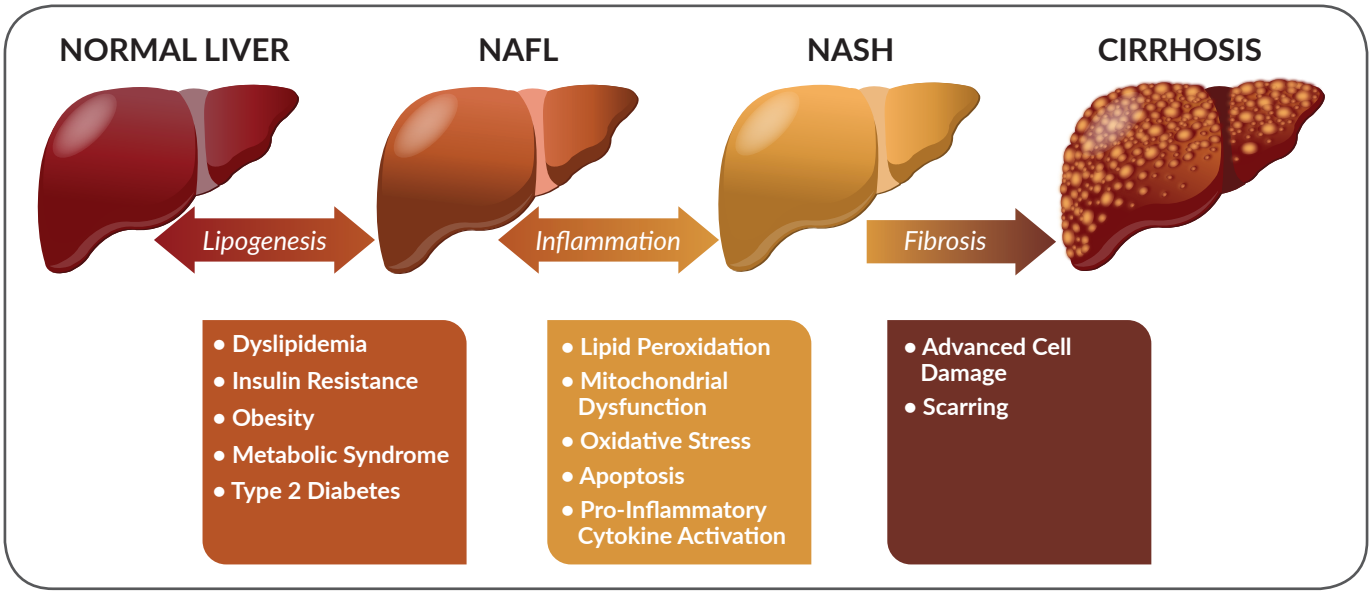
Research Tools for Fatty Liver Diseases

Non-alcoholic fatty liver disease (NAFLD) refers to a group of conditions characterized by steatosis (NAFL), the abnormal accumulation of lipids in hepatocytes that is not a consequence of excess alcohol consumption. NAFL can progress to non-alcoholic steatohepatitis (NASH), a severe form of NAFLD characterized by the presence of sustained liver inflammation and cellular damage. NASH can progress further to more chronic conditions such as cirrhosis or hepatocellular carcinoma. The molecular mechanisms involved in the development and progression of fatty liver diseases remain poorly understood. Cayman offers a range of biochemical tools and assay kits to assist investigators in their study of this growing health problem.



Progression of NAFLD. NAFL can progress to NASH and potentially cirrhosis. Each stage is defined by specific risk factors and/or pathological mechanisms. Both NAFL and NASH are thought to be reversible.

Products to Study Lipogenesis

NAFLD is marked by excessive fat accumulation in the liver (steatosis), which can result from systemic and hepatic desensitization of insulin signaling pathways.

Biochemicals

Item No.	Product Name	Description
22478	Aramchol	Prevents the formation of cholesterol crystals and gallstones in mice fed a lithogenic, high-fat diet
11686	Betulinic Acid	TGR5 agonist (EC_{50} = 1 µM); reduces NF-κB signaling in LPS-treated macrophages and increases ABCA1 expression
12032	BI6015	HNF4α antagonist that causes dose-dependent fat accumulation (steatosis) in mouse liver
10008335	all-*cis*-4,7,10,13,16-Docosapentaenoic Acid	A DPA isomer whose concentrations increased in NASH
16624	GPR120 Compound A	Decreases hepatic steatosis when included at 30 mg/kg body weight in a high-fat diet fed to obese mice

Biochemicals *Continued*

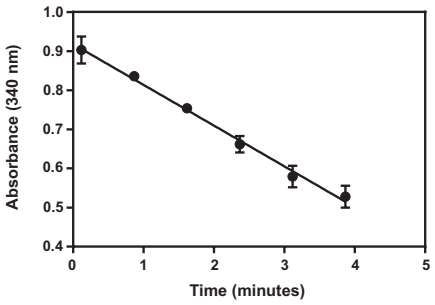
Item No.	Product Name	Description
17678	INT-777	TGR5 agonist (EC_{50} = 0.82 µM); reduces hepatic steatosis and adiposity in mice subjected to diet-induced obesity
13118	Metformin (hydrochloride)	Improves fatty liver disease by reversing hepatic steatosis in *ob/ob* mice
18293	MHY908	Improves hepatic steatosis by enhancing CPT1 levels and reducing ER stress and JNK activation in livers of *db/db* mice
15192	ML-261	Inhibits hepatic lipid droplet formation (IC_{50} = 69.7 nM in mouse AML-12 hepatocytes)
10007853	Muraglitazar	A dual agonist of PPARα and PPARγ that improves diabetes and other metabolic abnormalities while preserving β-cell function in *db/db* mice
14173	Naringenin	Corrects VLDL overproduction, ameliorates hepatic steatosis, and attenuates dyslipidemia in LDL receptor-deficient mice fed a Western diet
17118	Niclosamide (ethanolamine salt)	Prevents high-fat diet-induced hepatic steatosis in *db/db* mice
16209	*p*-nitro-Pifithrin-α	Attenuates steatosis and liver injury in mice fed a high-fat diet
71745	Pioglitazone	A selective PPARγ1 agonist with antidiabetic actions (one-tenth as potent as rosiglitazone)
71740	Rosiglitazone	A potent antidiabetic agent that acts as a selective PPARγ agonist (K_d = 43 nM)
18771	SR9238	LXRα and LXRβ inverse agonist (IC_{50}s = 214 and 43 nM, respectively); suppresses hepatic lipogenesis, inflammation, lipid accumulation, and fibrosis in mouse models of NASH
16291	TGR5 Receptor Agonist	Activator of TGR5 (pEC_{50} = 6.8-7.5); increases GLP-1 secretion and improves glucose disposal

Featured Lipogenesis Assay Kit

Alanine Transaminase Colorimetric Activity Assay Kit

Item No. 700260

- Measure ALT activity in serum, plasma, tissue samples, and cell lysates
- Assay 47 samples in duplicate
- Measure ALT activity down to 0.006 U/ml
- Plate-based colorimetric measurement (340 nm)



Additional Assay Kits

Item No.	Product Name	Description
10007640	Cholesterol Fluorometric Assay Kit	Quantitation of total cholesterol in plasma or serum
700310	Free Fatty Acid Fluorometric Assay Kit	Measure FFAs in plasma, serum, and urine
15741	FXR (human) Reporter Assay Kit	Screen test samples to quantify functional activity, either agonist or antagonist, that they may exert against human FXR
500010	Leptin (human) EIA Kit *(Manufactured by Bertin Pharma)*	Measure leptin in human serum, plasma, and culture supernatant samples Also available: Leptin (mouse/rat) EIA Kit (Item No. 10007609) and Leptin Receptor (human) EIA Kit (Item No. 10007608)
500001	Lipid Droplets Fluorescence Assay Kit	Detect lipid droplets, cellular organelles that are also referred to as lipid bodies, oil bodies, or adiposomes
10010854	SREBP-1 Transcription Factor Assay Kit	A sensitive, non-radioactive method of detecting SREBP-1 from whole cell lysates
10012643	Steatosis Colorimetric Assay Kit	Detect excessive lipid accumulation in cells
601440	TGR5 (GP-BAR1) Reporter Assay Kit	Screen for TGR5 agonists, antagonists, and modulators
10010303	Triglyceride Colorimetric Assay Kit	Measure TG levels in plasma, serum, cell lysates, and tissue homogenates

Products to Study Inflammation

NASH is marked by inflammation of the liver (steatohepatitis), which can result from cytokine dysregulation, oxidative stress, and hepatocyte apoptosis.

Biochemicals

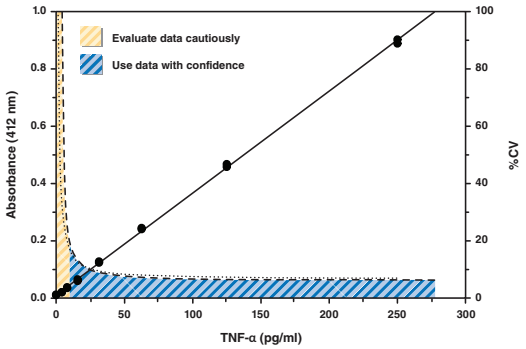
Item No.	Product Name	Description
70935	(−)-Epigallocatechin Gallate	Inhibits cellular oxidation of LDLs
14127	Febuxostat	Inhibits oxidized and reduced forms of xanthine oxidase
10739	Isoliquiritigenin	Exhibits antioxidant, anti-inflammatory, and antitumor activities, as well as hepatoprotection against steatosis-induced oxidative stress
11948	MN-001	Produces antifibrotic and anti-inflammatory activity in models of NASH
16093	Myrtillin	A natural anthocyanin with antioxidant activity
18720	Pentoxifylline	Anti-inflammatory activity, inhibiting TNF-α production
70675	*trans*-Resveratrol	Phenolic antioxidant with anti-inflammatory activity
18771	SR9238	LXRα and LXRβ inverse agonist (IC_{50}s = 214 and 43 nM, respectively); suppresses hepatic lipogenesis, inflammation, lipid accumulation, and fibrosis in mouse models of NASH
10011659	Trolox	Derivative of vitamin E with potent antioxidant properties

Featured Inflammation Assay Kit

TNF-α (human) ELISA Kit

Item No. 589201

- Measure TNF-α from human plasma, serum, and other sample matrices
- **Assay Range:** 3.9-250 pg/ml with an LOD of 3.9 pg/ml
- **Incubation:** 18 hours | **Development:** 60-90 minutes
  Read: Colorimetric at 405-420 nm



Also available: *TNF-α (mouse) ELISA Kit (Item No. 500850)*

Additional Assay Kits

Item No.	Product Name	Description
701080	COX-2 (human) Inhibitor Screening Assay Kit	Complete Drug Discovery Assay for screening COX-2 inhibitors
702000	COX-2 (ovine) Inhibitor Screening Assay Kit	Complete Drug Discovery Assay for screening COX-2 inhibitors
10011236	C-Reactive Protein (human) ELISA Kit	Measure CRP from human plasma without prior sample purification
501030	Interleukin-6 (human) ELISA Kit	Measure IL-6 from human plasma, serum, synovial fluid, and other sample matrices
601290	ROS Detection Cell-Based Assay Kit (DHE)	Measure superoxide and hydrogen peroxide levels in living cells
10009055	TBARS Assay Kit	Measure lipid peroxidation in plasma, serum, urine, tissue homogenates, and cell lysates
700870	TBARS (TCA Method) Assay Kit	Measure lipid peroxidation in plasma, serum, urine, tissue homogenates, and cell lysates; includes TCA precipitation procedure for improved sample processing

Additional lipid peroxidation, mitochondrial dysfunction, oxidative stress, and apoptosis assay kits available online

Products to Study Fibrosis

Cirrhosis is marked by prolonged cell damage and fibrosis, which results from the activation of hepatic stellate cells and the emergence of fibrotic progenitors.

Biochemicals

Item No.	Product Name	Description
16018	Camostat (mesylate)	A protease inhibitor that disrupts the proliferation of stellate cells
10008199	Linolenic Acid ethyl ester	Stimulates intracellular signaling pathways in hepatic stellate cells
11948	MN-001	Produces antifibrotic and anti-inflammatory activity in models of NASH
17278	Necrox-5 (methanesulfonate)	A necrosis inhibitor that protects cells from carbon tetrachloride-induced liver injury and chronic liver fibrosis in rodent models
19131	NK 252	Exhibits antifibrotic effects in a rat model of NASH
13986	Pirfenidone	Antioxidant, anti-inflammatory, and antifibrotic effects
18771	SR9238	LXRα and LXRβ inverse agonist (IC_{50}s = 214 and 43 nM, respectively); suppresses hepatic lipogenesis, inflammation, lipid accumulation, and fibrosis in mouse models of NASH

Proteins

Item No.	Product Name	Description
10009547	FABP1 (human recombinant)	Potential marker of liver injury
10005200	FABP1 (rat recombinant)	Potential marker of liver injury

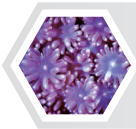
Nuclear Receptor Assays

Current NASH research indicates drug and treatment discovery relies on nuclear receptor activation, specifically the PPARα, PPARγ, PPARβ/δ, FXR, LXRα, LXRβ, VDR, PXR, CAR, and RORγ receptors. Cayman partners with Indigo Bioscience to offer assay kits for these NAFLD/NASH-associated nuclear receptors.

INDIGO BIOSCIENCES
The Nuclear Receptor Experts™

Item No.	Product Name
15748	CAR1 (human) Reporter Assay Kit
15747	CAR3 (human) Reporter Assay Kit
15741	FXR (human) Reporter Assay Kit
20349	FXR (mouse) Reporter Assay Kit
15735	LXRα (human) Reporter Assay Kit
15734	LXRβ (human) Reporter Assay Kit
15730	PPARα (human) Reporter Assay Kit
15762	PPARα (mouse) Reporter Assay Kit
15729	PPARγ (human) Reporter Assay Kit
15761	PPARγ (mouse/rat) Reporter Assay Kit

Item No.	Product Name
15764	PPARα (rat) Reporter Assay Kit
15731	PPARδ (human) Reporter Assay Kit
15763	PPARδ (mouse) Reporter Assay Kit
15765	PPARδ (rat) Reporter Assay Kit
15732	PPAR (human) Reporter Assays Panel
17528	Pregnane X (human) Receptor Assay Kit
17585	Pregnane X (rat) Receptor Assay Kit
15757	RORγ (human) Reporter Assay Kit
15742	VDR (human) Reporter Assay Kit



To view a complete list of our NAFLD research tools, visit us online at **www.caymanchem.com**