

# Diabetes and Obesity Research Tools



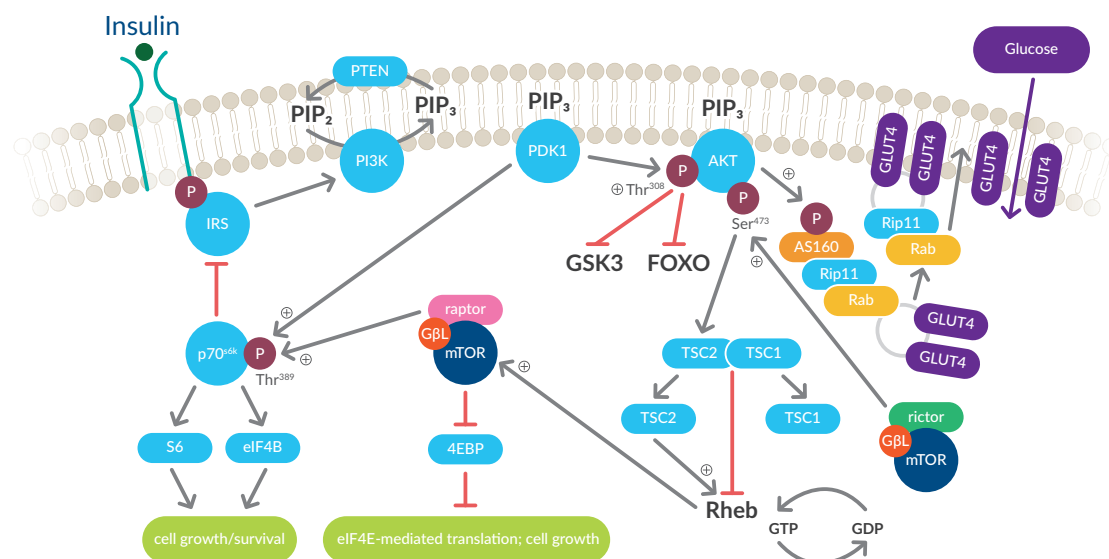
Metabolic control requires balance between energy intake, utilization, and storage. Diabetes and obesity are twinning epidemics that arise from certain metabolic imbalances. Cayman offers a range of biochemical tools and assay kits to assist researchers in their work to better understand the molecular underpinnings of these diseases.

## Glucose Metabolism and Transport Assays

Item No.	Product Name	Summary
10009582	Glucose Colorimetric Assay Kit	For analysis of glucose in plasma, serum, and urine
700300	Glucose-6-Phosphate Dehydrogenase Activity Assay Kit	For the detection of glucose-6-phosphate dehydrogenase activity in a variety of samples including erythrocyte lysates, tissue homogenates, and cell culture samples
700750	Glucose-6-Phosphate Fluorometric Assay Kit	A fluorescence-based method for detecting G6P in tissue homogenates and cell culture samples
600470	Glucose Uptake Cell-Based Assay Kit	A cell-based assay for studying modulators of cellular glucose uptake
700480	Glycogen Assay Kit	A simple and sensitive tool for assaying glycogen from tissue
600450	Glycolysis Cell-Based Assay Kit	A colorimetric-based method for detecting L-lactate in culture medium
700520	D-Lactate Assay Kit	A fluorescence-based method for detecting D-lactate in biological samples such as serum, plasma, blood, urine, and saliva
700510	L-Lactate Assay Kit	A fluorescence-based method for detecting L-lactate in biological samples such as serum, plasma, blood, urine, and saliva
700470	Pyruvate Assay Kit	A fluorescence-based method for quantifying pyruvate in biological samples

## Glucose Metabolism Inhibitors

Item No.	Product Name	Target
18860	Fructose-1,6-bisphosphatase-1 Inhibitor	Gluconeogenesis
14325	2-deoxy-D-Glucose	Hexokinase
14640	Lonidamine	Hexokinase
16548	D-Mannoheptulose	Glucokinases and hexokinases



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

# Insulin Production and $\beta$ -Cell Function Research Tools

For high-sensitivity measurements of insulin

## Insulin (human) ELISA Kit - Item No. 26619

- Broad standard curve range:  
0.4  $\mu$ IU/ml - 52  $\mu$ IU/ml [15.4 pg/ml - 2,000 pg/ml]
- High sensitivity: LOD  $\leq$  0.3  $\mu$ IU/ml (11.5 pg/ml)
- No cross reactivity to pro-insulin or C-peptide
- Versatile: Applicable for cell culture supernatant, serum, and plasma

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## Glucagon Receptor Ligands

Glucagon counterregulates the glucose-lowering actions of insulin by stimulating glucose production. Therefore, strategies for blocking glucagon action are potential therapies for diabetes.

Item No.	Product Name
24204	Glucagon
21223	Glucagon Receptor Antagonist I
22164	Glucagon Receptor Antagonist 4
21188	Glucagon Receptor Antagonist Inactive Control
24459	[Des-His <sup>1</sup> ,Glu <sup>2</sup> ]-Glucagon (1-29) amide (trifluoroacetate salt)

## GLP Receptor Ligands

Signaling through the glucagon-like peptide (GLP) receptor can increase glucose-dependent insulin secretion, stimulate  $\beta$ -cell proliferation, inhibit glucagon secretion, and increase satiety.

Item No.	Product Name
19890	Exendin-3 (9-39) amide
11096	Exendin-4 (acetate)
24460	GLP-1 (1-37) (human, rat, mouse, bovine) (trifluoroacetate salt)
24756	GLP-2 (1-34) (human) (trifluoroacetate salt)
24727	Liraglutide

## DPP-4 Inhibitors

Dipeptidyl peptidase 4 (DPP-4) degrades incretins such as GLP-1. DPP-4 inhibitors can reduce glucagon and glucose levels and increase insulin secretion.

Item No.	Product Name	Activity
23768	Alogliptin (benzoate salt)	IC <sub>50</sub> = 6.9 nM
23306	Linagliptin	IC <sub>50</sub> = 1 nM
23697	Saxagliptin (hydrochloride)	K <sub>i</sub> = 0.6 nM
13252	(-)-Sitagliptin (phosphate)	IC <sub>50</sub> = 18 nM
14705	Vildagliptin	IC <sub>50</sub> = 3.5-34 nM

## Simplify DPP-4 Screening

### DPP (IV) Inhibitor Screening Assay Kit

Item No. 700210

- Screen for DPP (IV) inhibitors
- Assay 46 samples in duplicate
- Includes positive control inhibitor
- Plate-based fluorometric measurement

## FFAR1 Research Tools

Free fatty acid receptor 1 (GPR40) induces the release of incretins and demonstrates direct insulinotropic effects.

Item No.	Product Name	Summary
10007205	FFAR1 (GPR40) Polyclonal Antibody	For detection of GPR40 by IHC and WB
601190	FFAR1 (GPR40) Reporter Assay Kit	A cell-based screening assay based on novel transfection technology
21815	AMG 837	A potent, orally bioavailable GPR40 partial agonist
19388	DC260126	An FFAR1 (GPR40) antagonist
17335	TAK-875	A selective FFAR1 (GPR40) agonist

## SGLT2 Inhibitors

Sodium-glucose cotransporter 2 (SGLT2) inhibitors decrease glucose reabsorption in renal proximal tubules, which has dual effects of insulin-independent glycemic control and caloric loss.

Item No.	Product Name
11575	Canagliflozin
11574	Dapagliflozin
17375	Empagliflozin
21507	Ertugliflozin
23509	Tofogliflozin (hydrate)

## FAHFAs with Antidiabetic Potential

Branched fatty acid esters of hydroxy fatty acids (FAHFAs) are regulated by fasting and high-fat feeding and associated with insulin sensitivity.

Item No.	Product Name
17037	9-PAHSA
18022	9(R)-PAHSA
17725	9-PAHSA <sup>13</sup> C <sub>4</sub>
19975	10-OAHSA
19973	10-PAHSA

View a complete list of 30 FAHFAs at [www.caymanchem.com](http://www.caymanchem.com)

## Insulin Mimetics and Additional Regulators of Insulin Secretion

Item No.	Product Name	Summary
10010622	Genipin	An inhibitor of UCP2 activity that upregulates insulin secretion
16411	β-Nicotinamide Mononucleotide	Enhances glucose-stimulated insulin secretion in a Namp1 <sup>+/-</sup> mouse model
15782	PTP1B Inhibitor	A cell-permeable allosteric inhibitor of PTP1B that mimics the action of insulin
13104	Streptozotocin	A diabetogenic agent which targets β-cells

## Lipid Homeostasis Research Tools

### Lipid Storage and Metabolism Assay Kits

Item No.	Product Name
10009381	Adipolysis Assay Kit
10007619	Adiponectin (human) EIA Kit (HS)
700310	Free Fatty Acid Fluorometric Assay Kit
10011725	Glycerol Cell-Based Assay Kit
10010755	Glycerol Colorimetric Assay Kit
10007609	Leptin (mouse/rat) EIA Kit
700640	Lipase Activity Assay Kit

### Lipid Droplet Staining Tools

Item No.	Product Name
10006908	Adipogenesis Assay Kit
500001	Lipid Droplets Fluorescence Assay Kit
25892	BODIPY 493/503
25893	BODIPY 505/515
27014	BODIPY 558/568 C12
25911	IraZolve-L1™
25907	ReZolve-L1™

## PPAR Agonists and Antagonists

Peroxisome proliferator-activated receptors (PPARs) have a critical role as master regulators of lipid and glucose metabolism.

Item No.	Product Name	Target
10009145	Bezafibrate	Pan-PPAR
10956	Clofibrate	PPARα
13689	GW 1929	PPARγ
10004272	GW 501516	PPARδ
22263	Pioglitazone (hydrochloride)	PPARγ
18570	15-deoxy-Δ <sup>12,14</sup> -Prostaglandin J <sub>2</sub>	PPARγ
10026	T0070907	PPARγ
16791	Tesaglitazar	PPARα and PPARγ
71750	Troglitazone	PPARγ

PPAR assays, recombinant proteins, and antibodies are also available

## Targeting PPARs: A guide to function and structure

The guide includes a flowchart of PPAR signaling pathways and a detailed table of agonists and antagonists for PPARα, PPARδ, and PPARγ. The table lists the compound name, its target, and its mechanism of action.

Agonist/Antagonist	Target	Mechanism of Action
PPARα Agonists	PPARα	PPARα agonists activate PPARα, leading to increased fatty acid oxidation and decreased lipogenesis.
PPARδ Agonists	PPARδ	PPARδ agonists activate PPARδ, leading to increased fatty acid oxidation and decreased lipogenesis.
PPARγ Agonists	PPARγ	PPARγ agonists activate PPARγ, leading to increased lipogenesis and decreased fatty acid oxidation.
PPARα Antagonists	PPARα	PPARα antagonists block PPARα activation, leading to decreased fatty acid oxidation and increased lipogenesis.
PPARδ Antagonists	PPARδ	PPARδ antagonists block PPARδ activation, leading to decreased fatty acid oxidation and increased lipogenesis.
PPARγ Antagonists	PPARγ	PPARγ antagonists block PPARγ activation, leading to decreased lipogenesis and increased fatty acid oxidation.

Download a copy at [www.caymanchem.com/literature](http://www.caymanchem.com/literature)

## PGC-1 $\alpha$ Activator and Inhibitor

Peroxisome proliferator-activated receptor- $\gamma$  coactivator-1 $\alpha$  (PGC-1 $\alpha$ ) is a metabolic sensor involved in the expression of genes important to gluconeogenesis and lipid transport.

Item No.	Product Name	Action
22084	SR 18292	Inhibitor
14121	ZLN005	Activator

## DGAT Inhibitors

Diacylglycerol acyltransferase-1 and -2 (DGAT-1/2) inhibitors interfere with triglyceride biosynthesis, preventing the accumulation of triglycerides.

Item No.	Product Name	Target
10012708	A-922500	DGAT-1
17774	Amidepsine A	DGAT
16425	PF-04620110	DGAT-1
17680	PF-06424439	DGAT-2

## TGR5 and FXR Agonists and Antagonists

G protein-coupled bile acid activated receptor (TGR5 or GP-BAR1) and farnesoid X receptor (FXR) have roles as master regulators of carbohydrate and lipid metabolism as well as glucose homeostasis.

Item No.	Product Name	Action
9003230	Glycine- $\beta$ -muricholic Acid	Antagonist
17678	INT-777	Agonist
16291	TGR5 Receptor Agonist	Agonist
23350	XL335	Agonist

## Food Intake and Satiety

### Peptides

Item No.	Product Name
24895	Amylin (human) (amidated) (trifluoroacetate salt)
24983	Ghrelin (rat) (palmitoyl) (trifluoroacetate salt)
24552	Obestatin (human)
15073	Orexin A (bovine, human, mouse, rat)
24776	Peptide YY (human) (trifluoroacetate salt)
24748	Urocortin III (human) (trifluoroacetate salt)

## BAT Inducers

$\beta_3$ -Adrenoceptor agonists have been used to study the induction of brown adipocytes and to increase thermogenesis in a mouse model of dietary obesity.

Item No.	Product Name
18622	BRL 37344 (sodium salt)
17499	CL 316,243

## AMPK Pathway Activators

AMP-activated protein kinase (AMPK) pathway activators inhibit *de novo* lipogenesis, increase fatty acid oxidation, and promote mitochondrial function in adipose tissue.

Item No.	Product Name
11900	A-769662
15941	AdipoRon
10010241	AICAR
13118	Metformin (hydrochloride)

## Scalable Screening Assays

### TGR5 & FXR Reporter Assay Kits

Item Nos. 601440 & 601790

- Cell-based screening assays based on novel transfection technology
- No need to develop, maintain, or expand stable cell lines

### Peptide Assay Kits

Item No.	Product Name
501160	Acylated Ghrelin (human) Easy Sampling EIA Kit*
501210	Acylated Ghrelin (dog) Easy Sampling EIA Kit
501170	Acylated Ghrelin (mouse, rat) Easy Sampling EIA Kit*
500010	Leptin (human) EIA Kit
10007609	Leptin (mouse/rat) EIA Kit
18902	Obestatin (human) EIA Kit

\*Unacylated and express kits available



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View a complete list of Metabolic Disease research tools at [www.caymanchem.com](http://www.caymanchem.com)