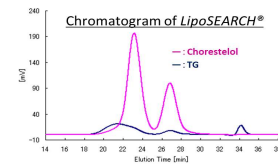


LipoSEARCH® has been internationally recognized as a reliable lipid profiling service and > 500 references have been published.


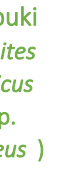


Here are some examples of its use in Functional food R&D.



LipoSEARCH® is a useful analyzing tool for

- Evaluating of food efficacy and mechanism.
- R&D of functional food for dieting, etc.



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Food material	Reported action	Species	Article title	Overview
Blackcurrant Extract 	T-Cho ↓ VLDL-C ↓	Human	Hypocholesterolemic Effect of Blackcurrant (Ribes nigrum) Extract in Healthy Female Subjects: A Pilot Study <i>Molecules</i> . 2021 Jul 4;26(13):4085. Naoki Nanashima et al	The effects of blackcurrant extract on serum lipid levels in healthy young women were estimated. The total cholesterol level decreased on day 29. Furthermore, the levels of total VLDL-C, small VLDL-C, and large LDL-C were significantly decreased.
Akitabuki (Petasites japonicus subsp. giganteus) 	T-TG ↓ CM-TG ↓ VLDL-TG ↓	Caco-2 cells, HepG2 cells, Mouse	Anti-dyslipidemic effects of water extract from the leaves of <i>Petasites japonicus</i> subsp. <i>giganteus</i> (Akitabuki) <i>Journal of Biological Macromolecules</i> 2021 Volume 21 Issue 1 Pages 33-44 Gen Toshima et al	The extract suppressed gene expression involved in transacylation, such as MGAT2 and DGAT2 and also attenuated the expression of MTP and APOB100, elements required for lipoprotein synthesis. Intakes of the extract normalized the plasma TG, CM-TG, and VLDL-TG levels in HFD-fed mice.
Trehalose	CM-TG ↓	Mouse	Trehalose itself plays a critical role on lipid metabolism: Trehalose increases jejunal cytoplasmic lipid droplets which negatively correlated with mesenteric adipocyte size in both HFD-fed trehalase KO and WT mice <i>Nutr Metab (Lond)</i> . 2020 Mar 18;17:22. Chikako Arai et al	CM-TG tended to be decreased in both trehalase knockout (KO) mice and wild-type (WT) mice. When trehalose was ingested in mice loaded with the HFD, we observed that lipid droplets were trapped in the jejunum epithelium and then the intestinal epithelium was exfoliated, lipids were excreted in feces, and the amount of fat transferred to peripheral adipose tissue as CM decreased. The effect of trehalose may induce suppression of adipocyte hypertrophy.
Barley 	LDL-C ↓ HDL-C ↑ medium HDL-C ↑ small HDL-C ↑ very small HDL-C ↑	Mouse	Association of Lifelong Intake of Barley Diet with Healthy Aging: Changes in Physical and Cognitive Functions and Intestinal Microbiome in Senescence-Accelerated Mouse-Prone 8 (SAMP8) <i>Nutrients</i> . 2019 Aug 1;11(8):1770. Chikako Shimizu et al	The starch components of AIN-93G were replaced by rice or barley. SAMP8 (four weeks old, male) mice were fed AIN-93G until eight weeks old, and then rice (rice group) or barley diet (rice: barley = 1:4, barley group) until death. Barley intake in SAMP8 mice significantly increased low-risk HDL-C (medium HDL-C, small HDL-C, very small HDL-C) levels, and reduced LDL-C.
D-allulose (Rare sugar)	LDL/HDL ratio ↓	Hamster	Dietary d-allulose alters cholesterol metabolism in Golden Syrian hamsters partly by reducing serum PCSK9 levels <i>Journal of Functional Foods</i> Volume 60, September 2019, 103429 Akane Kanasaki et al	Golden Syrian hamsters received either normal diet (ND) or high-fat diet (HFD) with or without 3% D-allulose for 4 or 8 weeks. D-allulose significantly increased HDL-C levels in ND-fed hamsters and decreased LDL-C levels in HFDfed hamsters, causing an overall decrease in the LDL/HDL ratio. Serum PCSK9 concentrations in both feeding groups also decreased significantly.
Sweetpotato protein digest 	T-TG ↓ VLDL-TG ↓	Mouse	Effects of a sweetpotato protein digest on lipid metabolism in mice administered a high-fat diet <i>Heliyon</i> . 2016 Dec 7;2(12):e00201. Koji Ishiguro et al	Cholesterol levels were significantly lower in the sweetpotato peptide (SPP)-administered group compared with the control in serum VLDL and LDL. TG levels were also lower in the SPP-administered group compared with the control in serum VLDL, LDL and HDL. SPP dose-dependent responses in cholesterol levels were observed, in particular, in very small LDL.
Camellia Seed Oil	LDL-C ↓ HDL-C ↑	Mouse	The Effect of Camellia Seed Oil Intake on Lipid Metabolism in Mice <i>Nat Prod Commun</i> . 2016 Apr;11(4):511-3. Tadaaki Satou et al	In total cholesterol and HDL-C levels, camellia seed oil diet groups showed significant increases compared with the normal diet. However, increases in LDL-C levels were inhibited by the camellia seed oil diet similarly to the olive oil diet. As the high oleic acid content of camellia seed oil is similar to that of olive oil, it is proposed that its presence mitigated plasma cholesterol levels.

Food material	Reported action	Species	Article title	Overview
Quercetin-3-O-glucuronide	HDL-C ↑	Mouse	Quercetin-3-O-glucuronide induces ABCA1 expression by LXRα activation in murine macrophages <i>Biochem Biophys Res Commun</i> . 2013 Nov 29;441(4):929-34. Kazuaki Ohara et al	It was found that quercetin-3-O-glucuronide (Q3GA), a major quercetin metabolite after absorption from the digestive tract, enhanced ABCA1 expression, in vitro, via LXRα in macrophages. In addition, leaf extracts of a traditional Asian edible plant, <i>Nelumbo nucifera</i> (NNE), which contained abundant amounts of quercetin glycosides, significantly elevated plasma HDLC in mice.
Mukitake (<i>Sarcomyxa serotina</i>)	T-Cho ↓ T-TG ↓ (VLDL + LDL) /HDL-C ratio ↓	Mouse	Effect of Mukitake mushroom (<i>Panellus serotinus</i>) on the pathogenesis of lipid abnormalities in obese, diabetic ob/ob mice <i>Lipids Health Dis</i> . 2013 Feb 14;12:18. Nao Inoue et al	In ob/ob mice fed with mukitake, total serum cholesterol and total TG were significantly decreased in Mukitake-fed ob/ob mice. Moreover, the calculated atherogenic index (cholesterol ratio of [VLDL + LDL]/ HDL) was significantly lower (by 41%) in Mukitake-fed ob/ob mice compared with control-fed ob/ob mice.
Mulberry leaf extract	medium LDL ↑ very small LDL ↓ VLDL particle size ↓	Human	Effects of mulberry leaf extract rich in 1-deoxynojirimycin on blood lipid profiles in humans <i>Clin Biochem Nutr</i> . 2010 Sep;47(2):155-61. Yoshihiro Kojima et al	An open-label, single-group study was conducted in 10 subjects with initial serum TG level ≥200 mg/dL. Mulberry leaves are rich in 1-deoxynojirimycin (DNJ), an inhibitor of α-glucosidase. Use of mulberry leaf extract modestly decreased TG, and increased medium LDL-C and decreased very small LDL-C after 12-week intake. Also, the particle size of VLDL was significantly reduced.
Fish oil  Flaxseed oil	T-TG ↓ T-Cho ↓ LDL-C ↓ HDL-C ↑	Rat	A comparison of the effects of fish oil and flaxseed oil on cardiac allograft chronic rejection in rats <i>Am J Physiol Heart Circ Physiol</i> . 2008 Mar;294(3):H1452-8. Rgia A Othman et al	The effects of flaxseed and fish oils in a rat cardiac allograft model were compared. Treatment with fish oil significantly decreased plasma levels of TG, total cholesterol, and LDL-C. Treatment with flaxseed oil significantly increased plasma levels of HDL-C.
Young persimmon fruit	CM-C ↓ VLDL-C ↓ LDL-C ↓ T-TG ↓	Mouse	Hypolipidemic effect of young persimmon fruit in C57BL/6.KOR-ApoEshl mice <i>Biosci Biotechnol Biochem</i> . 2008 Oct;72(10):2651-9. Kenji Matsumoto et al	The hypolipidemic effects of young persimmon fruit (YP) on apoE-deficient C57BL/6.KOR-ApoEshl mice were investigated. YP treatment significantly lowered plasma CM-C, VLDL-C and LDL-C, and TG, and this response was accompanied by an elevation of fecal bile acid excretion. In the liver, SREBP-2 gene expression was significantly higher in mice fed YP, while the mRNA and protein levels of the LDL receptor did not change.
Royal jelly	T-Cho ↓ LDL-C ↓ small VLDL-C ↓	Human	Royal jelly supplementation improves lipoprotein metabolism in humans <i>J Nutr Sci Vitaminol (Tokyo)</i> . 2007 Aug;53(4):345-8. Hang Guo et al	Serum TC and LDL-C concentrations in the royal jelly group were significantly reduced compared with those in the control group. Among lipoprotein subfractions, small VLDL-C was significantly decreased after royal jelly intake.
Soybean beta-conglycinin 	T-TG ↓ VLDL-TG ↓	Human	Decreases in serum triacylglycerol and visceral fat mediated by dietary soybean beta-conglycinin <i>J Atheroscler Thromb</i> . 2006 Oct;13(5):247-55. Mitsutaka Kohno et al	The effects of soybean beta-conglycinin on lowering TG and lowering visceral fat were evaluated. In a study of 138 volunteers aged 26-69 years with TG concentrations above 1.69 mmol/L, total serum TG was significantly reduced in the soybean beta-conglycinin intake group compared to the placebo group. The mean concentration of VLDL-TG in the test group significantly decreased from the baseline value after 12 weeks. In a study of 102 volunteers aged 26-69 years with a body mass index (BMI) of 25-30 years, visceral fat was significantly reduced in the soybean beta-conglycinin intake group compared to the placebo group.
Goldenseal	CM-C ↓ VLDL-C ↓ LDL-C ↓ T-TG ↓	Hamster	The medicinal plant goldenseal is a natural LDL-lowering agent with multiple bioactive components and new action mechanisms <i>J Lipid Res</i> . 2006 Oct;47(10):2134-47. Parveen Abidi et al	Goldenseal treatment reduced levels in CM-associated cholesterol, VLDL-C and LDL-C without decreasing HDL-C in hyperlipidemic hamsters. The TG-lowering effect of goldenseal was also confirmed.

(Cho, C; Cholesterol TG; Triglyceride)

Please refer to each paper for the details of the research contents.

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