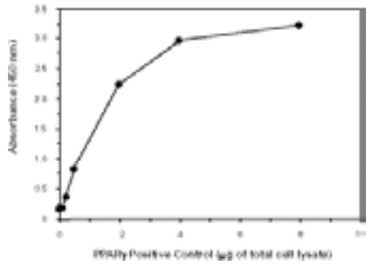
96 wells



PPARγ Transcription Factor Assay Kit 10006855

Stability: ≥6 months at -20°C

96 wells



PPARα LBD (human recombinant) 10009088

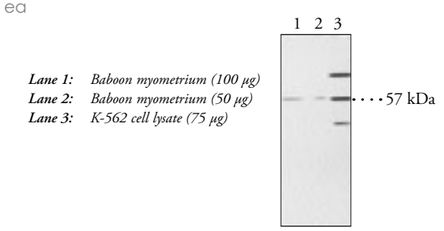
PPARα Ligand Binding Domain
Purity: ≥90%
A solution in 50 mM sodium phosphate, pH 7.2, containing 20% glycerol, 100 mM sodium chloride, and 1 mM DTT **Stability:** ≥6 months at -80°C
Summary: Source: recombinant His-tagged protein purified from *E. coli* • M_r: 34 kDa

25 µg
50 µg
100 µg

PPARα Polyclonal Antibody 101710

Peptide affinity-purified IgG **Stability:** ≥1 year at -20°C
Summary: Antigen: human, murine, and rat PPARα amino acids 22-36 • Host: rabbit • Cross-reactivity: (+) human, murine, rat, ovine, and porcine PPARα; (-) PPARγ • Application: WB; other applications not tested • PPARα is a ligand-activated transcription factor involved in the regulation of lipid homeostasis.

1 ea



Also Available: *PPARα Blocking Peptide (301710)* *200 µg*

PPARδ (human recombinant) 10007451

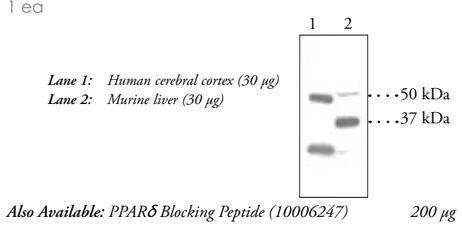
FAAR, NUC1, Nuclear Hormone Receptor 1, PPARβ
Purity: ≥95%
A solution in 50 mM sodium phosphate, pH 7.2, containing 20% glycerol, 150 mM sodium chloride, and 1 mM DTT **Stability:** ≥6 months at -80°C
Summary: Source: recombinant protein isolated from baculovirus overexpression system in Sf21 cells • M_r: 54 kDa

10 µg
25 µg
50 µg

PPARδ Polyclonal Antibody 101720

FAAR, NUC1, Nuclear Hormone Receptor 1, PPARβ
Peptide affinity-purified IgG **Stability:** ≥1 year at -20°C
Summary: Antigen: human PPARd amino acids 39-54 • Host: rabbit • Cross-reactivity: (+) human, murine, rat, ovine, and porcine PPARd; other species not tested • Applications: WB, IHC, and ICC; other applications not tested • PPARd is a ligand-activiated transcription factor with diverse physiological functions including lipid and cholesterol homeostasis, embryo implantation, and cancer development.

1 ea



Also Available: *PPARδ Blocking Peptide (10006247)* *200 µg*

PPARγ FL (human recombinant from *E. coli*) 61700

PPARγ Full Length
Purity: ≥90% by SDS-PAGE
A solution in 20 mM Tris HCl, pH 8.0, containing 250 mM KCl, 20% glycerol, 5 mM DTT, and 0.5 mM EDTA **Stability:** ≥6 months at -80°C
Summary: Source: human recombinant N-terminal His-tagged protein expressed in *E. coli* • M_r: 60 kDa

5 µg
10 µg
25 µg
50 µg

PPARδ Western Ready Control 10009568

FAAR, NUC1, Nuclear Hormone Receptor 1, PPARβ
Purity: 54 kDa tagged; 51 kDa native
Stability: ≥6 months at -20°C
Summary: Source: human recombinant N-terminal His-tagged protein expressed in Sf21 cells • Application: Positive control for WB

1 ea

PPARγ FL (human recombinant from Sf21 cells) 10009987

PPARγ Full Length
Purity: ≥80% by SDS-PAGE
A solution in 50 mM sodium phosphate, pH 7.2, containing 100 mM NaCl, 20% glycerol, 1 mM DTT, and 20% mM glycerol **Stability:** ≥6 months at -80°C
Summary: Source: human recombinant N-terminal His-tagged protein expressed in Sf21 cells • M_r: ~60 kDa

5 µg
10 µg
25 µg
50 µg

PPARγ LBD (human recombinant) 10007941

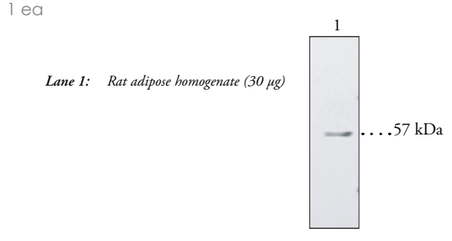
PPARγ Ligand Binding Domain
Purity: ≥90%
A solution in 50 mM sodium phosphate, pH 7.2, containing 20% glycerol, 150 mM sodium chloride, and 1 mM DTT **Stability:** ≥6 months at -80°C
Summary: Source: recombinant N-terminal His-tagged protein expressed in *E. coli* • M_r: 34 kDa

25 µg
50 µg
100 µg

PPARγ Polyclonal Antibody 101700

Peptide affinity-purified IgG **Stability:** ≥1 year at -20°C
Summary: Antigen: human PPARγ1 amino acids 82-101; amino acids 110-129 of PPARγ2 • Host: rabbit • Cross-reactivity: (+) human and murine PPARγ1 and PPARγ2 • Application: WB; other applications not tested • PPARg is a ligand-activated transcription factor involved in the regulation of lipid homeostasis and may function as a master regulator of adipogenesis.

1 ea

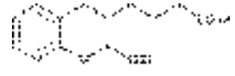


Also Available: *PPARγ Blocking Peptide (301700)* *200 µg*

PPOH 75760

[206052-01-9]
MF: $C_{15}H_{18}O_3$ **FW:** 246.3 **Purity:** ≥99%
A crystalline solid **Stability:** ≥1 year at -20°C
Summary: PPOH is a selective inhibitor of the epoxygenation reactions catalyzed by specific CYP450 isozymes. PPOH inhibits the formation of arachidonate 11,12 epoxides by CYP4A2 and CYP4A3 enzymes with an IC_{50} value of 9 µM, but has effect on the formation of 20-HETE, the ω-hydroxylation product of CYP4A1.

1 mg
5 mg
10 mg
50 mg



2-(2-propynyloxy)-benzenehexanoic acid

Progesterone EIA Kit 582601

Stability: ≥1 year at -20°C
Summary: Progesterone, along with pregnenolone, is the biosynthetic precursor of all other steroid hormones. Progesterone is synthesized from cholesterol by the sequential action of desmolase in the mitochondria, which produces pregnenolone, followed by $D^{4,5}$-isomerase in the outer mitochondrial membrane and smooth endoplasmic reticulum of steroid-secreting cells. The main function of progesterone is to prepare the uterine lining for implantation of a fertilized ovum and to maintain pregnancy. Measurement of serum or plasma progesterone levels are used as an index to monitor ovulation and investigate luteal function. Plasma concentrations of progesterone are approximately 0.2-0.8 ng/ml and 4-20 ng/ml during the follicular phase and luteal phase of the menstrual cycle, respectively. Salivary concentrations of progesterone are approximately 100-fold lower than those found in plasma.

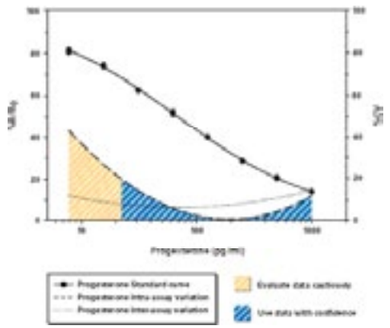
Sensitivity: 50% B/B_0: 62 pg/ml
80% B/B_0: 10 pg/ml
Specificity:

Progesterone	100%
Pregnenolone	61%
17β-Estradiol	7.2%
5β-Pregnan-3α-ol-20-one	6.7%
17-hydroxy Progesterone	0.5%

For a full specificity profile, please go to www.caymanchem.com

96 wells
480 wells

Also Available: *Progesterone EIA Kit (Solid Plate) (582601.1)*



Progesterone Receptor (Phospho-Ser[190]) Monoclonal Antibody 10009762

Peptide affinity-purified IgG **Stability:** ≥1 year at -20°C
Summary: Antigen: phosphospeptide corresponding to amino acid residues surrounding phospho-Ser[190] of the human progesterone receptor • Host: mouse • Cross-reactivity: (+) human progesterone receptor • Applications: WB and IHC (frozen sections)

100 µl

Progesterone Receptor (Phospho-Ser[294]) Monoclonal Antibody 10009763

Peptide affinity-purified IgG **Stability:** ≥1 year at -20°C
Summary: Antigen: phosphopeptide corresponding to amino acid residues surrounding phospho-Ser[294] of the human progesterone receptor • Host: mouse • Cross-reactivity: (+) human progesterone receptor; expected to react with murine, rat, and non-human primates progesterone receptor based on 100% homology with the amino acid sequence used as the antigen • Applications: WB and IHC (frozen sections)

100 µl

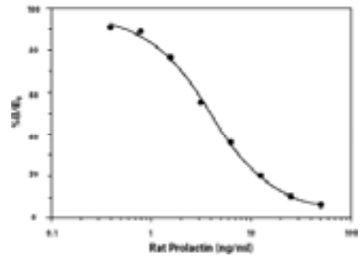
Prolactin (rat) EIA Kit* 589701

Stability: ≥6 months at -20°C
Summary: Prolactin is a 199 amino acid (23 kDa) neuropeptide best known for its role in the initiation and maintenance of lactation. The hormone is secreted by the lactotrophic cells of the anterior pituitary. Prolactin concentrations in the circulation rise continually from the fifth week of pregnancy until parturition, reaching a level greater than 150 ng/ml, which is approximately 10 times the levels prior to conception. The phenotypes of prolactin knockout animals indicate that milk production and reproductive properties of prolactin cannot be taken over by other hormones or cytokines. However, numerous other biological roles of prolactin, in areas such as water and electrolyte balance, growth and development, metabolism, behavior, and immunoregulation, have been described. The fact that prolactin is found in all vertebrates, not only mammals, and that the prolactin receptor is expressed in virtually all organs or tissues, also point to functions other than lactation.

Sensitivity: 50% B/B_0: 3 ng/ml
80% B/B_0: 0.9 ng/ml
Specificity:

Rat Prolactin	100%
Murine Prolactin	<10%
Rat Growth Hormone	<1%
Rat Luteinizing Hormone	<1%
Rat Thyroid Stimulating Hormone	<1%

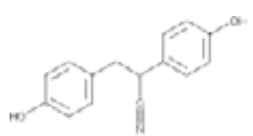
96 wells



2,3-*bis*(4-hydroxyphenyl) Propionitrile 10008842

[1428-67-7] DPN
MF: $C_{15}H_{13}NO_2$ **FW:** 239.3 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: DPN is an estrogen receptor b (ERb) selective agonist. DPN exhibits a 70-fold higher relative binding affinity for ERb (18%) *versus* ERa (0.25%), about 80-fold higher transcriptional potency (EC_{50} = 0.85 nM *versus* 66 nM), and 170-fold higher relative potency (4.6% *versus* 0.025%) in transcription assays. Based on this selectivity, DPN is commonly used as a tool to evaluate the biological role of ERb.

5 mg
10 mg
50 mg
100 mg

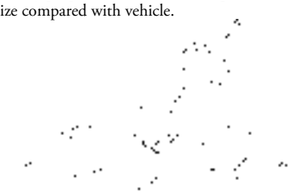


*4-hydroxy-*a*-(4-hydroxyphenyl)-benzenepropanenitrile*

Propylpyrazole Triol 10008841

[263717-53-9] PPT
MF: $C_{24}H_{22}N_2O_3$ **FW:** 386.4 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: PPT is an ERa selective agonist with a 410-fold relative binding affinity for ERa (49%) *versus* ERb (0.12%) and therefore activates gene transcription only through ERa. In an *in vivo* rabbit model of ischemia-reperfusion injury, treatment with estradiol and PPT, but not diarylpropinitrile (a selective agonist of ERb) significantly decreased the infarct size compared with vehicle.

1 mg
5 mg
10 mg
50 mg



4,4',4"-(4-propyl-1H-pyrazole-1,3,5-triyl)tris-phenol

Prorenin (human recombinant) 10007599

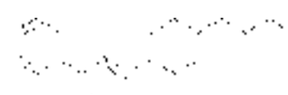
M_r: 45 kDa **Purity:** ≥99% by SDS-PAGE
A solution in 50 mM Tris, pH 8.0 **Stability:** 6 months at -80°C
Summary: Prorenin is the inactive precursor of renin, which is a key enzyme in the regulation of blood pressure and electrolyte balance. In renal juxtaglomerular cells, sequential cleavage of the N-terminal 20 and 46 amino acids of preprorenin produces prorenin and active renin, respectively. Renin catalyzes the conversion of angiotensinogen to angiotensin I. Prorenin exhibits 5-10% of the proteolytic activity of renin, however, the blood circulating levels are 10 times higher.

25 µg
50 µg
100 µg
500 µg

PSN375963 10008593

[388575-52-8]
MF: $C_{17}H_{23}N_3O$ **FW:** 285.4 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: GPR119 (previously designated SNORF25) is an orphan GPCR expressed predominantly in the pancreas and gastrointestinal tract in humans and in the brain, pancreas, and gastrointestinal tract in rodents. It mediates a reduction in food intake and body weight gain in rats upon treatment with oleoyl ethanolamide (OEA), an endogenous, potent agonist for PPARa. PSN375963 is a potent and selective agonist of GPR119 that shows similar potency to OEA at both recombinant murine and human GPR119 receptors, exhibiting EC_{50} values of 8.4 and 7.9 µM, respectively (EC_{50} values for OEA are 3.2 and 2.9 µM, respectively). These data suggest that PSN375963 may be useful as a therapeutic agent for the treatment of obesity.

1 mg
5 mg
10 mg
25 mg



4-[5-(4-butylcyclohexyl)-1,2,4-oxadiazol-3-yl]-pyridine

PSN632408 10008594

[857652-30-3]
MF: $C_{18}H_{24}N_4O_4$ **FW:** 360.4 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: GPR119 (previously designated SNORF25) is an orphan GPCR expressed predominantly in the pancreas and gastrointestinal tract in humans and in the brain, pancreas, and gastrointestinal tract in rodents. It mediates a reduction in food intake and body weight gain in rats upon treatment with oleoyl ethanolamide (OEA), an endogenous, potent agonist for PPARa. PSN632408 is an optimized agonist of GPR119 receptors that shows similar potency to OEA at both recombinant murine and human GPR119 receptors, exhibiting EC_{50} values of 5.6 and 7.9 µM, respectively (EC_{50} values for OEA are 3.2 and 2.9 µM, respectively). Systemic administration of PSN632408 (30 mg/kg intraperitoneally) suppresses food intake, reduces weight gain, and white adipose tissue deposition in rats. These data suggest that PSN632408 may be useful as a therapeutic agent for the treatment of obesity.

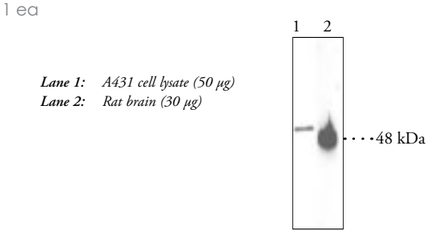
1 mg
5 mg
10 mg
25 mg

4-[[3-(4-pyridinyl)-1,2,4-oxadiazol-5-yl]methoxy]-1-piperidinecarboxylic acid, 1,1-dimethylethyl ester

PTEN Polyclonal Antibody 10005059

MMAC1, Phosphatase and Tensin Homolog on Chromosome 10, Phosphoinositide 3-phosphatase, TEP1
Peptide affinity-purified IgG **Stability:** ≥1 year at -20°C
Summary: Antigen: human PTEN amino acids 254-270 • Host: rabbit • Cross-reactivity: (+) human, chimpanzee, murine, rat, and canine PTEN; other species not tested • Applications: WB and IHC (paraffin-embedded sections); other applications not tested • PTEN (phosphatase and tensin homology on chromosome 10) dephosphorylates proteins and lipids such as AKT and phosphatidylinositol 3,4,5-triphosphate (PIP_3) and therefore functions as a key regulatory enzyme in a central signal transduction pathway.

1 ea



Lane 1: *A431 cell lysate (50 µg)*
Lane 2: *Rat brain (30 µg)*

Also Available: *PTEN Blocking Peptide (10007073)* *200 µg*

PTEN Western Ready Control 10009747

MMAC1, Phosphatase and Tensin Homology on Chromosome 10 TEP1, Phosphoinositide 3-Phosphotase
Purity: 84 kDa (GST fusion)
Stability: ≥6 months at -20°C
Summary: Source: human recombinant GST-tagged protein expressed in *E. coli* • Application: Positive control for WB

1 ea

Renin Fluorogenic Substrate 10006906

MF: $C_{109}H_{156}N_{32}O_{21}S$ **Purity:** ≥95% **Supplied as:** A red/brown crystalline solid
Summary: The renin fluorogenic substrate consists of the normal peptide substrate for renin which has been linked to the fluorophore EDANS at one end and to a non-fluorescent quenching molecule (Dabcyl) at the other. After cleavage by renin, the product (peptide-EDANS) is brightly fluorescent and can be easily analyzed using an excitation wavelength of 340 nm and emission wavelengths of 485-510 nm.

1 mg

**SPI-BIO Assays are available through Cayman Chemical only within North & South America and Asia; elsewhere contact SPI-BIO.*

Renin (human recombinant) 10006217

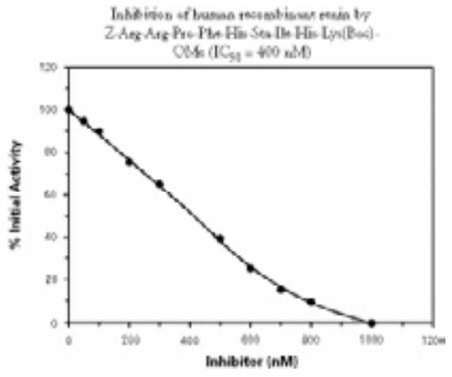
M_r: 40 kDa **Purity:** ≥99% by SDS-PAGE
A solution in sodium acetate buffer **Stability:** 6 months at -80°C
Summary: Renin is an aspartyl protease of approximately 40 kDa produced in the kidney by juxtaglomerular cells of the macula densa. Renin converts angiotensinogen into angiotensin I, activating a major arm of renal sodium and volume autoregulation. Native human renin is a glycoprotein derived from preprorenin by sequential cleavage of 20 and 46 amino acid residues from the N-terminus of the 406 amino acid precursor. The enzyme provided by Cayman is the active, 340 amino acid protease produced in HEK cells transfected with a human renin expression construct.

5 µg
10 µg
25 µg
50 µg

Renin Inhibitor Screening Assay Kit 10006270

Stability: ≥6 months at -80°C
Summary: Cayman's Renin Inhibitor Screening Assay provides a convenient assay in a 96-well format for evaluating human renin inhibitors. The assay utilizes a renin-based synthetic peptide substrate which incorporates the fluorophore EDANS at one end and an EDAN-quenching molecule (Dabcyl) at the other end. After cleavage by renin, the peptide-EDANS product is released yielding bright fluorescence which can be easily analyzed using excitation wavelengths of 335-345 nm and emission wavelengths of 485-510 nm.

96 wells



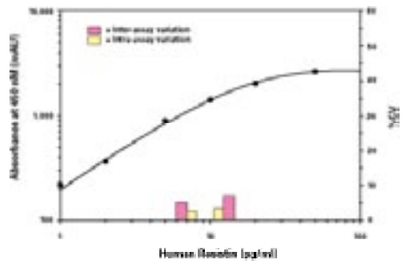
Resistin

Resistin is a peptide hormone belonging to the class of cysteine-rich secreted proteins termed the RELM family, and is also described as adipose tissue-specific secretory factor (ADSF) and Found in Inflammatory Zone (FIZZ3). Resistin impairs glucose tolerance and insulin action in mice and also inhibits adipogenesis of murine 3T3-L1 cells. Therefore, resistin has been proposed as an adipocyte secreted factor linking obesity and type 2 diabetes.

Resistin (human) EIA Kit* 10007610

ADSF, FIZZ3
Stability: ≥6 months at 4°C
Summary: This EIA is based on a double-antibody sandwich technique for quantification of human resistin.

96 wells



Resistin (murine) EIA Kit 10005726

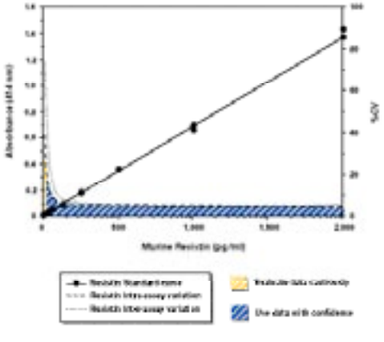
ADSF, FIZZ3
Stability: ≥6 months at -20°C
Summary: This EIA is based on a double-antibody sandwich technique that utilizes a standard curve ranging from 0-2,000 pg/ml, typically with a limit of detection of 60 pg/ml. Inter- and intra-assay CV's of less than 10% may be achieved at most concentrations.

Limit of Detection: 60 pg/ml
Specificity:

Murine Resistin	100%

For a full specificity profile, please go to www.caymanchem.com

96 wells



**SPI-BIO Assays are available through Cayman Chemical only within North & South America and Asia; elsewhere contact SPI-BIO.*

Resistin (rat) EIA Kit* 10007612

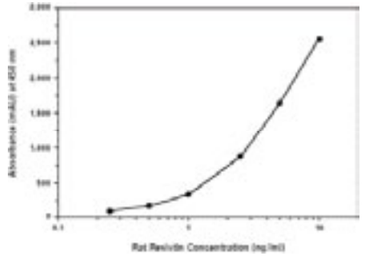
ADSF, FIZZ3
Stability: ≥6 months at 4°C
Summary: This EIA is based on a double-antibody sandwich technique for quantification of rat resistin.

Limit of Detection: 0.05 ng/ml
Specificity:

Rat Resistin	100%

For a full specificity profile, please go to www.caymanchem.com

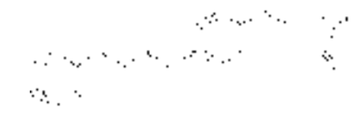
96 wells



Rosiglitazone 71740

[122320-73-4] BRL 49653
MF: $C_{18}H_{19}N_3O_3S$ **FW:** 357.4 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: Rosiglitazone is a potent and selective PPARγ ligand. It binds to the PPARγ ligand-binding domain with a K_d value of 43 nM. It activates luciferase-based expression constructs PPARγ1 and PPARγ2 with EC_{50} values of approximately 30 nM and 100 nM, respectively. Rosiglitazone is active *in vivo* as a antidiabetic agent in the *ob/ob* murine model, and has been used as an oral hypoglycemic agent in the treatment of Type II diabetes in humans for many years.

5 mg
10 mg
50 mg
100 mg



5-[[4-[2-(methyl-2-pyridinylamino)ethoxy]phenyl]methyl]-2,4-thiazolidinedione

Also Available: *Rosiglitazone (potassium salt) (71742)*

5 mg
10 mg
50 mg
100 mg

Semi-Quantitative Biomarker EIA Component Kit (anti-mouse)† 10007680

Stability: ≥3 months at 4°C
Summary: Detection of the egg yolk protein Vtg, egg shell proteins, Zrp, CYP1A, and metallothionein (MT) are simple and sensitive biomarkers for endocrine pollutant exposure in fish. The semi-quantitative Biomarker ELISA Kit is well suited for applications such as environmental and effluent monitoring and can easily be combined with standard fish tests according to OECD Guidelines for Testing of Chemicals. The semi-quantitative biomarker ELISA Kit contains a set of reagents to be used together with a suitable Biosense primary antibody for semi-quantitative detection of biomarkers such as Vtg, CYP1A, Zrp, and MT in samples from fish. The assay described is based on detection of the biomarker using a suitable monoclonal antibody in an indirect antibody capture ELISA format.

96 wells
480 wells

Semi-Quantitative Biomarker EIA Component Kit (anti-rabbit)† 10008659

Stability: ≥3 months at 4°C
Summary: Detection of the egg yolk protein Vtg, egg shell proteins, Zrp, CYP1A, and metallothionein (MT) are simple and sensitive biomarkers for endocrine pollutant exposure in fish. The semi-quantitative biomarker ELISA Kit is well suited for applications such as environmental and effluent monitoring and can easily be combined with standard fish tests according to OECD Guidelines for Testing of Chemicals. The semi-quantitative biomarker ELISA Kit contains a set of reagents to be used together with a suitable Biosense primary antibody for semi-quantitative detection of biomarkers such as Vtg, CYP1A, Zrp, and MT in samples from fish. The assay described is based on detection of the biomarker using a suitable monoclonal antibody in an indirect antibody capture ELISA format.

96 wells
480 wells

Serum Retinol Binding Protein 4 (human recombinant) 10007818

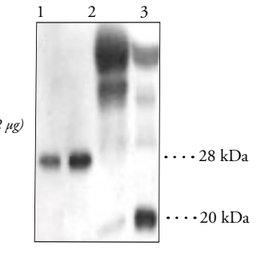
Plasma Retinol Binding Protein 4, pRBP, RBP4, sRBP4
Purity: ≥95%
A solution in 50 mM sodium phosphate, pH 8.2, containing 100 mM sodium chloride and 20% glycerol **Stability:** ≥6 months at -80°C
Summary: Source: recombinant His-tagged protein purified from *E. coli* • M_r: ~21 kDa • Human serum retinol binding protein 4 (sRBP4) binds to one equivalent of vitamin A and is one of the major retinol carriers found in the blood of mammals.

25 µg
50 µg
100 µg

Serum Retinol Binding Protein 4 Polyclonal Antibody 10007681

Plasma Retinol Binding Protein 4, pRBP, RBP4, sRBP4
Peptide affinity-purified IgG **Stability:** ≥1 year at -20°C
Summary: Antigen: human sRBP4 amino acids 28-37 • Host: rabbit • Cross-reactivity: (+) human sRBP4; other species not tested • Application: WB • Serum retinol binding protein 4 (sRBP4) binds one equivalent of vitamin A and is one of the major retinol carriers found in the blood of mammals.

1 ea



Lane 1: *Recombinant sRBP4 (6X His-tagged) (0.075 µg)*
Lane 2: *Recombinant sRBP4 (6X His-tagged) (0.150 µg)*
Lane 3: *Human plasma (-Albumin) (12 µg)*
Lane 4: *Human plasma (50 µg)*

Also Available: *Serum Retional Binding Protein 4 Blocking Peptide (10007682)* *200 µg*

†Biosense ELISA Kits are available through Cayman Chemical only within North & South America; elsewhere contact Biosense. NOTE: 480 well kits contain single 480 determination vials of tracer and antiserum and a 5-pack of plates.

**SPI-BIO Assays are available through Cayman Chemical only within North & South America and Asia; elsewhere contact SPI-BIO.*

Tom Brock, Ph.D.

Hypertension

Lower Your Blood Pressure with Some Good EETs

Give them credit. The American Heart Association has made "high blood pressure" an everyday term, a part of everybody's vocabulary. We all know high blood pressure, or hypertension, is bad. But, beyond the "120 over 80" for systolic/diastolic pressure, what is it? And what are some key players? The pressure in your vascular system is the integration of several factors which affect, primarily, either the blood or the vessel walls. The level of salts, and in particular sodium, is an important blood factor that affects hypertension. Among other things, increased salt causes an increase in blood volume by osmotically increasing water content. A small increase in blood volume can produce a disproportionately large increase in blood pressure, primarily when the vessel walls stiffen. The elastic properties of the vessel walls will change as the surrounding smooth muscle relaxes or constricts. Changes in the composition of the wall, as may occur with fat deposition and hardening associated with atherosclerosis, or with inflammatory disease will also affect blood pressure. The blood pressure measurement is an indicator of how well your endocrine system is responding to your changing diet and life style to keep the cardiovascular system running normally. Persistent hypertension is a sign that there's a problem and forecasts heart failure, heart attack, stroke, or renal failure.

The Renin-Angiotensin System

There are many different types and causes of high blood pressure. The renin-angiotensin system is important in the normal maintenance of blood pressure and, in some cases, problems with this system contribute to hypertension.[1] The kidneys release renin as a pro-peptide, prorenin, into the blood in response to a drop in blood pressure and reduce prorenin release in response to high salt. The conversion of prorenin to renin can occur through either proteolytic or nonproteolytic mechanisms. Prorenin itself has a poorly understood biological function, as it, as well as renin, can activate intracellular signaling pathways through specific receptors. Relevant to hypertension, renin protease activity releases the decapeptide angiotensin I from the 118 amino acid angiotensinogen. Angiotensin I is shortened to the octapeptide angiotensin II by the enzyme angiotensin-converting enzyme (ACE). Angiotensin II has multiple actions that act to increase blood pressure by promoting salt and water retention at the kidney and vasoconstriction of the arteries. Some effects of angiotensin II involve stimulating aldosterone secretion at the adrenal cortex and antidiuretic hormone production in the pituitary gland.

Hypertension that involves the overproduction of angiotensin II can be effectively treated with ACE inhibitors. These inhibitors, numerous and diverse in structure, are broadly used, in part because of their limited and minor adverse effects (the most common being cough). Potential effects on fetal development prevent their use in women who are likely to become pregnant. On the upside, ACE inhibitors are used to slow diabetic nephropathy and heart failure following infarction. These effects may be related to the capacity of the ACE enzyme to inactivate bradykinin and the tetrapeptide N-acetyl-Ser-Asp-Lys-Pro (AcSDKP) through its carboxypeptidase action. Bradykinin receptor B_1 is upregulated following tissue injury, allowing bradykinin to promote inflammation, while AcSDKP interferes with hematopoiesis.

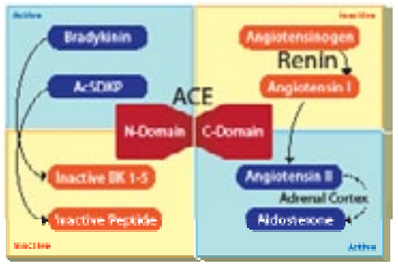


Figure 1. The central role of the protease angiotensin converting enzyme (ACE) in inactivating bradykinin and AcSDKP as well as shortening angiontensin I to the blood pressure-increasing mediator, angiotensin II.

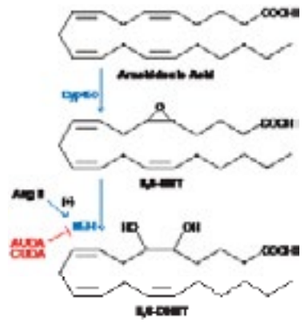


Figure 2. Enzymes and modulators involved in the conversion of arachidonic acid to EETs and DHETs: This shows modification at the 5,6 carbon double bond; identical changes also occur at the three other double bonds on arachidonic acid.

Good EETs, Bad DHETs

Small lipid molecules play big roles in regulating blood pressure. These lipid "hormones" are produced by a simple enzymatic modification of any of four carbon-carbon double bonds on arachidonic acid. In the presence of NADPH and oxygen, various CYP450 isoforms can insert oxygen on the fatty acid to produce an epoxide, with the products referred to as epoxy-eicosatrienoic acids (EET, EpETrE). In fact, EET biosynthesis can be carried out by several cytochrome CYP450 isoforms, including the CYP1A, CYP2B, CYP2C, CYP2D, CYP2E, and CYP2J families.[2] Arachidonic acid has four sites where epoxides can be placed, so there are four different EETs. All EETs are potent vasodilators that promote renal vasodilation, inhibit sodium reabsorption in renal tubules, and mediate the pharmacological action of hormones in the kidney. In this way, EETs increase renal sodium excretion and lower blood pressure. The EETs, then, are representative of the endothelium-derived hyperpolarizing factors (EDHF; also called endothelium-derived relaxing factor, or EDRF), which are produced by endothelial cells and evoke relaxation of vascular smooth muscle cells. Their production may be modulated by fibrates, which activate the nuclear receptor PPARα and in this way increase the expression of several CYP isoforms.

The EETs are hydrolyzed by sEH to the corresponding dihydroxy-eicosatrienoic acids (DHET, or DiHETrE). DHETs are less active than EETs and more readily excreted. Angiotensin II induces sEH expression, leading to a reduction in EETs and their positive effects on blood pressure. Inhibition of sEH, or disruption of the sEH gene, reduces blood pressure.[3] This effect is observed in animals pretreated with angiotensin II but not in mice made hypertensive by phenylephrine infusion, suggesting that the depressor effects of sEH inhibition are limited to hypertension linked to angiotension action.

An interesting side note is that scientists who study nuclear receptors recognize that many nuclear receptor ligands are CYP450 metabolites of more abundant lipids. Nuclear receptors whose biological ligand has yet to be identified are known as 'orphan receptors'. Eicosanoids (arachidonic acid metabolites) typically act through specific receptors. However, the EETs are 'adoptable ligands', as no receptor has been found. Is there a nuclear receptor out there that will adopt these respectable CYP450 products, the EETs?

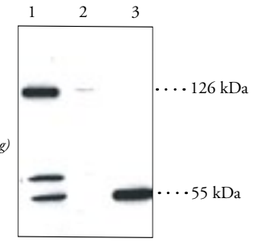
References

1. Danser, A.H., Deinum, J. *Hypertension* **46,** 1069-1076 (2005).
2. Fleming, I. *Prostaglandins Other Lipid Mediat.* **82,** 60-67 (2007).
3. Chiamvimonvat, N., Ho, C.M., Tsai, H.J., *et al. J. Cardiovasc. Pharmacol.* **50 (3),** 225-237 (2007).

SREBP-2 Polyclonal Antibody 10007663

SREBF-2, Sterol Regulatory Element-binding Protein-2, Sterol Regulatory Element-binding Transcription Factor 2
Affinity-purified IgG **Stability:** ≥1 year at -20°C
Summary: Antigen: human SREBP-2 amino acids 455-469 • Host: rabbit • Cross-reactivity: (+) human, murine, and rat SREBP-2; other species not tested • Applications: WB and ICC; other applications not tested

1 ea



Lane 1: *Human fibroblast cell lysate (60 µg)*
Lane 2: *Rat brown fat homogenate (60 µg)*
Lane 3: *Rat testis supernatant (60 µg)*

Also Available: *SREBP-2 Blocking Peptide (10009266) 200 µg*

Substance P EIA Kit 583751

Stability: ≥1 year at -20°C
Summary: Substance P is a bioactive 12-amino acid peptide (Arg-Pro-Lys-Pro-Gln-Gln-Phe-Phe-Gly-Leu-Met-amide) first isolated in 1931 from brain and intestine. The peptide is involved in many physiological processes including pain modulation, smooth muscle contraction, blood pressure control, kidney function, and water homeostasis. Substance P is widely distributed in numerous tissues and body fluids including the central and peripheral nervous system, gastrointestinal tract, respiratory tract, visual system, and circulatory system. Serum levels of substance P determined by EIA, after C18-SPE purification, range between 5-115 pg/ml with a mean of 38 pg/ml. These values are similar to those obtained by RIA analysis of substance P in plasma of healthy adults.

Sensitivity: 50% B/B_0: 32 pg/ml
80% B/B_0: 8.2 pg/ml

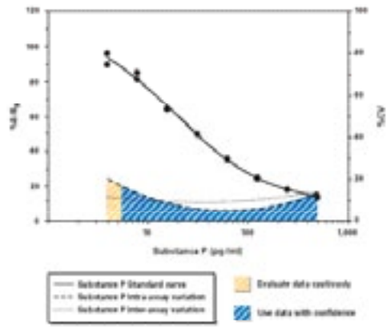
Specificity:

Substance P	100%
Substance P (4-11)	97%
Substance P (2-11)	93%
Substance P (7-11)	30%
Eledoisin	12%
NKA (substance K)	2.7%
NKB (neuromedine K)	0.04%

For a full specificity profile, please go to www.caymanchem.com

96 wells
480 wells

Also Available: *Substance P EIA Kit (Solid Plate) (583751.1)*



T0070907 10026

[313516-66-4]
MF: $C_{12}H_8ClN_3O_3$ **FW:** 277.7 **Purity:** ≥98%
A crystalline solid **Stability:** ≥1 year at -20°C
Summary: T0070907 is a potent and selective antagonist of the human PPARg with an apparent IC_{50} value of 1 nM for the binding inhibition of rosiglitazone, a reference TZD. T0070907 covalently binds to Cys^{313} of PPARg, inducing conformational changes that block the recruitment of transcriptional cofactors to the PPARg/RXR heterodimer.

1 mg
5 mg
10 mg
50 mg

2-chloro-5-nitro-N-4-pyridinyl-benzamide

6β-hydroxy Testosterone (DEA Schedule III) 10008519

[62-99-7] 4-Androsten-6β,17β-diol-3-one
MF: $C_{19}H_{28}O_3$ **FW:** 304.4 **Purity:** ≥97%
A crystalline solid **Stability:** ≥1 year at 4°C
Summary: 6b-hydroxy Testosterone is a CYP3A metabolite of testosterone.

5 mg

6β,17β-androst-4-en-3-one

11α-hydroxy Testosterone (DEA Schedule III) 10008647

[3066-12-4]
MF: $C_{19}H_{28}O_3$ **FW:** 304.4 **Purity:** ≥97%
A crystalline solid **Stability:** ≥1 year at 4°C
Summary: 11a-hydroxy Testosterone is a CYP3A metabolite of testosterone.

5 mg

11α,17β-dihydroxy-androst-4-en-3-one

Testosterone EIA Kit 582701

Stability: ≥1 year at -20°C

Summary: Testosterone is the prototypic and predominant circulating androgenic steroid. It plays a major role in the growth and function of many reproductive and non-reproductive tissues and organs including muscle, liver, and brain, directing the development of the male phenotype during embryogenesis and at puberty. Testosterone is synthesized from 17a-hydroxy progesterone by the enzymes 17,20-lyase and 17b-hydroxysteroid dehydrogenase in the gonads of both males and females. In many target cells it is reduced to 5a-dihydro testosterone, which mediates many of the biological actions of testosterone. It is then further metabolized to 17b-estradiol by aromatase. Serum levels of testosterone range from 0.5 ng/ml in women to approximately 6-10 ng/ml in men, declining with age.

Sensitivity: 50% B/B_0: 32 pg/ml
80% B/B_0: 6 pg/ml

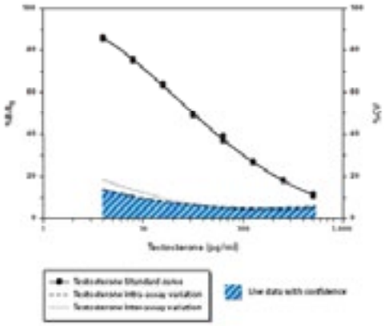
Specificity:

Testosterone	100%
5α-dihydro Testosterone	27.4%
5β-dihydro Testosterone	18.9%
Androstenedione	3.7%
11-keto Testosterone	2.2%
5-Androstenediol	0.51%
epi-Testosterone	0.2%
Progesterone	0.14%
Testosterone Enanthate	0.11%
Androsterone	0.05%
Androsterone Sulfate	0.04%
Testosterone Sulfate	0.03%
DHEA Sulfate	0.02%

For a full specificity profile, please go to www.caymanchem.com

96 wells
480 wells

Also Available: *Testosterone EIA Kit (Solid Plate) (582701.1)*



11-keto Testosterone EIA Kit 582751

11-KT

Stability: ≥1 year at -20°C

Summary: While testosterone is the primary androgenic male steroid found in mammals, 11-KT is a second key androgenic steroid found in fish. It occurs in males together with testosterone in amounts which vary from less than 1 ng/ml to as much as 50-100 ng/ml, depending on the species and the stage of the reproductive cycle. In the sea bass, testosterone concentrations are generally higher than 11-KT, with peak levels found after the spawning season. 11-KT, on the other hand, remains at levels less than 1 ng/ml but rises abruptly to 4-6 ng/ml during spermiation at the height of the spawning season. 11-KT also shows individual variations in Arctic char, with dominant males having significantly higher 11-KT levels.

Sensitivity: 50% B/B_0: 5 pg/ml
80% B/B_0: 1.3 pg/ml

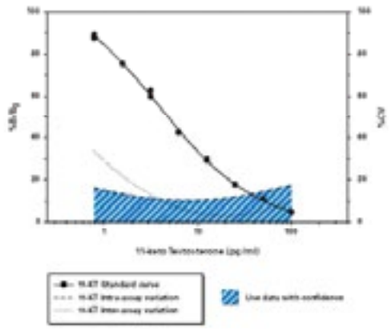
Specificity:

11-keto Testosterone	100%
4-Androsten-11β,17β-diol-3-one	0.01%

For a full specificity profile, please go to www.caymanchem.com

96 wells
480 wells

Also Available: *11-keto Testosterone EIA Kit (Solid Plate) (582751.1)*

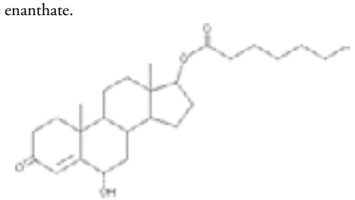


6a-Testosterone Enanthate 10010003

MF: $C_{26}H_{40}O_4$ **FW:** 416.6 **Purity:** ≥98%
A solution in methyl acetate **Stability:** ≥1 year at -20°C

Summary: Testosterone enanthate is an ester of the naturally occurring androgen, testosterone. It has been investigated as a potential therapy for hypogonadal men, a marker for android use in sports, and as a possible male contraceptive. Higher levels of testosterone enanthate have been shown to increase total cholesterol, LDL, and triglycerides while HDL levels decreased. These changes may pose an increased risk in men for cardiovascular disease. 6a-Testosterone enanthate is a synthetic analog of testosterone enanthate. There are no published studies on the pharmacological properties of 6a-testosterone enanthate.

500 µg
1 mg
5 mg
10 mg



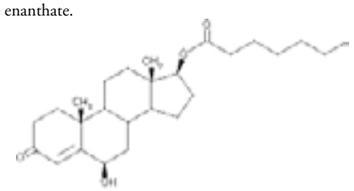
(6S)-6-hydroxy-10,13-dimethyl-3-oxo-2,3,6,7,8,9,10,11,12,13,14,15,16,17-tetradecahydro-1H-cyclopenta[a]phenanthren-17-yl heptanoate

6b-Testosterone Enanthate 10010004

MF: $C_{26}H_{40}O_4$ **FW:** 416.6 **Purity:** ≥98%
A solution in methyl acetate **Stability:** ≥1 year at -20°C

Summary: Testosterone enanthate is an ester of the naturally occurring androgen, testosterone. It has been investigated as a potential therapy for hypogonadal men, a marker for android use in sports, and as a possible male contraceptive. Higher levels of testosterone enanthate have been shown to increase total cholesterol, LDL, and triglycerides while HDL levels decreased. These changes may pose an increased risk in men for cardiovascular disease. 6b-Testosterone enanthate is a synthetic analog of testosterone enanthate. There are no published studies on the pharmacological properties of 6b-testosterone enanthate.

500 µg
1 mg
5 mg
10 mg



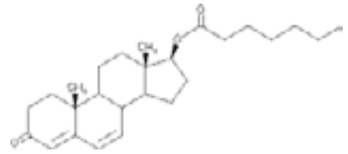
(6R,10R,13S,17S)-6-hydroxy-10,13-dimethyl-3-oxo-2,3,6,7,8,9,10,11,12,13,14,15,16,17-tetradecahydro-1H-cyclopenta[a]phenanthren-17-yl heptanoate

Δ6-Testosterone Enanthate 10010001

MF: $C_{26}H_{38}O_3$ **FW:** 398.6 **Purity:** ≥98%
A solution in methyl acetate **Stability:** ≥1 year at -20°C

Summary: D6-Testosterone enanthate is a synthetic analog of testosterone enanthate. There are no published studies on the pharmacological properties of D6-testosterone enanthate.

10 mg
25 mg
50 mg
100 mg



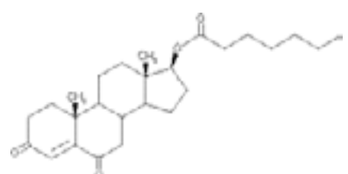
(10R,13S,17S)-10,13-dimethyl-3-oxo-2,3,8,9,10,11,12,13,14,15,16,17-dodecahydro-1H-cyclopenta[a]phenanthren-17-yl heptanoate

6-keto Testosterone Enanthate 10010002

MF: $C_{26}H_{38}O_4$ **FW:** 414.6 **Purity:** ≥98%
A solution in methyl acetate **Stability:** ≥1 year at -20°C

Summary: 6-keto Testosterone enanthate is a synthetic analog of testosterone enanthate. There are no published studies on the pharmacological properties of 6-keto testosterone enanthate.

1 mg
5 mg
10 mg
50 mg



(10R,13S,17S)-10,13-dimethyl-3,6-dioxo-2,3,6,7,8,9,10,11,12,13,14,15,16,17-tetradecahydro-1H-cyclopenta[a]phenanthren-17-yl heptanoate

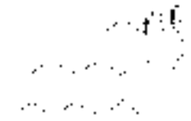
Tibolone 10006321

[5630-53-5] Livial, Liviella

MF: $C_{21}H_{28}O_2$ **FW:** 312.5 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C

Summary: Tibolone is an estrogen-like compound used for the treatment of the symptoms associated with menopausal transition (*i.e.,* climacteric symptoms) and also for the treatment of osteoporosis. Three major metabolites of tibolone are responsible for its tissue selective mechanism of action. Conversion into 3a- and 3b-hydroxy-tibolone results in estrogenic effects in brain, vagina, and bone. The D^4 isomer has progestrogenic and androgenic effects and does not cause estrogenic stimulation in the endometrium. A two-year longitudinal study indicates that low doses (1.25-2.5 mg) of tibolone effectively relieve climacteric symptoms and prevent loss of bone mass in early postmenopausal women.

100 mg
500 mg
1 g
5 g



17α-hydroxy-7α-methyl-19-norpregn-5(10)-en-20-yn-3-one

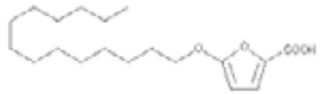
TOFA 10005263

[54857-86-2] RMI 14514, 5-(Tetradecyloxy)-2-furoic acid

MF: $C_{19}H_{32}O_4$ **FW:** 324.5 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C

Summary: Inhibition of FAS by the irreversible inhibitor cerulenin leads to cytotoxicity and apoptosis in human cancer cell lines. TOFA is an inhibitor of fatty acid synthesis acting one step earlier in the metabolic pathway, blocking the synthesis of malonyl-CoA by acetyl-CoA carboxylase (ACC). Both cerulenin (at about 10 µg/ml) and TOFA (at about 1 µg/ml) are effective at blocking the incorporation of radiolabeled acetate into palmitate. However, TOFA reduces malonyl-CoA levels rather than elevating them, and TOFA is relatively non-toxic to various cancer cell lines. TOFA also attenuates the inhibition of feeding observed when FAS inhibitors such as cerulenin and C75 are administered to obese *ob/ob* mice.

5 mg
10 mg
50 mg
100 mg



5-(tetradecyloxy)-2-furancarboxylic acid

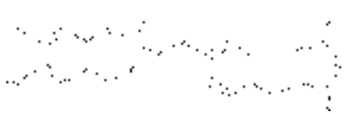
Troglitazone 71750

[97322-87-7] Resulin™

MF: $C_{24}H_{27}NO_5S$ **FW:** 441.5 **Purity:** ≥98%
A crystalline solid **Stability:** ≥1 year at -20°C

Summary: Troglitazone is a thiszolidinedione which was approved for the treatment of insulin resistance and hyperglycemia in Type II diabetes, under the trade name Resulin™, but was withdrawn from the market due to hepatotoxicity. Troglitazone is a potent and selective PPARg agonist. The EC_{50} values for transactivation of human and murine PPARg in a cell-based assay are 0.55 and 0.78 µM, respectively. In the same assay system, no activation of PPARa and PPARd was observed at concentrations up to 10 µM. Troglitazone binds to the PPARg LBD but fails to induce interaction of the PPARg LBD with the transcriptional coactivators SRC-1, TIF2, AIB1, p300, or TRAP220. Troglitazone also induces cell cycle arrest and apoptosis in several cancer cell lines with an EC_{50} value of 10 µM.

5 mg
10 mg
50 mg
100 mg



5-[[4-[(3,4-dihydro-6-hydroxy-2,5,7,8-tetramethyl-2H-1-benzopyran-2-yl)methoxy]phenyl]methyl]-2,4-thioazolidinedione

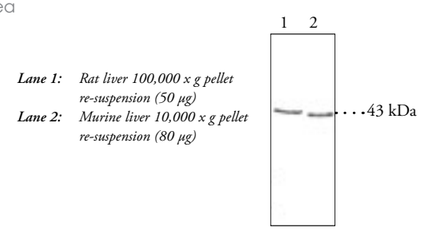
U19 Polyclonal Antibody 10005190

EAF2, ELL-Associated Factor 2

Peptide affinity-purified IgG **Stability:** ≥1 year at -20°C

Summary: Antigen: human U19 amino acids 5-16 • Host: rabbit • Cross-reactivity: (+) human, murine, and rat U19; other species not tested • Applications: WB and IHC (paraffin-embedded sections) • U19 is a testosterone-regulated apoptosis inducer with tumor suppressive activity.

1 ea



Also Available: *U19 Blocking Peptide (10005732)* *200 µg*

Vinclozolin M2 10007452

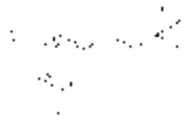
[83792-61-4] M2

MF: $C_{11}H_{11}Cl_2NO_2$ **FW:** 260.1 **Purity:** ≥98%

A crystalline solid **Stability:** ≥2 years at -20°C

Summary: Vinclozolin is a dicarboximide fungicide widely used in Europe and the United States for control of diseases caused by *B. cinerea*, *S. sclerotiorum*, and *Monilinia* species in grapes, fruits, vegetables, ornamental plants, and turfgrass. Metabolites of vinclozolin, M1 and M2, are effective antagonists of the androgen receptor in rats exhibiting K_i values of 92 and 9.7 µM respectively.

5 mg
10 mg
25 mg
50 mg



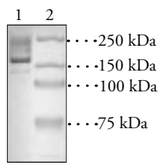
N-(3,5-dichlorophenyl)-2-hydroxy-2-methyl-3-butenamide

Vitellogenin (alligator) Monoclonal Antibody (ND-1E8)† 10007143

Affinity-purified mouse monoclonal IgG **Stability:** ≥1 year at 4°C

Summary: Antigen: Vtg purified from American alligator (*A. mississippiensis*) • Host: mouse • Cross-reactivity: (+) American alligator (*A. mississippiensis*) Vtg • Applications: WB and ELISA • Isotype: IgG_{1-k}

100 µl
500 µl

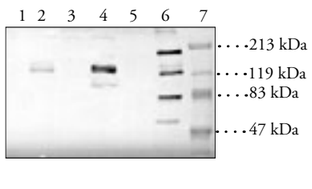


Vitellogenin (Arctic char) Polyclonal Antibody (PO-1)† 170120

Purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 0.1% mM sodium azide, and 1% BSA **Stability:** ≥1 year at 4°C

Summary: Antigen: Vtg purified from plasma of 17b-estradiol-treated Arctic char (*S. alpinus*) • Host: rabbit • Cross-reactivity: (+) Arctic char (*S. alpinus*), Atlantic salmon (*S. salar*), brown trout (*S. trutta*), Atlantic cod (*G. morhua*), wrasse (*C. rupestris*), turbot (*S. maximus*), flounder (*P. flesus*), tilapia (*O. niloticus*), and somewhat with zebrafish (*D. rerio*) Vtg • Applications: ELISA and immunoblotting; the optimum dilution should be determined for each application

100 µl
500 µl



(each sample lane is 10 µl at a 1:200 dilution)

Vitellogenin (Atlantic salmon) Standard† 470144

Stability: ≥3 months at 4°C

Summary: The lyophilized Atlantic salmon Vtg may be used as a positive control in immunoblotting. Freshly reconstituted Vtg may also be used as a standard in a quantitative ELISA. This product contains bovine serum albumin which will appear as a strong protein band in acrylamide gels.

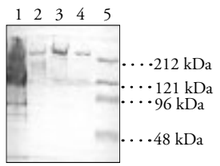
1 ea
5 ea

Vitellogenin (bird) Monoclonal Antibody (ND-3C3)† 10007048

Affinity-purified mouse monoclonal IgG **Stability:** ≥1 year at 4°C

Summary: Antigen: Vtg purified from Japanese quail (*C. japonica*), common tern (*S. hirundo*), and barn swallow (*H. rustica*) • Host: mouse • Cross-reactivity: (+) Japanese quail (*C. japonica*), common tern (*S. hirundo*), barn swallow (*H. rustica*), American kestrel (*F. sparverius*), zebra finch (*T. guttata*), and domestic chicken (*G. gallus*) Vtg • Applications: WB and ELISA • Isotype: IgG_{2b-k}

100 µl
500 µl



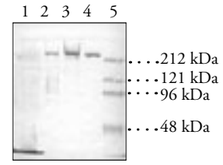
†*Biosense ELISA Kits and Antibodies are available through Cayman Chemical only within North & South America; elsewhere contact Biosense.*
NOTE: 480 well kits contain single 480 determination vials of tracer and antiserum and a 5-pack of plates.

Vitellogenin (bird) Monoclonal Antibody (ND-3G6)† 10007049

Affinity-purified mouse monoclonal IgG **Stability:** ≥1 year at 4°C

Summary: Antigen: Vtg purified from Japanese quail (*C. japonica*), common tern (*S. hirundo*), and barn swallow (*H. rustica*) • Host: mouse • Cross-reactivity: (+) Japanese quail (*C. japonica*), common tern (*S. hirundo*), barn swallow (*H. rustica*), American kestrel (*F. sparverius*), zebra finch (*T. guttata*), and domestic chicken (*G. gallus*) Vtg • Applications: WB and ELISA • Isotype: IgG_{1-k}

100 µl
500 µl



Vitellogenin (brown bullhead) Monoclonal Antibody (ND-1D12)† 170101

Affinity-purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 0.1% mM sodium azide, and 1% BSA **Stability:** ≥1 year at 4°C

Summary: Antigen: Vtg purified from brown bullhead (*A. nebulosus*), sheepshead minnow (*C. variegatus*), bowfin (*A. calva*), and spotted gar (*L. oculatus*) • Host: mouse • Cross-reactivity: (+) brown bullhead (*A. nebulosus*) Vtg; (-) sheepshead minnow (*C. variegatus*), bowfin (*A. calva*), spotted gar (*L. oculatus*), killifish (*F. heteroclitus*), tilapia (*O. niloticus*), halibut (*H. hippoglossus*), rainbow trout (*O. mykiss*), carp (*C. carpio*), and zebrafish (*D. rerio*) Vtg • Applications: WB and ELISA • Isotype: IgG_{1-k}

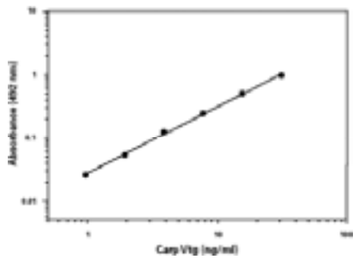
100 µl
500 µl

Vitellogenin (carp) EIA Kit (pre-coated)† 10004993

Stability: ≥3 months at 4°C

Summary: Detection of the yolk protein Vtg in plasma from juvenile or male fish is a simple and sensitive biomarker for endocrine disrupting chemicals (EDCs) with estrogenic effects in fish. Quantification of Vtg has become an accepted screening test for the estrogenic effects of EDCs in fish. The Vtg (carp) EIA kit is a double-antibody immunometric (sandwich) EIA for analyzing Vtg in whole body homogenates and plasma samples. Each kit contains pre-coated plate(s), detecting antibody, secondary antibody-HRP conjugate, purified carp Vtg standard, OPD-peroxidase substrate tablets, PBS tablets, PBS-Tween tablets, BSA, and complete instructions. A five-plate kit contains two vials of Vtg and three OPD sets, sufficient to run two separate assays (for example two plates + three plates).

96 wells
480 wells

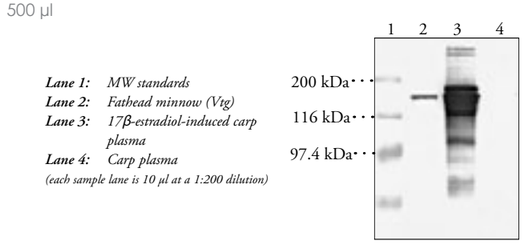


Vitellogenin (carp) Monoclonal Antibody (ND-2D3)† 170115

Purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 0.1% mM sodium azide, and 1% BSA **Stability:** ≥1 year at 4°C

Summary: Antigen: Vtg purified from plasma of 17β-estradiol-treated striped bass (*M. saxatilis*), brown bullhead (*I. nebulosus*), and common carp (*C. carpio*) • Host: mouse • Cross-reactivity: (+) common carp (*C. carpio*), fathead minnow (*P. promelas*), zebrafish (*D. rerio*), goldfish (*C. auratus*), mullet (*Mugil sp.*), pinfish (*L. rhomboides*), and sucker (*Catostomidae sp.*) Vtg; (-) striped bass (*M. saxatilis*) and brown bullhead (*I. nebulosus*) Vtg • Applications: ELISA and WB

100 µl
500 µl

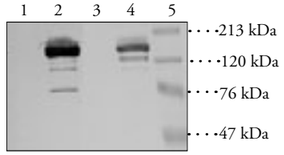


(each sample lane is 10 µl at a 1:200 dilution)

Vitellogenin (carp) Polyclonal Antibody (CT-1)† 170110

Affinity-purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 0.1% mM sodium azide, and 1% BSA **Stability:** ≥1 year at 4°C
Summary: Antigen: Vtg purified from plasma of 17β-estradiol-treated common carp *(C. carpio)* • Host: rabbit • Cross-reactivity: (+) common carp *(C. carpio)*, fathead minnow *(P. promelas)*, and zebrafish *(D. rerio)* Vtg • Applications: ELISA and WB; the optimum dilution should be determined for each application

50 µl



Lane 1: *Carp plasma*
Lane 2: *17β-estradiol-induced carp plasma*
Lane 3: *Zebrafish plasma*
Lane 4: *17β-estradiol-induced zebrafish plasma*
Lane 5: *MW standards*
(each sample lane is 10 µl at a 1:200 dilution)

Vitellogenin (carp) Standard† 470114

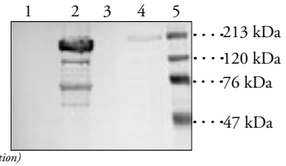
Stability: ≥3 months at 4°C
Summary: The lyophilized carp Vtg may be used as a positive control in immunoblotting. Freshly reconstituted Vtg may also be used as a standard in a quantitative ELISA. This product contains bovine serum albumin which will appear as a strong protein band in acrylamide gels.

1 ea
5 ea

Vitellogenin (cod) Polyclonal Antibody (CS-1)† 170130

Affinity-purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 1% BSA, and 0.1% sodium azide **Stability:** ≥1 year at 4°C
Summary: Antigen: Vtg purified from plasma of 17β-estradiol-treated Atlantic cod *(G. morhua)* • Host: rabbit • Cross-reactivity: (+) Atlantic cod *(G. morhua)*, rainbow trout *(O. mykiss)*, turbot *(S. maximus)*, common carp *(C. carpio)*, and tilapia *(O. niloticus)* Vtg • Applications: ELISA and WB; the optimum dilution should be determined for each application

100 µl
500 µl

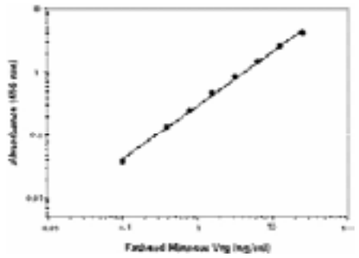


Lane 1: *Cod plasma*
Lane 2: *17β-estradiol-induced cod plasma*
Lane 3: *Tilapia plasma*
Lane 4: *17β-estradiol-induced tilapia plasma*
Lane 5: *MW standards*
(each sample lane is 10 µl at a 1:200 dilution)

Vitellogenin (fathead minnow) EIA Kit (pre-coated)† 10006943

Stability: ≥3 months at 4°C
Summary: Detection of the yolk protein Vtg in plasma from juvenile or male fish is a simple and sensitive biomarker for endocrine disrupting chemicals (EDCs) with estrogenic effects in fish. Quantification of Vtg has become an accepted screening test for the estrogenic effects of EDCs in fish. The Vtg (fathead minnow) EIA kit is a double-antibody immunometric (sandwich) EIA for analyzing Vtg in whole body homogenates samples.

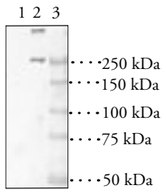
96 wells
480 wells



Vitellogenin (killifish) Monoclonal Antibody (ND-5F8)† 170195

Affinity-purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 0.1% mM sodium azide, and 1% BSA **Stability:** ≥1 year at 4°C
Summary: Antigen: Vtg purified from plasma of 17β-estradiol-treated killifish *(F. heteroclitus)*, white perch *(M. americans)*, bowfin *(A. calva)*, and egg yolk from swordfish *(X. gladius)* • Host: mouse • Cross-reactivity: (+) killifish *(F. heteroclitus)*, white perch *(M. americans)*, common carp *(C. carpio)*, wrasse *(C. rupestris)*, tilapia *(O. niloticus)*, halibut *(H. hippoglossus)*, and sheepshead minnow *(C. variegatus)* Vtg; (-) bowfin *(A. calva)* and egg yolk from swordfish *(X. gladius)* Vtg • Application: ELISA and WB; the optimum dilution should be determined for each application

100 µl
500 µl



Lane 1: *Killifish plasma*
Lane 2: *17β-estradiol-induced killifish plasma*
Lane 3: *MW standards*

Vitellogenin (medaka) EIA Kit (pre-coated)† 10009223

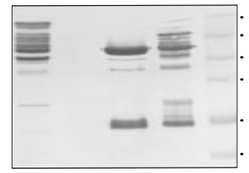
Stability: ≥3 months at 4°C
Summary: Detection of the yolk protein Vtg in plasma from juvenile or male fish is a simple and sensitive biomarker for endocrine disrupting chemicals (EDCs) with estrogenic effects in fish. Detection of the yolk protein Vtg in plasma from juvenile or male fish is a simple and sensitive biomarker for endocrine disrupting chemicals (EDCs) with estrogenic effects in fish. Quantification of Vtg has become an accepted screening test for the estrogenic effects of EDCs in fish. The Vtg (medaka) EIA kit is a double-antibody immunometric (sandwich) EIA for analyzing Vtg in whole body homogenates samples. Each kit contains detecting antibody, secondary antibody-HRP conjugate, purified medaka Vtg standard, OPD-peroxidase substrate tablets, PBS tablets, PBS-Tween tablets, BSA, pre-coated plate(s), and complete instructions. A five-plate kit contains two vials of Vtg and three OPD sets, sufficient to run two separate assays (for example two plates + three plates).

96 wells
480 wells

Vitellogenin (medaka) Monoclonal Antibody (CK-4B3)† 100012

Purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 0.1% mM sodium azide, and 1% BSA **Stability:** ≥1 year at 4°C
Summary: Antigen: lipovitellin purified from eggs of female Japanese medaka *(O. latipes)* • Host: mouse • Cross-reactivity: (+) Japanese medaka *(O. latipes)* lipovitellin, sheepshead minnow *(C. variegatus)*, and killifish *(F. heteroclitus)* Vtg • Applications: WB and ELISA • Isotype: $IgG_{1-κ}$

100 µl
500 µl

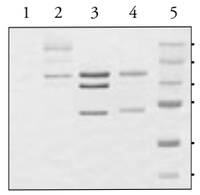


Lane 1: *17β-estradiol-induced medaka whole body homogenate*
Lane 2: *Medaka whole body homogenate*
Lane 3: *Medaka (lipovitellin)*
Lane 4: *Medaka (Vtg)*
Lane 5: *MW standards*

Vitellogenin (medaka) Monoclonal Antibody (CK-1H11)† 100033

Affinity-purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 0.1% mM sodium azide, and 1% BSA **Stability:** ≥1 year at 4°C
Summary: Antigen: lipovitellin purified from eggs of female Japanese medaka (*O. latipes*) • Host: mouse • Cross-reactivity: (+) Japanese medaka (*O. latipes*), Atlantic cod (*G. morhua*), rainbow trout (*O. mykiss*), carp (*C. carpio*), and tilapia (*O.niloticus*) Vtg • Applications: ELISA and WB • Isotype: $IgG_{1-κ}$

100 µl
500 µl



Lane 1: *Medaka whole body homogenate*
Lane 2: *17β-estradiol-induced medaka whole body homogenate*
Lane 3: *Medaka (Vtg)*
Lane 4: *Medaka (Vtg)*
Lane 5: *MW standards*

Vitellogenin (Japanese medaka) Standard† 470184

Stability: ≥3 months at 4°C
Summary: Positive control in WB and ELISA.

1 ea

Vitellogenin (rainbow trout) EIA Kit (pre-coated)† 10004994

Stability: ≥3 months at 4°C
Summary: Detection of the yolk protein Vtg in plasma from juvenile or male fish is a simple and sensitive biomarker for endocrine disrupting chemicals (EDCs) with estrogenic effects in fish. Quantification of Vtg has become an accepted screening test for the estrogenic effects of EDCs in fish. The Vtg (rainbow trout) EIA kit is a double-antibody immunometric (sandwich) EIA for analyzing Vtg in plasma samples. Each kit contains rainbow trout Vtg standard, pre-coated plate(s), blocking/dilution buffer, detecting antibody-AChE conjugate, Ellman's reagent, PBS-Tween tablets, and complete instructions. A five-plate kit contains two vials of Vtg and two vials of Ellman's reagent, sufficient to run two separate assays (for example 2 plates + three plates).

96 wells
480 wells

Vitellogenin (rainbow trout) Standard† 470164

Stability: ≥3 months at 4°C
Summary: The lyophilized rainbow trout Vtg may be used as a positive control in immunoblotting. Freshly reconstituted Vtg may also be used as a standard in a quantitative ELISA. The product contains BSA which will appear as a strong protein band in acrylamide gels.

1 ea
5 ea

Vitellogenin (salmonid) Semi-Quantitative EIA Kit† 10009272

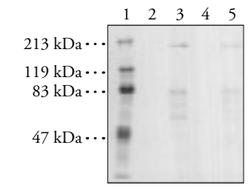
Stability: ≥3 months at 4°C
Summary: Detection of the yolk protein Vtg in plasma from juvenile or male fish is a simple and sensitive biomarker for endocrine disrupting chemicals (EDCs) with estrogenic effects in fish. Quantification of Vtg has become an accepted screening test for the estrogenic effects of EDCs in fish. The assay is based on detection of Vtg by a monoclonal antibody, BN-5, which has high cross reactivity with Vtg from a variety of other species including *Salmoniformes*, *Pleuronectiformes*, and some *Perciformes*. This assay is a semi-quantitative assay for Vtg from fish plasma and it is not suitable for measuring absolute amounts of Vtg.

96 wells
480 wells

Vitellogenin (salmon) Monoclonal Antibody (BN-5)† 170145

0.2 mg/ml purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 0.1% mM sodium azide, and 1% BSA **Stability:** ≥1 year at 4°C
Summary: Antigen: Vtg purified from plasma of 17β-estradiol-treated Atlantic salmon *(S. salar)* • Host: mouse • Cross-reactivity: (+) Atlantic salmon *(S. salar)*, brown trout *(S. trutta)*, rainbow trout *(O. mykiss)*, Arctic char *(S. alpinus)*, wrasse *(C. rupestris)*, turbot *(S. maximus)*, flounder *(P. flesus)*, and halibut *(H. hippoglossus)* Vtg; (-) Atlantic cod *(G. morhua)* Vtg • Applications: ELISA and it may also work for WB in some species, but the affinity will be much lower • Isotype: $IgG_{1-κ}$

100 µl
500 µl

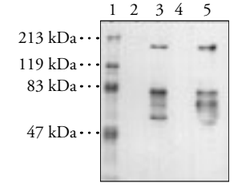


Lane 1: *MW standards*
Lane 2: *Salmon plasma*
Lane 3: *17β-estradiol-induced salmon plasma*
Lane 4: *Rainbow trout plasma*
Lane 5: *17β-estradiol-induced rainbow trout plasma*
(each sample lane is 7 µl at a 1:200 dilution)

Vitellogenin (salmon) Monoclonal Antibody (KB-1)† 170147

1 mg/ml purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 0.1% mM sodium azide, and 1% BSA **Stability:** ≥1 year at 4°C
Summary: Antigen: Vtg purified from plasma of 17β-estradiol-treated Atlantic salmon *(S. salar)* • Host: mouse • Cross-reactivity: (+) Atlantic salmon *(S. salar)*, other Salmo species, and brown trout *(S. trutta)* Vtg; (-) rainbow trout *(O. mykiss)*, Arctic char *(S. alpinus)*, turbot *(S. maximus)*, halibut *(H. hippoglossus)*, and Atlantic cod *(G. morhua)* Vtg • Applications: ELISA and WB • Isotype: $IgG_{1-κ}$

100 µl
500 µl



Lane 1: *MW standards*
Lane 2: *Salmon plasma*
Lane 3: *17β-estradiol-induced salmon plasma*
Lane 4: *Brown trout plasma*
Lane 5: *17β-estradiol-induced brown trout plasma*
(each sample lane is 7 µl at a 1:200 dilution)

†Biosense ELISA Kits are available through Cayman Chemical only within North & South America; elsewhere contact Biosense.
NOTE: 480 well kits contain single 480 determination vials of tracer and antiserum and a 5-pack of plates.

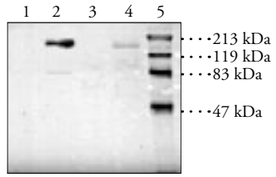
Vitellogenin (salmon) Polyclonal Antibody (AA-1)† 170140

Purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 0.1% mM sodium azide, and 1% BSA **Stability:** ≥1 year at 4°C

Summary: Antigen: Vtg purified from plasma of 17β-estradiol-treated Atlantic salmon *(S. salar)* • Host: rabbit • Cross-reactivity: (+) Atlantic salmon *(S. salar)*, salmonids *(Salmoniformes)*, flatfish *(Pleuronectiformes)*, and Atlantic cod *(G. morhua)* Vtg • Applications: ELISA and WB; the optimum dilution should be determined for each application

100 µl
500 µl

Lane 1: *Salmon plasma*
Lane 2: *17β-estradiol-induced salmon plasma*
Lane 3: *Cod plasma*
Lane 4: *17β-estradiol-induced cod plasma*
Lane 5: *MW standards*
(each sample lane is 7 µl at a 1:200 dilution)



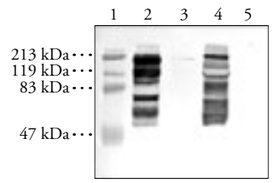
Vitellogenin (sea bream) Polyclonal Antibody (PO-2)† 170150

Purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 0.1% mM sodium azide, and 1% BSA **Stability:** ≥1 year at 4°C

Summary: Antigen: Vtg purified from plasma of 17β-estradiol-treated sea bream *(S. aurata)* • Host: rabbit • Cross-reactivity: (+) sea bream *(S. aurata)*, Atlantic salmon *(S. salar)*, brown trout *(S. trutta)*, rainbow trout *(O. mykiss)*, Atlantic cod *(G. morhua)*, wrasse *(C. rupestris)*, turbot *(S. maximus)*, flounder *(P. flesus)*, tilapia *(O. niloticus)*, and carp *(C. carpio)* Vtg • Applications: ELISA and WB; the optimum dilution should be determined for each application

100 µl
500 µl

Lane 1: *MW standards*
Lane 2: *17β-estradiol-induced wrasse plasma*
Lane 3: *Wrasse plasma*
Lane 4: *17β-estradiol-induced tilapia plasma*
Lane 5: *Tilapia plasma*
(each sample lane is 7 µl at a 1:200 dilution)



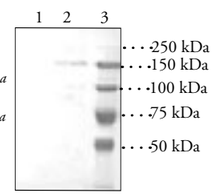
Vitellogenin (sheepshead minnow) Monoclonal Antibody (ND-5C9)† 170100

Affinity-purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 0.1% mM sodium azide, and 1% BSA **Stability:** ≥6 months at 4°C

Summary: Antigen: Vtg purified from sheepshead minnow *(C. variegatus)*, bowfin *(A. calva)*, brown bullhead *(A. nebulosus)*, and spotted gar *(L. oculatus)* • Host: mouse • Cross-reactivity: (+) sheepshead minnow *(C. variegatus)*, halibut *(H. hippoglossus)*, and flounder *(P. flesus)* Vtg; (-) bowfin *(A. calva)*, brown bullhead *(A. nebulosus)*, and spotted gar *(L. oculatus)* Vtg • Applications: WB and ELISA • Isotype: $IgG_{1-κ}$

100 µl
500 µl

Lane 1: *Sheepshead minnow plasma*
Lane 2: *17β-estradiol-induced sheepshead minnow plasma*
Lane 3: *MW standards*



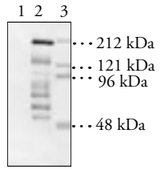
Vitellogenin (stickleback) Polyclonal Antibody (GA-306)† 10004442

Affinity-purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 0.1% mM sodium azide, and 1% BSA **Stability:** ≥1 year at 4°C

Summary: Antigen: Vtg purified from whole body homogenate of 17β-estradiol-treated three-spined stickleback (*G. aculeatus*) • Host: rabbit • Cross-reactivity: (+) three-spined stickleback (*G. aculeatus*), rainbow trout (*O. mykiss*), tilapia (*O. niloticus*), sheepshead minnow (*C. variegatus*), cod (*G. morhua*), turbot (*S. maximus*), and ballan wrasse (*L. bergylta*) Vtg • Applications: ELISA and WB; the optimum dilution should be determined for each application

100 µl
500 µl

Lane 1: *Stickleback plasma*
Lane 2: *17β-estradiol-induced Stickleback*
Lane 3: *MW standards*
(each sample lane is 7 µl at a 1:200 dilution)



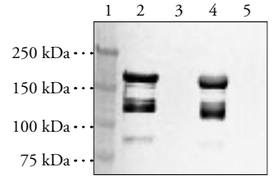
Vitellogenin (striped bass) Monoclonal Antibody (ND-1C8)† 170105

Purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 0.1% mM sodium azide, and 1% BSA **Stability:** ≥1 year at 4°C

Summary: Antigen: Vtg purified from plasma of 17β-estradiol-treated striped bass *(M. saxatilis)* • Host: mouse • Cross-reactivity: (+) striped bass *(M. saxatilis)*, rainbow trout *(O. mykiss)*, largemouth bass *(M. salmonides)*, Atlantic cod *(G. morhua)*, tilapia *(O. niloticus)*, killifish *(F. heteroclitus)*, and sheepshead minnow *(C. variegatus)* Vtg • Applications: ELISA and WB; the optimum dilution should be determined for each application

100 µl
500 µl

Lane 1: *MW standards*
Lane 2: *17β-estradiol-induced rainbow trout plasma*
Lane 3: *Rainbow trout plasma*
Lane 4: *17β-estradiol-induced Atlantic cod plasma*
Lane 5: *Atlantic cod plasma*
(each sample lane is 7 µl at a 1:200 dilution)



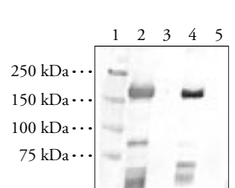
Vitellogenin (striped bass) Monoclonal Antibody (ND-3G2)† 170107

Purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 0.1% mM sodium azide, and 1% BSA **Stability:** ≥1 year at 4°C

Summary: Antigen: non-intact Vtg purified from plasma of 17β-estradiol-treated striped bass *(M. saxatilis)* • Host: mouse • Cross-reactivity (+) striped bass *(M. saxatilis)* (intact Vtg and degradation products), large-mouth bass *(M. salmonides)*, rainbow trout *(O. mykiss)*, flounder *(P. flesus)*, turbot *(S. maximus)*, and wrasse *(C. rupestris)* Vtg • Application: ELISA and WB; the optimum dilution should be determined for each application

100 µl
500 µl

Lane 1: *MW standards*
Lane 2: *17β-estradiol-induced rainbow trout plasma*
Lane 3: *Rainbow trout plasma*
Lane 4: *17β-estradiol-induced flounder plasma*
Lane 5: *Flounder plasma*
(each sample lane is 7 µl at a 1:200 dilution)



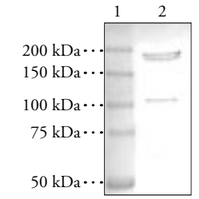
Vitellogenin (sturgeon) Monoclonal Antibody (ND-1H2)† 170265

Purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 0.1% mM sodium azide, and 1% BSA **Stability:** ≥1 year at 4°C

Summary: Antigen: Vtg purified from plasma of 17β-estradiol-treated Gulf sturgeon *(A. oxyrinchus desotoi)* • Host: mouse • Cross-reactivity (+) Gulf sturgeon *(A. oxyrinchus desotoi)* and lake sturgeon *(A. fulvenscens)* Vtg • Application: ELISA and WB • Isotype: $IgG_{1-κ}$

100 µl
500 µl

Lane 1: *MW standards*
Lane 2: *Gulf sturgeon Vtg*



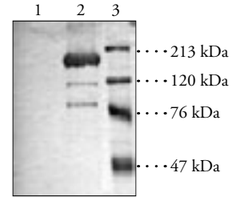
Vitellogenin (turbot) Polyclonal Antibody (CS-2)† 170170

Affinity-purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 0.1% mM sodium azide, and 1% BSA **Stability:** ≥1 year at 4°C

Summary: Antigen: Vtg purified from plasma of 17β-estradiol-treated turbot *(S. maximus)* • Host: rabbit • Cross-reactivity: (+) turbot *(S. maximus)*, wrasse *(C. rupestris)*, flounder *(P. flesus)*, halibut *(H. hippoglossus)*, common carp *(C. carpio)*, and tilapia *(O. niloticus)* Vtg • Applications: ELISA and WB; the optimum dilution should be determined for each application

100 µl
500 µl

Lane 1: *Turbot plasma*
Lane 2: *17β-estradiol-induced turbot plasma*
Lane 3: *MW standards*
(each sample lane is 7 µl at a 1:200 dilution)



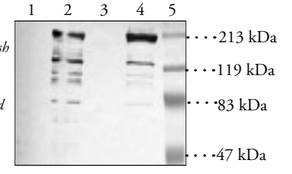
Vitellogenin (wolffish) Polyclonal Antibody (CS-3)† 170180

Affinity-purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 0.1% mM sodium azide, and 1% BSA **Stability:** ≥6 months at 4°C

Summary: Antigen: Vtg purified from plasma of 17β-estradiol-treated wolffish *(A. lupus)* • Host: rabbit • Cross-reactivity: (+) wolffish *(A. lupus)*, spotted wolffish *(A. minor)*, wrasse *(C. rupestris)*, common carp *(C. carpio)*, and tilapia *(O. niloticus)* Vtg • Applications: ELISA and WB; the optimum dilution should be determined for each application

100 µl
500 µl

Lane 1: *Wolffish plasma*
Lane 2: *17β-estradiol-induced wolffish plasma*
Lane 3: *Spotted wolffish plasma*
Lane 4: *17β-estradiol-induced spotted wolffish plasma*
Lane 5: *MW standards*
(each sample lane is 7 µl at a 1:200 dilution)

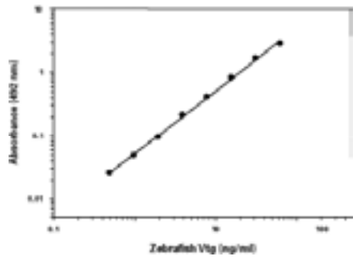


Vitellogenin (zebrafish) EIA Kit (pre-coated)† 10004995

Stability: ≥3 months at 4°C

Summary: Detection of the yolk protein Vtg in plasma from juvenile or male fish is a simple and sensitive biomarker for endocrine disrupting chemicals (EDCs) with estrogenic effects in fish. Quantification of Vtg has become an accepted screening test for the estrogenic effects of EDCs in fish. The Vtg (zebrafish) EIA kit is a double-antibody immunometric (sandwich) EIA for analyzing Vtg in whole body homogenates and plasma samples. Each kit contains zebrafish Vtg, pre-coated plate(s), detecting antibody, secondary antibody-HRP conjugate, BSA, OPD-peroxidase substrate, PBS-Tween tablets, PBS tablets, and complete instructions. A five-plate kit contains two vials of Vtg and three OPD sets, sufficient to run two separate assays (for example two plates + three plates).

96 wells
480 wells



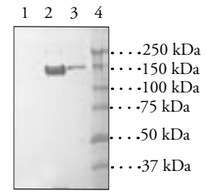
Vitellogenin (zebrafish) Monoclonal Antibody (JE-2A6)† 170165

Purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 12.3 mM sodium azide, and 1% BSA **Stability:** ≥1 year at 4°C

Summary: Antigen: Vtg purified from whole body homogenate of 17β-estradiol-treated zebrafish *(D. rerio)* • Host: mouse • Cross-reactivity: (+) zebrafish *(D. rerio)* Vtg; (-) carp *(C. carpio)*, fathead minnow *(P. promelas)*, and roach *(R. rutilus)* Vtg • Applications: ELISA and WB; the optimum dilution should be determined for each application

100 µl
500 µl

Lane 1: *Zebrafish whole body homogenate*
Lane 2: *17β-estradiol-induced Zebrafish whole body homogenate*
Lane 3: *Zebrafish (Vtg)*
Lane 4: *MW standards*
(each sample lane is 7 µl at a 1:200 dilution)

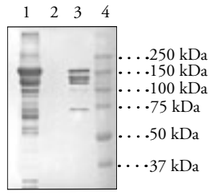


†Biosense ELISA Kits and Antibodies are available through Cayman Chemical only within North & South America; elsewhere contact Biosense.
NOTE: 480 well kits contain single 480 determination vials of tracer and antiserum and a 5-pack of plates.

Vitellogenin (zebrafish) Monoclonal Antibody (JE-8D6)† 170166

Purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 12.3 mM sodium azide, and 1% BSA **Stability:** ≥6 months at 4°C
Summary: Antigen: Vtg purified from whole body homogenate of 17β-estradiol-treated zebrafish *(D. rerio)* • Host: mouse • Cross-reactivity: (+) zebrafish *(D. rerio)*, carp *(C. carpio)*, fathead minnow *(P. promelas)*, and roach *(R. rutilus)* Vtg • Applications: ELISA and WB; the optimum dilution should be determined for each application

100 µl
500 µl

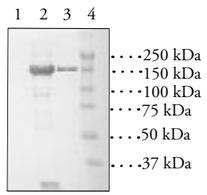


Lane 1: *17β-estradiol-induced Zebrafish whole body homogenate*
Lane 2: *Zebrafish whole body homogenate*
Lane 3: *Zebrafish (Vtg)*
Lane 4: *MW standards*
(each sample lane is 7 µl at a 1:200 dilution)

Vitellogenin (zebrafish) Monoclonal Antibody (JE-10D4)† 170167

Purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 12.3 mM sodium azide, and 1% BSA **Stability:** ≥1 year at 4°C
Summary: Antigen: Vtg purified from whole body homogenate of 17β-estradiol-treated zebrafish *(D. rerio)* • Host: rabbit • Cross-reactivity: (+) zebrafish *(D. rerio)*, carp *(C. carpio)*, fathead minnow *(P. promelas)*, and roach *(R. rutilus)* Vtg • Applications: ELISA, WB, and IHC; the optimum dilution should be determined for each application

100 µl
500 µl

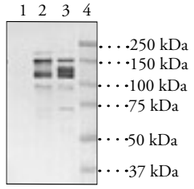


Lane 1: *Zebrafish whole body homogenate*
Lane 2: *17β-estradiol-induced Zebrafish whole body homogenate*
Lane 3: *Zebrafish (Vtg)*
Lane 4: *MW standards*

Vitellogenin (zebrafish) Polyclonal Antibody (DR-264)† 170160

Purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 0.1% mM sodium azide, and 1% BSA **Stability:** ≥1 year at 4°C
Summary: Antigen: Vtg purified from whole body homogenate of 17β-estradiol-treated zebrafish *(D. rerio)* • Host: rabbit • Cross-reactivity: (+) zebrafish *(D. rerio)*, carp *(C. carpio)*, and fathead minnow *(P. promelas)* Vtg • Applications: ELISA and WB; the optimum dilution should be determined for each application

100 µl
500 µl



Lane 1: *Zebrafish whole body homogenate*
Lane 2: *17β-estradiol-induced Zebrafish whole body homogenate*
Lane 3: *Zebrafish (Vtg)*
Lane 4: *MW standards*

Vitellogenin (zebrafish) Standard† 470174

Stability: ≥3 months at 4°C
Summary: Positive control in WB and ELISA.

1 ea

NEW WIN 55212-2 (mesylate) 10009023

[131543-23-2]
MF: $C_{27}H_{26}N_2O_3 \cdot CH_3SO_3H$ **FW:** 522.6 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 years at -20°C
Summary: WIN 55212-2 (mesylate) is a potent aminoalkylindole CB receptor agonist with a K_i value of 3.3 and 62.3 nM for human recombinant CB_1 and CB_2 receptors, respectively. In primary cultures of rat cerebral cortex neurons, WIN 55212-2 (mesylate) (0.01-100 nM) increases extracellular glutamate levels, displaying a bell-shaped concentration-response curve. This effect at a concentration of 1 nM was fully counteracted by SR141716A (10 nM), by decreasing Ca^{2+} concentrations below 0.2 mM, and by the IP_3 receptor antagonist xestospongin C at 1 µM. WIN 55212-2 (mesylate) induces release of the proinflammatory neuropeptide CGRP from trigeminal ganglion (TG) neurons in a calcium-dependent manner with an EC_{50} value of 26 µM. In addition, WIN 55212-2 (mesylate)-evoked CGRP release is not stereospecific, as the CB receptor-inactive enantiomer WIN 55212-3 also stimulates CGRP exocytosis.

1 mg
5 mg
10 mg
25 mg

[(3R)-2,3-dihydro-5-methyl-3-(4-morpholinylmethyl)pyrrolo[1,2,3-de]-1,4-benzoxazin-6-yl]-1-naphthalenyl-methanone, monomethanesulfonate

Wy 14643 70730

[50892-23-4] Pirinixic acid
MF: $C_{14}H_{14}ClN_3O_2S$ **FW:** 323.8 **Purity:** ≥98%
A crystalline solid **Stability:** ≥2 yearss at -20°C
Summary: Wy 14643 is a peroxisome proliferator-activated receptor (PPAR activator). Although this compound is primarily an activator of PPARa, it activates PPARg as well. Activation of PPARd by Wy 14643 is also observed, but this finding is rare. The potency of Wy 14643 as an activator of PPARa is species dependent, with receptor activation occurring at concentrations as low as 0.1 µM in the mouse compared to 10 µM in *Xenopus*.

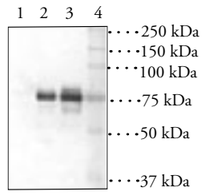
5 mg
10 mg
50 mg
250 mg

[[4-chloro-6-[(2,3-dimethylphenyl)amino]-2-pyrimidinyl]thio]-acetic acid

Zona Radiata (salmon) Monoclonal Antibody (MN-2B4)† 100020

Affinity-purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 12.3 mM sodium azide, and 1% BSA **Stability:** ≥1 year at 4°C
Summary: Antigen: purified eggshell proteins (Zrp and small amounts of zona pellucida proteins) from Atlantic salmon *(S. salar)* • Host: mouse • Cross-reactivity: (+) Atlantic salmon *(S. salar)* (reacts primarily with β monomer), rainbow trout *(O. mykiss)*, and Arctic char *(S. alpinus)* Zrp • Applications: WB and ELISA • Isotype: $IgG_{1-κ}$

100 µl
500 µl

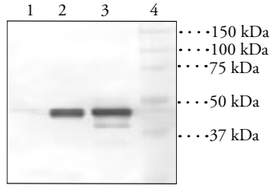


Lane 1: *Salmon plasma*
Lane 2: *17β-estradiol-induced salmon plasma*
Lane 3: *Zrp*
Lane 4: *MW standards*

Zona Radiata (salmon) Monoclonal Antibody (MN-7F2)† 100018

Affinity-purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 12.3 mM sodium azide, and 1% BSA **Stability:** ≥1 year at 4°C
Summary: Antigen: purified eggshell proteins (Zrp and small amounts of zona pellucida proteins) from Atlantic salmon *(S. salar)* • Host: mouse • Cross-reactivity: (+) Atlantic salmon *(S. salar)* (reacts primarily with γ monomer) and rainbow trout *(O. mykiss)* Zrp • Applications: WB and ELISA • Isotype: $IgG_{1-κ}$

100 µl
500 µl

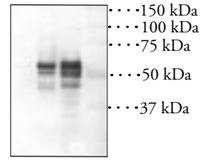


Lane 1: *Salmon plasma*
Lane 2: *17β-estradiol-induced salmon plasma*
Lane 3: *Zrp*
Lane 4: *MW standards*

Zona Radiata (salmon) Monoclonal Antibody (MN-8C4)† 100017

Affinity-purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 12.3 mM sodium azide, and 1% BSA **Stability:** ≥1 year at 4°C
Summary: Antigen: purified eggshell proteins (Zrp and small amounts of zona pellucida proteins) from Atlantic salmon *(S. salar)* • Host: mouse • Cross-reactivity: (+) Atlantic salmon *(S. salar)* (reacts primarily with α and β monomers), rainbow trout *(O. mykiss)*, Arctic char *(S. alpinus)*, turbot *(S. maximus)*, and cod *(G. morhua)* Zrp • Applications: WB and ELISA • Isotype: $IgG_{1-κ}$

100 µl
500 µl

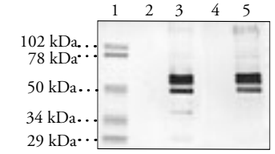


Lane 1: *Salmon plasma*
Lane 2: *17β-estradiol-induced salmon plasma*
Lane 3: *Zrp*
Lane 4: *MW standards*
(each sample lane is 7 µl at a 1:200 dilution)

Zona Radiata (salmon) Polyclonal Antibody (0-146)† 171142

Purified IgG in 0.1 M sodium phosphate, pH 7.4, containing 0.15 M NaCl, 12.3 mM sodium azide, and 1% BSA **Stability:** ≥1 year at 4°C
Summary: Antigen: purified eggshell proteins (Zrp and small amounts of zona pellucida proteins) from Atlantic salmon *(S. salar)* • Host: rabbit • Cross-reactivity: (+) Atlantic salmon *(S. salar)* Zrps α, β, and γ, brown trout *(S. trutta)*, rainbow trout *(O. mykiss)*, Arctic char *(S. alpinus)*, Atlantic cod *(G. morhua)*, turbot *(S. maximus)*, flounder *(P. flesus)*, and halibut *(H. hippoglossus)* Zrp; (-) wrasse *(C. rupestris)* and tilapia *(O. niloticus)* Zrp • Applications: ELISA and WB; the optimum dilution should be determined for each application

100 µl
500 µl



Lane 1: *MW standards*
Lane 2: *Salmon plasma*
Lane 3: *17β-estradiol-induced salmon plasma*
Lane 4: *Rainbow trout plasma*
Lane 5: *17β-estradiol-induced rainbow trout plasma*
(each sample lane is 7 µl at a 1:100 dilution)

†Biosense ELISA Kits and Antibodies are available through Cayman Chemical only within North & South America; elsewhere contact Biosense.
NOTE: 480 well kits contain single 480 determination vials of tracer and antiserum and a 5-pack of plates.

Alphabetical Index

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