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Comparison of venous and fingertip plasma using non-targeted proteomics and metabolomics

Shin Nishiumi[1,*], Tomohiro Kohata[2], Takashi Kobayashi[1], Yuzo Kodama[1], Sumio Ohtsuki[2,3], Masaru Yoshida[1,3,4,*]

[1]Division of Gastroenterology, Department of Internal Medicine, Kobe University Graduate School of Medicine

[2]Department of Pharmaceutical Microbiology, Faculty of Life Sciences, Kumamoto University

[3]AMED-CREST, AMED

[4]Division of Metabolomics Research, Department of Internal Related, Kobe University Graduate School of Medicine

*Corresponding author: Division of Gastroenterology, Department of Internal Medicine, Kobe University Graduate School of Medicine, 7-5-1 Kusunoki-cho, Chu-o-ku, Kobe, Hyogo 650-0017, Japan

Phone: +81-78-382-6305; Fax: +81-78-382-6309

E-mail: nishiums@med.kobe-u.ac.jp (S.N.) & myoshida@med.kobe-u.ac.jp (M.Y.)

Abbreviations: LC/MS, liquid chromatography/mass spectrometry; FDR, false discovery rate; LC/QqQMS, liquid chromatography/triple quadrupole mass spectrometry; LC/QTOFMS, liquid chromatography/quadrupole time-of-flight mass spectrometry; SD, standard deviation; LPC, lysophosphatidylcholine.

Abstract

Blood tests, which are used to evaluate health status, are relatively non-invasive and provide a great deal of health-related information. Blood is usually collected using a standard venous blood sampling protocol, but it is possible to collect blood from a subject's fingertip, and previous studies have investigated whether fingertip-derived blood can be used for various blood tests. In this study, the proteomes and metabolomes of venous and fingertip plasma were analyzed using non-targeted proteomics and metabolomics, respectively. In proteomics, the levels of 523 proteins were compared between venous and fingertip plasma. The correlation coefficient (r) for the relationship between protein levels of venous and fingertip plasma was 0.9999. Some proteins had high fingertip to venous plasma level ratios (finger:venous ratios), whereas others had low finger:venous ratios, and the mean±standard deviation (SD) finger:venous ratio was 0.994±0.304. In metabolomics, 40, 33, and 216 cationic metabolites, anionic metabolites, and lipids, respectively, were detected in venous plasma, and the equivalent figures for fingertip plasma were 40, 35, and 216, respectively. Regarding the correlations between metabolite levels in venous and fingertip plasma, the correlation coefficients (r) for cationic metabolites, anionic metabolites, and lipids were 0.9952, 0.9699, and 0.9980, respectively. The mean±SD finger:venous ratio was 1.19±0.584 for cationic metabolites, 1.23±0.548 for anionic metabolites, and 1.00±0.245 for lipids. Our study suggests that it might be possible to use fingertip plasma to measure plasma protein and metabolite levels, and will contribute to development of a fingertip blood sampling procedure for measuring blood biomarker levels.

Keywords: venous plasma; fingertip plasma; proteomics; metabolomics.

Introduction

It is important for humans to maintain good health. In order to achieve this, it is useful to be able to assess people's health status. Health screening is one of the methods used to do this. In health screening, a variety of examinations, including physical (height, body weight, etc.), blood (glucose, triglycerides, cholesterol, etc.), urinary (glucose, protein, etc.), and imaging (X-ray, endoscopy, etc.) examinations, are carried out, and the subject's lifestyle habits (drinking, smoking, etc.) are also investigated. Among these examinations, blood tests are relatively non-invasive and can provide a great deal of health-related information. Blood is usually collected using a standard venous blood sampling protocol, followed by the separation of serum and plasma, except in tests of blood itself, for example the hematocyte test. However, some kits for collecting blood from subjects' fingertips have recently been developed, which can be used to measure the levels of certain molecules, such as glucose and triglycerides [1]. In addition, these kits make it possible for individuals to collect their own blood samples, which reduce the barriers to their usage.

In the medical field, studies involving searches for novel biomarkers that would facilitate the early detection of diseases or the monitoring of various conditions have been performed worldwide. In recent biomarker research, proteomics and metabolomics have been widely utilized as analytical procedures [2-4]. Proteomics (proteome analysis) is one of the omics, and it involves the large-scale study of the proteome, which is the set of proteins produced in an organism or biological material. Metabolomics (metabolome analysis), which is another of the omics, involves the

analysis of the metabolome; i.e., the low-molecular-weight metabolites, in an organism or biological material. Previous biomarker studies involving proteomics and/or metabolomics have analyzed the proteomes and metabolomes present in serum/plasma, saliva, urine, feces, or tissues, and a particularly large number of studies have evaluated the proteomes and metabolomes found in serum and plasma. In research based on proteomics and metabolomics, serum/plasma is separated from blood collected using the standard venous blood sampling protocol and then the levels of the target substances are measured. However, there have only been a few reports about the analysis of blood obtained from the fingertip using proteomics and/or metabolomics. Therefore, understanding the proteomic and metabolomic information in fingertip blood would aid the practical use of protein/metabolite blood biomarkers in the future. In this study, the proteomes and metabolomes in venous and fingertip plasma were compared via liquid chromatography/mass spectrometry (LC/MS)-based non-targeted proteomics and metabolomics, respectively.

Materials and Methods

Sample collection

The human samples were collected in accordance with the guidelines of Kobe University Hospital. The fingertip plasma samples were collected using the 'KANTAN SAIKETSU SET EIKEN', which is a finger-prick blood sample collection kit (EIKEN CHEMICAL, Tokyo, Japan). Specifically, each subject put a few drops of blood from their fingertip onto the pad contained in the finger-prick blood sample collection kit. The centrifugation machine included with the kit was then used to collect plasma

(centrifugation was performed at about 2,000 x g) after the blood had been treated with sodium heparin (an anticoagulant). The obtained plasma samples were transferred to clean tubes and stored at -80°C before being used. The venous plasma samples were prepared from blood samples obtained using the standard venous blood sampling protocol. To prepare the venous plasma samples, blood was obtained from the median cubital vein, and then the blood samples were collected in blood tubes containing sodium heparin as an anticoagulant (TERUMO, Tokyo, Japan), before being gently mixed. The blood samples were quickly chilled and stored using the Cube Cooler (FORTE GROW MEDICAL, Tochigi Japan). Next, the blood-containing tubes were centrifuged at 1,670 x g for 10 minutes at 4°C. The venous plasma samples were transferred to clean tubes and stored at -80°C before being used. The procedures used to collect the venous and fingertip plasma samples are described in **Figure S1**. The fingertip and venous blood samples were obtained from the same subjects, who fasted overnight prior to the sampling procedures. The fingertip blood was collected first, and the venous blood was collected 20 minutes later. During the blood collection, the person fasted, and furthermore, did not drink water.

Proteomics

The trypsin digestion was performed as described previously [5,6]. Briefly, 10 μL of 6-fold diluted plasma were denatured and solubilized in 12 mM sodium deoxycholate, 12 mM N-lauroylsarcosinate, and 100 mM Tris-HCl (pH 9.0). The samples were reduced in 10 mM dithiothreitol, alkylated in 55 mM iodoacetamide, and diluted 5-fold with 50 mM ammonium bicarbonate. Then, the samples were digested in lysyl endopeptidase for 3 hours at room temperature, before being digested in

sequence-grade modified trypsin for 16 hours at 37°C. After being subjected to desalting, the tryptic peptides were dissolved in 50 μL of 0.1% trifluoroacetic acid. The resultant peptide solution was diluted 20-fold, and 5-μL samples were subjected to nano-liquid chromatography-electrospray ionization-tandem mass spectrometry (LC-ESI-MS/MS) on a TripleTOF 5600 instrument (Sciex) connected to a DIONEX Ultimate 3000 RSLC nano system (Thermo Scientific, Waltham, MA, USA). The peptide samples were trapped with a nano-trap column (internal diameter [ID]: 100 μm, length: 2 cm, packed with 5 μm Acclaim PepMap100 C18; Thermo Scientific) and separated using an analytical nano-column (ID: 75 μm, length: 25 cm, packed with 2 μm Acclaim PepMap C18; Thermo Scientific).

For the protein identification, data were acquired in a data-dependent acquisition mode and analyzed using ProteinPilot 4.5 (Sciex). The protein identification confidence level for the dataset was evaluated based on the false discovery rate (FDR). A spectral library for SWATH-MS data was generated from the identification data for the same samples.

For protein quantification, data were acquired with a data-independent acquisition mode (SWATH-MS). The acquired data were imported into the peak view component of the SWATH Acquisition MicroApp (Sciex), and the target peptide peaks were identified. In addition, the SWATH-MS data were analyzed using the data extraction software Skyline and an in-house spectral library. The target peptide peaks were identified at an FDR of <1%, and all of the peaks were manually inspected. The levels of proteins were calculated based on the sum of the peak areas of unique tryptic peptides.

Metabolomics

In the analysis based on liquid chromatography/triple quadrupole mass spectrometry (LC/QqQMS), cationic and anionic metabolites (hydrophilic metabolites) and lipids (hydrophobic metabolites) were analyzed using three types of analytical systems. The hydrophilic metabolites were analyzed using slightly modified versions of the procedures described in our previous reports [7,8]. Briefly, 25 μL of each plasma sample were mixed with 900 μL of a solvent mixture (MeOH:H_2O:$CHCl_3$=2.5:1:1) containing 1 μM 10-camphorsulfonic acid and 1 μM 2-bromohypoxanthine as internal standards. The solution was subsequently shaken at 1,400 rpm for 30 minutes at 37°C, before being centrifuged at 16,000 × g for 3 minutes at 4°C. Then, 630 μL of the supernatant were mixed with 280 μL of distilled water. The resultant solution was centrifuged at 16,000 × g for 5 minutes at 4°C, and 500 μL of the supernatant were passed through an ultrafiltration filter (Amicon Ultra 0.5-mL centrifugal filters; Ultracel-3K, Merck Millipore, Germany) and then centrifuged at 14,000 × g for 60 minutes at 4°C, before being lyophilized. The lyophilized sample was reconstituted with 100 μL of distilled water, and the levels of hydrophilic metabolites in the resultant solution were measured using LC/MS. The LC/MS-based measurements of hydrophilic metabolite levels were obtained using a Nexera LC system (Shimadzu Co.), which was equipped with two LC-30AD pumps, a DGU-20As degasser, an SIL-30AC autosampler, a CTO-20AC column oven, and a CBM-20A control module and coupled with an LCMS-8040 (Shimadzu Co.). The cationic metabolites were separated with a pentafluorophenylpropyl column (Discovery HS F5; ID: 2.1 mm, length: 150 mm, particle size: 3 μm; SUPELCO, PA, USA) and a guard column (ID: 2.1 mm, length: 20 mm, particle size: 3 μm). The mobile phase used for the analysis of cationic metabolites

consisted of solvent A (0.1% formic acid in water) and solvent B (acetonitrile). The anionic metabolites were separated with an octadecylsilylated silica column (InertSustain C18; ID: 2.1 mm, length: 150 mm, particle size: 3 μm; GL Sciences, Tokyo, Japan). The mobile phase used for the analysis of anionic metabolites consisted of solvent A (water containing 15 mM acetic acid and 10 mM tributylamine) and solvent B (methanol). To identify the hydrophilic metabolites, the m/z value and retention time of each peak were compared with those of authentic chemical standards that had been analyzed using the same analytical methods. The peak area of each metabolite was normalized to that of the internal standard.

The hydrophobic metabolites were analyzed with slightly modified versions of the procedures described in our previous reports [7,8]. Briefly, 10 μL of each plasma sample were mixed with 90 μL of methanol containing 10 μL of 500 ppb dilauroylphosphatidylcholine (PC_12:0_12:0; Avanti Polar Lipids, AL, USA) dissolved in methanol as an internal standard. The solution was placed on ice for 10 minutes and then centrifuged at 16,000 × g for 5 minutes at 4°C. The levels of hydrophobic metabolites in the resultant supernatant were measured with LC/MS. During the LC/MS-based measurements, the hydrophobic metabolites were separated using an octadecylsilylated silica column (InertSustain C18; ID: 2.1 mm, length: 100 mm, particle size: 3 μm; GL Sciences, Tokyo, Japan) and a guard column (ID: 3 mm, length: 10 mm x mm, particle size: 5 μm). The mobile phase used for the lipid analysis consisted of solvent A (20 mM ammonium acetate in water) and solvent B (methanol). The putative identification of each peak was conducted based on m/z value and retention time data from an in-house library because appropriate chemical reference standards could not be obtained for all of the hydrophobic metabolites, and the peak

area of each metabolite was normalized to that of the internal standard.

Results

Proteomics

Our liquid chromatography/quadrupole time-of-flight mass spectrometry (LC/QTOFMS)-based system for analyzing proteins identified 523 proteins in the venous and fingertip plasma samples (**Table S1**). Then, the stability of the proteins in venous or fingertip plasma was analyzed using LC/QTOFMS based on their percentage relative standard deviation (RSD%) values. As a result, it was revealed that >90% of the proteins in both venous and fingertip plasma had RSD% values of between 0 and 20% (**Table S1, Figure 1**).

Next, the correlation between the protein levels of the venous and fingertip plasma samples was investigated (**Figure 2**). Accordingly, a strong correlation was detected between the protein levels of the venous and fingertip plasma samples ($r=0.9999$), although some proteins deviated from the observed linear relationship. Then, ratios of the relative level of each protein in fingertip plasma to that seen in venous plasma (the fingertip:venous ratio) were calculated. Some proteins had high ratios, whereas others had low ratios (**Figure 2**), and the proteins with ratios of >1.3 and <0.8 are listed in **Table 1**. The mean±standard deviation (SD) fingertip:venous ratio value was 0.994±0.304, and the fingertip:venous ratios exhibited an almost normal distribution (**Figure 2**).

Metabolomics

In this study, a wide variety of plasma metabolites were analyzed using three kinds of LC/QqQMS-based metabolite-analyzing platforms. In the LC/MS-based analysis, cationic metabolites, anionic metabolites, and lipids were analyzed using the three different platforms. In the LC/QqQMS-based analysis of cationic metabolites, 40 and 40 metabolites were detected in venous and fingertip plasma, respectively (**Table S2**). In the analysis of anionic metabolites, 33 and 35 metabolites were detected in venous and fingertip plasma, respectively (**Table S3**). In the lipid analysis, 216 and 216 metabolites were detected in venous and fingertip plasma, respectively (**Table S4**). Then, the stability of the metabolites detected in venous or fingertip plasma during the LC/QqQMS-based analysis was evaluated based on their RSD% values. Among all metabolites, the proportion of the metabolites that exhibited RSD% of between 0 and 20% was almost the same in both the venous and fingertip plasma (**Table S2-S4, Figure 3**). Regarding the proportions of cationic and anionic metabolites with RSD% values of between 0 and 10%, they were higher in venous plasma than in fingertip plasma (**Table S2-S3, Figure 3**).

Next, the correlations between the levels of each type of metabolite in venous and fingertip plasma were investigated using the three LC/QqQMS-based analytical platforms (**Figure 4**). As a result, strong correlations were detected between the metabolite levels detected in the two types of plasma, although some metabolites deviated from the observed linear relationships. The correlation coefficients (r) for the cationic metabolites, anionic metabolites, and lipids were 0.9952, 0.9699, and 0.9980, respectively. Then, the ratios of the relative level of each metabolite in fingertip plasma to that seen in venous plasma were calculated. Among the cationic and anionic metabolites, some metabolites had high fingertip:venous ratios, whereas others had low

fingertip:venous ratios (**Figure 4**), and the metabolites with fingertip:venous ratios of >1.5 or <0.7 are listed in **Table 2**. The mean±SD fingertip:venous ratio was 1.19±0.584 for the cationic metabolites and 1.23±0.548 for the anionic metabolites. Regarding lipids, the mean±SD fingertip:venous ratio was 1.00±0.245, and the fingertip:venous ratios exhibited a normal distribution. Some lipids had high fingertip:venous ratios, whereas others had low fingertip:venous ratios (**Figure 4**). The lipids with fingertip:venous ratios of >1.5 or <0.7 are listed in **Table 2**.

Discussion

In this study, the proteomes and metabolomes in plasma obtained from blood collected via a standard venous blood sampling protocol and a fingertip sampling protocol were analyzed and compared. As a result, it was found that the levels of some plasma proteins and metabolites differed between the venous and fingertip plasma samples, although most proteins and metabolites exhibited similar levels in both venous and fingertip plasma. Fingertip blood samples usually hemolyze more readily than venous blood samples. It is known that hemolysis affects the levels of proteins and metabolites in serum/plasma because the proteins and metabolites in erythrocytes can leak into serum/plasma [9,10]. For example, it was reported that the levels of lysophosphatidylcholine (LPC)_16:0 and LPC_18:0 were higher in plasma that had been subjected to hemolysis [9], although in the present study the levels of these LPC tended to be lower in the fingertip plasma samples than in the venous plasma samples (**Table S4**). As for proteins, a previous study reported that the level of aspartate aminotransferase, but not C-reactive protein, was increased by hemolysis [9]. In the

proteome analysis conducted in the current study, the levels of some hemoglobin subunits were higher in the fingertip plasma samples than in the venous plasma samples (**Table 1**). Hemoglobin is the iron-containing oxygen-transport metalloprotein found in erythrocytes, and the higher hemoglobin levels detected in fingertip plasma might be explained by hemolysis, although the occurrence of hemolysis in the fingertip plasma samples could not be confirmed visually in the present study. The fingertip:venous ratios of many proteins and metabolites were close to 1 (**Figures 2 and 4**) so the occurrence of slight hemolysis in the fingertip blood samples might not have had a big influence on their protein or metabolite profiles, although data relating to proteins and metabolites whose levels are markedly altered by hemolysis should be interpreted carefully. There are also other aspects of the analysis of proteins and metabolites via fingertip blood sampling that need to be taken into consideration. For example, it seems that the levels of platelet-related proteins are higher in fingertip plasma than venous plasma (**Table 1**). Platelet basic protein and fibronectin are involved in platelet activation and aggregation. In this study, sodium heparin was used as an anticoagulant during the collection of venous and fingertip plasma, and so anticoagulant reactions were occurring during the plasma sampling process. Therefore, the conditions of the anticoagulant reactions might have differed between the two sampling procedures, and the characteristics of fingertip blood collection kits might affect these conditions.

Interestingly, the levels of some free fatty acids were higher in fingertip plasma than in venous plasma (**Table 2**). The frequency of contamination with bodily/tissue fluids is higher among fingertip blood samples than among venous blood samples because the amount of blood collected from the fingertip is very small. As shown in **Table 2**, the fingertip plasma levels of some metabolites were higher than their venous

289 plasma levels, and contaminating bodily/tissue fluids might have influenced the
290 fingertip plasma levels of these metabolites, including the levels of some free fatty acids.
291 Denery JR et al. compared the metabolite levels of fingertip and venous blood samples
292 and suggested that differences such as those mentioned above are due to the surfactants
293 and detergents used to pretreat the skin in order to ensure that the samples are collected
294 in sterile conditions [11]. However, in our study, it was suggested that some of the
295 differences between fingertip and venous blood samples are due to hemolysis, which is
296 not related to the surfactants or detergents used to pretreat the skin. Taken together, the
297 results of our study were mainly due to the differences between venous and fingertip
298 plasma, although the effects of surfactants and detergents cannot be completely
299 ameliorated.

300 Recently, kits for collecting blood from the fingertip using simple sampling
301 procedures have been developed, which have made it easy to measure the levels of
302 certain molecules, including glucose and triglycerides [1], and these kits have been used
303 in a variety of situations. In addition, proteomic and metabolomic research has been
304 performed around the world to discover protein and metabolite biomarkers that would
305 aid the detection of diseases, the prediction of and decision-making regarding
306 therapeutic efficacy, the prediction of side effects, and/or the monitoring of patients'
307 conditions, and these biomarkers might be put to practical use in the future. In recent
308 studies, whole blood obtained from the fingertip was subjected to lipid analysis [12,13].
309 Our study suggests that it might be possible to use fingertip plasma for obtaining
310 measurements of protein and metabolite biomarker levels, although data regarding
311 proteins and metabolites whose levels differ markedly between venous and fingertip
312 plasma need to be analyzed carefully. Our findings will hopefully contribute to the

development of fingertip blood sampling procedures for measuring the levels of various molecules in blood.

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Disclosures/conflicts of interest

The authors have no conflicts of interest to declare.

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Figure legends

Figure 1. The analytical stability of the proteins detected in venous or fingertip plasma by an LC/MS-based protein-analyzing platform

The analytical stability of the proteins detected in venous or fingertip plasma by an LC/MS-based protein-analyzing platform was evaluated on the basis of their RSD% values. The percentage (%) values shown on each pie chart represent percentages of all of the proteins detected by the LC/MS-based protein-analyzing platform.

Figure 2. The correlations between the levels of proteins in venous and fingertip plasma according to an LC/MS-based protein-analyzing platform

The correlation between the proteins levels of venous and fingertip plasma was investigated using an LC/MS-based protein-analyzing platform. A correlation diagram is shown on the left side, and the numbers of metabolites in each fingertip:venous ratio category (fingertip:venous: ≤0.5, 0.5-0.7, 0.7-0.9, 0.9-1.1, 1.1-1.3, 1.3-1.5, >1.5) are indicated in the graph on the right side.

Figure 3. The analytical stability of the metabolites detected in venous or fingertip plasma by an LC/MS-based metabolite-analyzing platform

The analytical stability of the cationic metabolites (A), anionic metabolites (B), and lipids (C) detected in venous or fingertip plasma using three different kinds of LC/MS-based metabolite-analyzing platforms was evaluated on the basis of their RSD% values. The percentage (%) values on each pie chart represent percentages of all of the metabolites detected by the relevant LC/MS-based metabolite-analyzing platform.

Figure 4. The correlations between the levels of metabolites in venous and fingertip plasma according to three LC/MS-based metabolite-analyzing platforms

The correlations between the levels of cationic metabolites (A), anionic metabolites (B), or lipids (C) in venous and fingertip plasma according to three kinds of LC/MS-based metabolite analyzing platforms were determined. Correlation diagrams are shown on the left side, and the numbers of metabolites in each fingertip:venous ratio category (fingertip:venous: ≤0.5, 0.5-0.7, 0.7-0.9, 0.9-1.1, 1.1-1.3, 1.3-1.5, >1.5) are indicated in the graphs on the right side.

Table 1. The List of proteins with the higher and lower ratio (Fingertip/Venous)

Accession No.	Protein Name	Ratio (Fingertip/Venous)
sp|P49908|SEPP1_HUMAN	Selenoprotein P	0.72
sp|A0A075B6S2|KVD29_HUMAN	Immunoglobulin kappa variable 2D-29	0.72
sp|P04196|HRG_HUMAN	Histidine-rich glycoprotein	0.74
sp|Q9NXG0|CNTLN_HUMAN	Centlein	0.75
sp|Q14676|MDC1_HUMAN	Mediator of DNA damage checkpoint protein 1	0.75
sp|P06312|KV401_HUMAN	Immunoglobulin kappa variable 4-1	0.76
sp|Q9BQG0|MBB1A_HUMAN	Myb-binding protein 1A	0.77
sp|Q8NI35|INADL_HUMAN	InaD-like protein	0.79
sp|Q9UIA9|XPO7_HUMAN	Exportin-7	0.79
sp|A0A0B4J1U3|LV136_HUMAN	Immunoglobulin lambda variable 1-36	0.79
sp|A0A0A0MS15|HV349_HUMAN	Immunoglobulin heavy variable 3-49	0.79
sp|P0DOY2|IGLC2_HUMAN	Immunoglobulin lambda constant 2	1.31
sp|O75808|CAN15_HUMAN	Calpain-15	1.40
sp|O95714|HERC2_HUMAN	E3 ubiquitin-protein ligase HERC2	1.41
sp|Q5SZD4|GLYL3_HUMAN	Glycine N-acyltransferase-like protein 3	1.54
sp|P02775|CXCL7_HUMAN	Platelet basic protein	1.70
sp|P02766|TTHY_HUMAN	Transthyretin	2.25
sp|P69905|HBA_HUMAN	Hemoglobin subunit alpha	3.21
sp|P02042|HBD_HUMAN	Hemoglobin subunit delta	3.83
sp|P02008|HBAZ_HUMAN	Hemoglobin subunit zeta	3.83
sp|P68871|HBB_HUMAN	Hemoglobin subunit beta	3.84
sp|P02751|FINC_HUMAN	Fibronectin	4.45

The proteins with the ratio (The value in fingertip plasma/The value in venous plasma) more than 1.3 (higher) and less than 0.8 (lower) were listed in **Table 1**.

Table 2. The List of metabolites with the higher and lower ratio (Fingertip/Venous)

Name	Ratio (Fingertip/Venous)
Cationic metabolites	
Cytidine	0.38
L-Lysine	0.53
L-Ornithine	1.69
L-Pyroglutamic acid	1.70
L-Glutamate	2.27
Creatine	2.27
L-Asparate	2.43
N-Acetylneuraminic acid	2.71
Phosphocholine	3.07
Anionic metabolites	
Threonic acid	1.67
Glyceric acid	1.68
Oxalic acid	2.06
Phosphoric acid	2.08
Malic acid	2.36
3-Hydroxy-propionic acid	3.39
Lipids	
PE_18-2_18-3	0.52
PE_18-0_22-5	0.58
PE_16-0_16-1 + PE_14-0_18-1	0.62
LPE_16-0 (sn-1)	0.64
LPC_19-0 (sn-2)	0.65
PE_20-0e_20-4 & PE_18-0e_22-4	0.67
Acylcarnitine_8-0	0.69
Fatty acid_17-1 (n-7)	1.51
Fatty acid_18-3 (n-3) + Fatty acid_18-3 (n-6)	1.52
Fatty acid_18-2 (n-6)	1.52
Fatty acid_18-1 (n-9)_trans + Fatty acid_18-1 (n-7)_trans	1.52
Fatty acid_18-1 (n-9)_cis + Fatty acid_18-1 (n-7)_cis	1.55
Fatty acid_16-1 (n-7)	1.64
PE_17-0_18-2	1.71
Fatty acid_18-4 (n-3)	1.81
Fatty acid_12-0	3.09

The cationic metabolites, anionic metabolites, and lipids with the ratio (The normalized value in fingertip plasma/The normalized value in venous plasma) more than 1.5 (higher) and less than 0.7 (lower) were listed in **Table 2**. '+' means that multiple metabolites were detected at the same retention time, because their metabolites were not separated in our analyzing conditions. Ether-linked lipid species are labeled with 'e' (plasmanyl). LPC, lysophosphatidylcholine; LPE, lysophosphatidylethanolamine; PE, phosphatidylethanolamine.

402

Figure 1

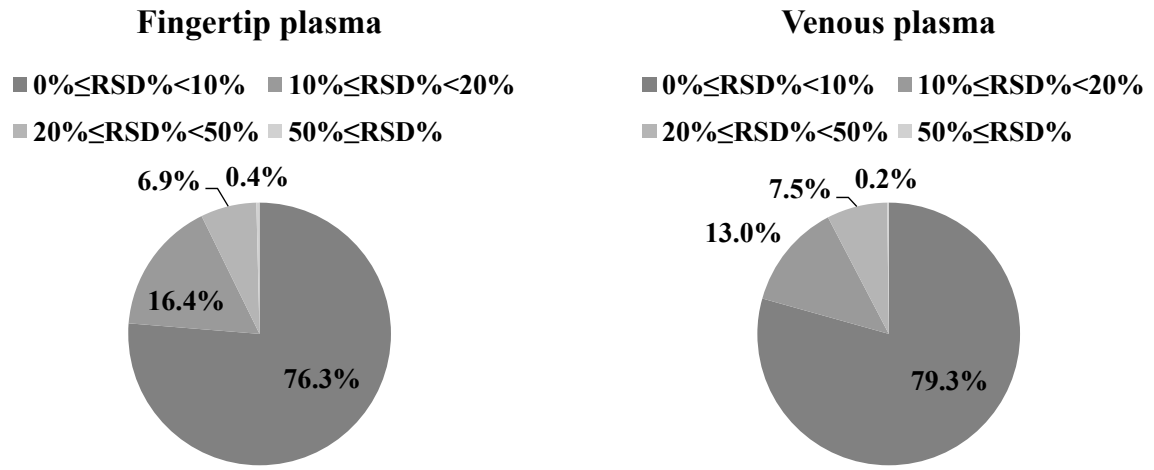
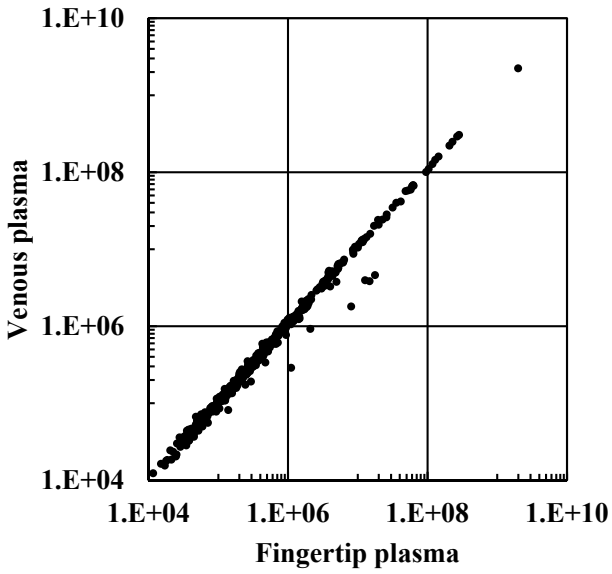

Fingertip plasma
0%≤RSD%<10%
10%≤RSD%<20%
20%≤RSD%<50%
50%≤RSD%
6.9%
0.4%
16.4%
76.3%
Venous plasma
0%≤RSD%<10%
10%≤RSD%<20%
20%≤RSD%<50%
50%≤RSD%
7.5%
0.2%
13.0%
79.3%

Figure 2


1.E+10
1.E+08
1.E+06
1.E+04
Venous plasma
1.E+04
1.E+06
1.E+08
1.E+10
Fingertip plasma

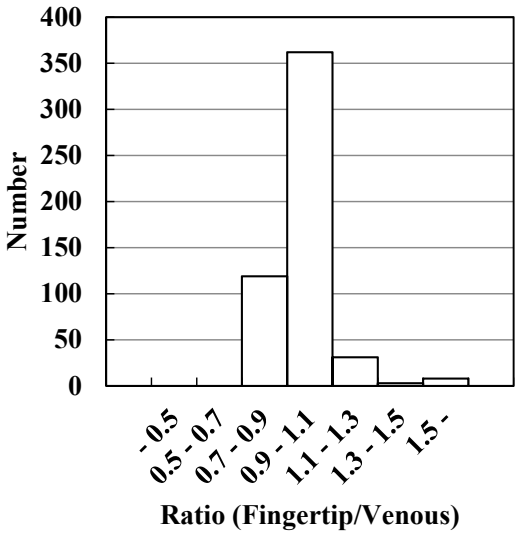

400
350
300
250
200
150
100
50
0
Number
- 0.5
0.5 - 0.7
0.7 - 0.9
0.9 - 1.1
1.1 - 1.3
1.3 - 1.5
1.5 -
Ratio (Fingertip/Venous)

Figure 3

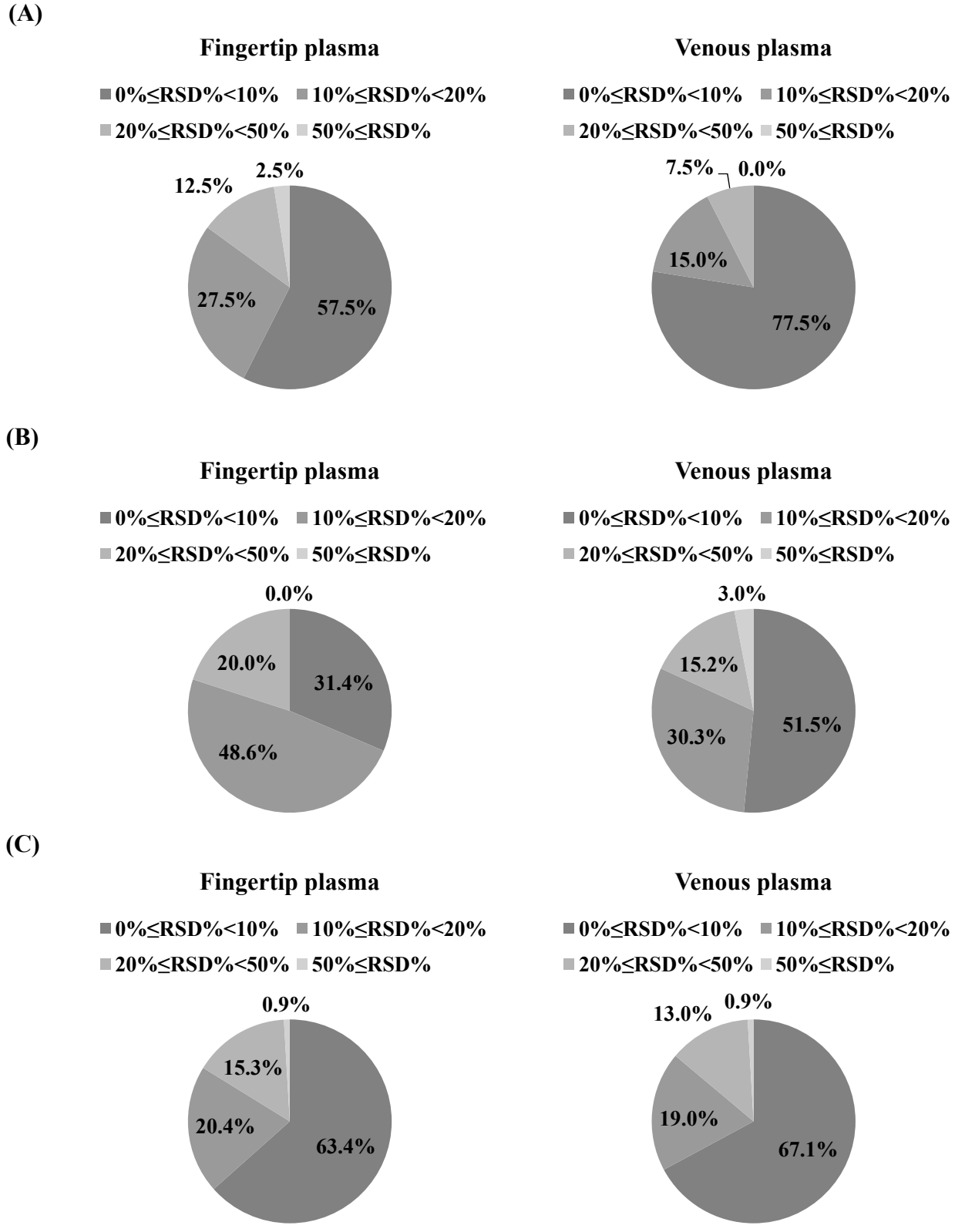

(A)
Fingertip plasma
0%≤RSD%<10%
10%≤RSD%<20%
20%≤RSD%<50%
50%≤RSD%
2.5%
12.5%
27.5%
57.5%
Venous plasma
0%≤RSD%<10%
10%≤RSD%<20%
20%≤RSD%<50%
50%≤RSD%
7.5%
0.0%
15.0%
77.5%
(B)
Fingertip plasma
0%≤RSD%<10%
10%≤RSD%<20%
20%≤RSD%<50%
50%≤RSD%
0.0%
20.0%
31.4%
48.6%
Venous plasma
0%≤RSD%<10%
10%≤RSD%<20%
20%≤RSD%<50%
50%≤RSD%
3.0%
15.2%
51.5%
30.3%
(C)
Fingertip plasma
0%≤RSD%<10%
10%≤RSD%<20%
20%≤RSD%<50%
50%≤RSD%
0.9%
15.3%
20.4%
63.4%
Venous plasma
0%≤RSD%<10%
10%≤RSD%<20%
20%≤RSD%<50%
50%≤RSD%
13.0%
0.9%
19.0%
67.1%

Figure 4

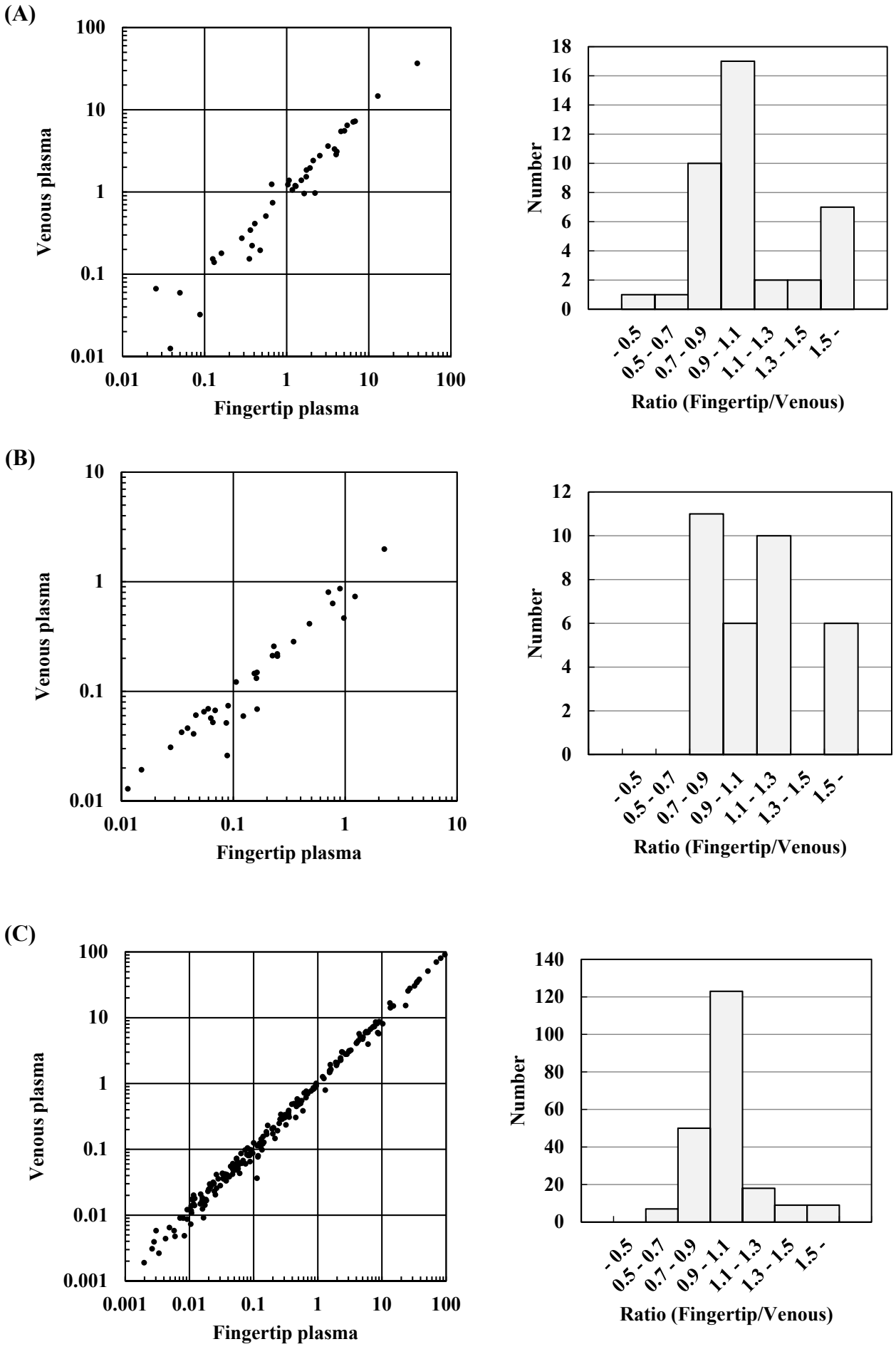

(A)
Venous plasma
Fingertip plasma
100
10
1
0.1
0.01
0.01
0.1
1
10
100
Number
Ratio (Fingertip/Venous)
- 0.5
0.5 - 0.7
0.7 - 0.9
0.9 - 1.1
1.1 - 1.3
1.3 - 1.5
1.5 -
(B)
Venous plasma
Fingertip plasma
Number
Ratio (Fingertip/Venous)
(C)
Venous plasma
Fingertip plasma
0.001
Number
Ratio (Fingertip/Venous)

Table 1. The List of proteins with the higher and lower ratio (Fingertip/Venous)

Accession No.	Protein Name	Ratio (Fingertip/Venous)
sp|P49908|SEPP1_HUMAN	Selenoprotein P	0.72
sp|A0A075B6S2|KVD29_HUMAN	Immunoglobulin kappa variable 2D-29	0.72
sp|P04196|HRG_HUMAN	Histidine-rich glycoprotein	0.74
sp|Q9NXG0|CNTLN_HUMAN	Centlein	0.75
sp|Q14676|MDC1_HUMAN	Mediator of DNA damage checkpoint protein 1	0.75
sp|P06312|KV401_HUMAN	Immunoglobulin kappa variable 4-1	0.76
sp|Q9BQG0|MBB1A_HUMAN	Myb-binding protein 1A	0.77
sp|Q8NI35|INADL_HUMAN	InaD-like protein	0.79
sp|Q9UIA9|XPO7_HUMAN	Exportin-7	0.79
sp|A0A0B4J1U3|LV136_HUMAN	Immunoglobulin lambda variable 1-36	0.79
sp|A0A0A0MS15|HV349_HUMAN	Immunoglobulin heavy variable 3-49	0.79
sp|P0DOY2|IGLC2_HUMAN	Immunoglobulin lambda constant 2	1.31
sp|O75808|CAN15_HUMAN	Calpain-15	1.40
sp|O95714|HERC2_HUMAN	E3 ubiquitin-protein ligase HERC2	1.41
sp|Q5SZD4|GLYL3_HUMAN	Glycine N-acyltransferase-like protein 3	1.54
sp|P02775|CXCL7_HUMAN	Platelet basic protein	1.70
sp|P02766|TTHY_HUMAN	Transthyretin	2.25
sp|P69905|HBA_HUMAN	Hemoglobin subunit alpha	3.21
sp|P02042|HBD_HUMAN	Hemoglobin subunit delta	3.83
sp|P02008|HBAZ_HUMAN	Hemoglobin subunit zeta	3.83
sp|P68871|HBB_HUMAN	Hemoglobin subunit beta	3.84
sp|P02751|FINC_HUMAN	Fibronectin	4.45

The proteins with the ratio (The value in fingertip plasma/The value in venous plasma) more than 1.3 (higher) and less than 0.8 (lower) were listed in **Table 1**.

Table 2. The List of metabolites with the higher and lower ratio (Fingertip/Venous)

Name	Ratio (Fingertip/Venous)
Cationic metabolites	
Cytidine	0.38
L-Lysine	0.53
L-Ornithine	1.69
L-Pyroglutamic acid	1.70
L-Glutamate	2.27
Creatine	2.27
L-Asparate	2.43
N-Acetylneuraminic acid	2.71
Phosphocholine	3.07
Anionic metabolites	
Threonic acid	1.67
Glyceric acid	1.68
Oxalic acid	2.06
Phosphoric acid	2.08
Malic acid	2.36
3-Hydroxy-propionic acid	3.39
Lipids	
PE_18-2_18-3	0.52
PE_18-0_22-5	0.58
PE_16-0_16-1 & PE_14-0_18-1	0.62
LPE_16-0 (sn-1)	0.64
LPC_19-0 (sn-2)	0.65
PE_20-0e_20-4 + PE_18-0e_22-4	0.67
Acylcarnitine_8-0	0.69
Fatty acid_17-1 (n-7)	1.51
Fatty acid_18-3 (n-3) + Fatty acid_18-3 (n-6)	1.52
Fatty acid_18-2 (n-6)	1.52
Fatty acid_18-1 (n-9)_trans + Fatty acid_18-1 (n-7)_trans	1.52
Fatty acid_18-1 (n-9)_cis + Fatty acid_18-1 (n-7)_cis	1.55
Fatty acid_16-1 (n-7)	1.64
PE_17-0_18-2	1.71
Fatty acid_18-4 (n-3)	1.81
Fatty acid_12-0	3.09

The cationic metabolites, anionic metabolites, and lipids with the ratio (The normalized value in fingertip plasma/The normalized value in venous plasma) more than 1.5 (higher) and less than 0.7 (lower) were listed in **Table 2**. '+' means that multiple metabolites were detected at the same retention time, because their metabolites were not separated in our analyzing conditions. Ether-linked lipid species are labeled with 'e' (plasmanyl). LPC, lysophosphatidylcholine; LPE, lysophosphatidylethanolamine; PE, phosphatidylethanolamine.

Fingertip plasma sampling

1. Hand washing with tap water
2. Washing and disinfecting of fingertip with ethanol cotton
3. Fingertip puncture
4. Blood collection with a Finger-prick blood sample collection kit
5. Centrifugation with a Finger-prick blood sample collection kit (about 2,000 x g)
6. Collection of plasma in 1.5-mL tube
7. Store at -80^{o}C after cooling on ice

Venous plasma sampling

1. Washing and disinfecting of arm with ethanol cotton
2. Usage of tourniquet
3. Venipuncture with 21-gauge needle
4. Blood collection with blood tube containing sodium heparin
5. Cooling of blood tube using Cube Cooler
6. Centrifugation (1,670 x g, 4^{o}C, 10 min)
7. Collection of plasma in 1.5-mL tube
8. Store at -80^{o}C after cooling on ice

Figure S1. The procedures used to collect the venous and fingertip plasma samples

Table S1. Comparision between fingertip and venous plasma in proteins.

Name	Average			RSD%	
	Fingertip plasma	Venous plasma	Fingertip/Venous	Fingertip plasma	Venous plasma
sp|P02751|FINC_HUMAN	8058146	1810584	4.45	0.36	0.87
sp|P68871|HBB_HUMAN	14779631	3849632	3.84	0.63	0.96
sp|P02008|HBAZ_HUMAN	1108465	289145	3.83	4.88	2.31
sp|P02042|HBD_HUMAN	17735342	4629999	3.83	1.91	1.55
sp|P69905|HBA_HUMAN	12754389	3974299	3.21	1.29	0.69
sp|P02766|TTHY_HUMAN	2088383	927482	2.25	0.39	1.39
sp|P02775|CXCL7_HUMAN	138820	81586	1.70	73.99	126.28
sp|Q5SZD4|GLYL3_HUMAN	294510	191587	1.54	3.95	0.86
sp|O95714|HERC2_HUMAN	245399	174398	1.41	7.93	4.62
sp|O75808|CAN15_HUMAN	474011	339613	1.40	2.65	5.55
sp|P0DOY2|IGLC2_HUMAN	4950076	3786427	1.31	2.21	2.54
sp|Q9UNN5|FAF1_HUMAN	70947	55658	1.27	5.74	2.31
sp|Q9Y2W1|TR150_HUMAN	34852	28333	1.23	5.12	20.71
sp|Q9BXI3|5NT1A_HUMAN	4030072	3284993	1.23	1.33	0.61
sp|Q00341|VIGLN_HUMAN	44963	36717	1.22	34.12	32.12
sp|P06310|KV230_HUMAN	936352	770845	1.21	2.04	5.50
sp|Q14554|PDIA5_HUMAN	104250	85845	1.21	4.10	8.82
sp|Q96RL1|UIMC1_HUMAN	69550	57277	1.21	25.67	28.68
sp|P01817|HV205_HUMAN	24725	20364	1.21	5.78	9.67
tr|A0A0G2JRQ6|A0A0G2JRQ6_HUMAN	93539	78019	1.20	0.93	5.03
sp|A0A075B6H9|LV469_HUMAN	59421	49819	1.19	1.05	11.82
sp|P14625|ENPL_HUMAN	24481	20669	1.18	39.17	28.43
sp|Q8NAX2|KDF1_HUMAN	51930	44109	1.18	20.56	33.24
sp|Q56VL3|OCAD2_HUMAN	158234	135024	1.17	43.00	36.17
sp|Q9Y6L6|SO1B1_HUMAN	25251	21560	1.17	27.05	42.27
sp|Q9Y2V7|COG6_HUMAN	716311	614330	1.17	1.59	0.28
sp|Q8N201|INT1_HUMAN	38285	32995	1.16	34.15	29.00
sp|P48741|HSP77_HUMAN	37663	32480	1.16	16.49	10.12
sp|P61326|MGN_HUMAN	1465172	1263958	1.16	3.56	5.66
sp|P35251|RFC1_HUMAN	125422	108227	1.16	24.34	27.73
tr|A0A075B7D0|A0A075B7D0_HUMAN	21311	18511	1.15	7.89	4.51
tr|A0A075B6R9|A0A075B6R9_HUMAN	1420178	1237409	1.15	2.91	2.64
sp|Q01082|SPTB2_HUMAN	180845	158450	1.14	6.68	14.54
sp|Q92752|TENR_HUMAN	673098	590045	1.14	10.75	13.48
sp|P51398|RT29_HUMAN	44736	39233	1.14	16.19	5.88
sp|P01706|LV211_HUMAN	125516	110077	1.14	0.17	1.78
sp|P20810|ICAL_HUMAN	38729	33996	1.14	13.77	22.07
sp|P46013|KI67_HUMAN	122946	110151	1.12	12.53	8.32
sp|Q5VZB9|DMRTA_HUMAN	347902	312293	1.11	15.97	20.90
sp|P07357|CO8A_HUMAN	188195	169512	1.11	8.55	6.70
sp|Q15477|SKIV2_HUMAN	518562	470595	1.10	10.83	5.73
sp|P01705|LV223_HUMAN	17138	15566	1.10	19.34	8.98
sp|P62266|RS23_HUMAN	123905	112747	1.10	9.50	3.62
sp|P55157|MTP_HUMAN	146688	133651	1.10	16.43	20.43
sp|Q13683|ITA7_HUMAN	36071	32948	1.09	11.81	18.21
sp|Q9BZ67|FRMD8_HUMAN	88786	81308	1.09	15.43	20.60
sp|Q7L576|CYFP1_HUMAN	59042	54084	1.09	13.01	12.75
sp|Q9UPN4|CP131_HUMAN	285504	261986	1.09	3.13	4.54
sp|Q14534|ERG1_HUMAN	89441	82245	1.09	5.25	10.54
sp|Q9UII2|ATIF1_HUMAN	1451858	1337424	1.09	8.28	11.78
sp|P22314|UBA1_HUMAN	53246	49311	1.08	42.24	36.21
sp|Q99715|COCA1_HUMAN	128066	118628	1.08	7.14	14.42
sp|Q8IXW5|RPAP2_HUMAN	154796	143425	1.08	2.07	1.78
sp|Q96DR4|STAR4_HUMAN	437211	405309	1.08	0.96	0.60
sp|Q9Y4K1|AIM1_HUMAN	680143	630826	1.08	8.16	9.56
sp|Q16610|ECM1_HUMAN	253230	235015	1.08	16.14	20.29
sp|P13639|EF2_HUMAN	46344	43112	1.07	47.92	39.92
sp|Q9P2J5|SYLC_HUMAN	161345	150382	1.07	1.75	3.19
sp|Q92499|DDX1_HUMAN	32917	30753	1.07	3.36	17.26
sp|P49411|EFTU_HUMAN	59672	55860	1.07	5.63	3.29
sp|Q9BQ52|RNZ2_HUMAN	34033	31861	1.07	3.37	10.18
sp|Q53R41|FAKD1_HUMAN	84506	79132	1.07	6.38	10.17
sp|Q12923|PTN13_HUMAN	264986	248460	1.07	8.05	8.54
sp|O15178|BRAC_HUMAN	127911	120078	1.07	26.99	32.55
sp|P12110|CO6A2_HUMAN	83288	78238	1.06	45.19	40.38
sp|Q8IY18|SMC5_HUMAN	258751	243077	1.06	12.82	11.42
sp|Q04721|NOTC2_HUMAN	207002	194550	1.06	6.60	3.11
sp|Q9Y2I1|NISCH_HUMAN	164388	154500	1.06	5.88	6.02
sp|Q9UNY4|TTF2_HUMAN	216591	203720	1.06	4.19	7.53
sp|Q96RS0|TGS1_HUMAN	227383	213887	1.06	5.58	4.10
sp|P30101|PDIA3_HUMAN	41530	39073	1.06	14.38	9.65
sp|P05089|ARGI1_HUMAN	387510	365353	1.06	19.83	20.25
sp|P40763|STAT3_HUMAN	185069	174836	1.06	5.10	4.68
sp|Q8NFQ8|TOIP2_HUMAN	112254	106335	1.06	7.72	7.12
sp|Q13461|FOXE3_HUMAN	115149	109192	1.05	11.27	7.36
sp|P84157|MXRA7_HUMAN	315036	298903	1.05	12.29	10.86
sp|P02745|C1QA_HUMAN	197954	188135	1.05	1.96	8.48

sp|Q13576|IQGA2_HUMAN	28645	27226	1.05	35.93	25.77
sp|Q9H2H9|S38A1_HUMAN	452686	430480	1.05	34.52	38.84
sp|P32780|TF2H1_HUMAN	139473	132692	1.05	32.87	26.29
sp|Q96EB1|ELP4_HUMAN	119883	114074	1.05	21.56	21.22
sp|P46940|IQGA1_HUMAN	518349	493408	1.05	3.06	3.54
sp|O60346|PHLP1_HUMAN	61343	58403	1.05	38.13	45.65
sp|P28331|NDUS1_HUMAN	248007	236163	1.05	22.15	26.97
sp|Q9NZU5|LMCD1_HUMAN	52914	50703	1.04	7.70	10.10
sp|Q12905|ILF2_HUMAN	67808	65037	1.04	41.21	37.76
sp|Q02790|FKBP4_HUMAN	421867	404771	1.04	13.42	11.12
sp|P35749|MYH11_HUMAN	367384	352605	1.04	6.87	1.46
sp|Q8NE71|ABCF1_HUMAN	1848554	1776844	1.04	2.43	2.73
sp|P00505|AATM_HUMAN	308666	296929	1.04	7.54	4.38
tr|G3V5I3|G3V5I3_HUMAN	63863	61520	1.04	8.91	10.18
sp|Q8WWQ8|STAB2_HUMAN	1734484	1670980	1.04	4.52	2.68
sp|Q9UPN9|TRI33_HUMAN	1103299	1063838	1.04	5.26	5.14
sp|A0A0C4DH41|HV461_HUMAN	1916775	1848402	1.04	2.05	2.79
sp|P04430|KV116_HUMAN	43857	42317	1.04	4.40	2.25
sp|Q16658|FSCN1_HUMAN	1202444	1160634	1.04	6.67	7.37
sp|P20700|LMNB1_HUMAN	305749	295727	1.03	2.22	9.35
sp|Q9H078|CLPB_HUMAN	549466	531912	1.03	3.24	1.99
sp|Q9BUK6|MSTO1_HUMAN	33936	32857	1.03	14.17	16.93
sp|Q8NCA5|FA98A_HUMAN	209393	202945	1.03	2.39	2.69
sp|P11182|ODB2_HUMAN	324026	314693	1.03	10.18	5.16
sp|P01714|LV319_HUMAN	376656	365839	1.03	0.91	3.74
sp|P62910|RL32_HUMAN	268902	261216	1.03	4.00	2.12
sp|Q09666|AHNK_HUMAN	111001	107947	1.03	2.75	8.42
sp|Q9UQ80|PA2G4_HUMAN	146182	142212	1.03	13.79	3.35
sp|Q9Y6W3|CAN7_HUMAN	515734	502026	1.03	6.44	2.08
sp|Q86YM7|HOME1_HUMAN	517311	504122	1.03	0.83	6.14
sp|Q9NS91|RAD18_HUMAN	419091	408527	1.03	3.77	6.20
sp|Q86TB9|PATL1_HUMAN	70243	68507	1.03	9.10	6.69
sp|Q9BTV4|TMM43_HUMAN	34757	33905	1.03	8.95	7.14
sp|Q96L58|B3GT6_HUMAN	429148	419838	1.02	4.61	3.04
sp|Q9H2G2|SLK_HUMAN	600256	587608	1.02	2.85	2.07
tr|A0A0A0MT69|A0A0A0MT69_HUMAN	127181	124538	1.02	3.77	7.28
sp|Q27J81|INF2_HUMAN	179902	176509	1.02	11.67	8.53
sp|P10768|ESTD_HUMAN	1293535	1269403	1.02	3.70	4.13
sp|Q9UIL8|PHF11_HUMAN	234940	230663	1.02	6.28	7.75
sp|Q9H2S9|IKZF4_HUMAN	131204	128841	1.02	7.47	5.36
sp|Q9NUQ6|SPS2L_HUMAN	480389	472116	1.02	7.38	2.42
sp|Q15149|PLEC_HUMAN	418885	411788	1.02	3.29	4.52
sp|Q9BYD1|RM13_HUMAN	97025	95574	1.02	8.79	1.11
sp|Q7Z406|MYH14_HUMAN	221795	218730	1.01	3.13	1.02
sp|P08514|ITA2B_HUMAN	167361	165070	1.01	3.36	5.32
sp|A0A075B6I1|LV460_HUMAN	18584	18334	1.01	0.88	8.11
sp|Q13618|CUL3_HUMAN	336058	331959	1.01	1.43	1.18
sp|A0A087WSY6|KVD15_HUMAN	1696896	1679192	1.01	2.49	4.46
sp|O60313|OPA1_HUMAN	203571	201722	1.01	3.16	5.42
sp|P52732|KIF11_HUMAN	361545	358714	1.01	8.07	9.06
sp|Q9BWM7|SFXN3_HUMAN	65729	65228	1.01	15.21	7.66
sp|O43704|ST1B1_HUMAN	232469	230980	1.01	2.11	4.45
sp|P00338|LDHA_HUMAN	205015	203909	1.01	16.62	14.23
sp|Q8IVF2|AHNK2_HUMAN	17895	17804	1.01	19.63	12.75
sp|O43795|MYO1B_HUMAN	1852991	1845517	1.00	9.18	3.37
sp|P49736|MCM2_HUMAN	47303	47136	1.00	11.33	6.73
sp|Q9H0P0|5NT3A_HUMAN	114392	114075	1.00	6.34	2.40
sp|P83731|RL24_HUMAN	162488	162139	1.00	6.19	1.71
sp|P22352|GPX3_HUMAN	134761	134537	1.00	9.99	6.22
sp|Q3KR16|PKHG6_HUMAN	225275	225085	1.00	0.38	11.99
sp|Q86YV5|PRAG1_HUMAN	137653	137542	1.00	1.95	4.21
sp|P18583|SON_HUMAN	246362	246252	1.00	14.16	9.04
sp|P50570|DYN2_HUMAN	377206	377042	1.00	1.62	3.52
sp|Q03591|FHR1_HUMAN	290841	291400	1.00	0.61	2.00
sp|P12270|TPR_HUMAN	188483	188918	1.00	2.09	4.16
sp|Q86X51|CX067_HUMAN	103492	103734	1.00	6.54	6.53
sp|Q16513|PKN2_HUMAN	432445	433998	1.00	5.86	2.51
sp|A0A075B6I0|LV861_HUMAN	1616831	1624317	1.00	2.37	3.62
sp|Q9Y3R0|GRIP1_HUMAN	190236	191197	0.99	11.30	3.88
sp|Q92667|AKAP1_HUMAN	195201	196237	0.99	3.80	4.85
sp|Q99569|PKP4_HUMAN	3436821	3457108	0.99	6.83	2.72
sp|Q8TAD7|OCC1_HUMAN	3319453	3340570	0.99	8.16	1.65
sp|P30040|ERP29_HUMAN	370762	373125	0.99	8.70	4.78
sp|O95907|MOT3_HUMAN	8660396	8720595	0.99	3.98	3.25
sp|Q9Y4D7|PLXD1_HUMAN	42981	43286	0.99	10.43	4.39
sp|Q03923|ZNF85_HUMAN	581262	586188	0.99	3.64	3.96
sp|P02671|FIBA_HUMAN	41344543	41709090	0.99	0.41	0.65
sp|Q8WVV4|POF1B_HUMAN	34011	34334	0.99	12.81	0.96
sp|Q9UL01|DSE_HUMAN	100812	101780	0.99	7.01	1.36
sp|O75592|MYCB2_HUMAN	156445	158057	0.99	15.25	15.25

sp|Q8WYA0|IFT81_HUMAN	1986675	2007498	0.99	4.40	1.76
sp|P31939|PUR9_HUMAN	422051	426537	0.99	4.06	0.48
sp|Q92985|IRF7_HUMAN	25794358	26086151	0.99	1.45	1.19
sp|Q4KWH8|PLCH1_HUMAN	110139	111421	0.99	7.93	14.34
sp|P01602|KV105_HUMAN	830652	840501	0.99	3.27	3.29
sp|P37802|TAGL2_HUMAN	547971	554562	0.99	4.51	5.85
sp|Q9NVN3|RIC8B_HUMAN	33096	33503	0.99	9.04	10.73
sp|Q9UHI5|LAT2_HUMAN	497079	503930	0.99	1.69	3.29
sp|Q96T51|RUFY1_HUMAN	579586	588021	0.99	5.55	5.71
sp|P23083|HV102_HUMAN	77219	78372	0.99	6.09	3.57
sp|P31943|HNRH1_HUMAN	86398	87758	0.98	12.79	9.56
sp|Q9P2B2|FPRP_HUMAN	74824	76112	0.98	11.17	12.11
sp|Q9BYB4|GNB1L_HUMAN	156344	159096	0.98	10.97	7.92
sp|Q6UVK1|CSPG4_HUMAN	512414	521490	0.98	1.52	3.65
sp|P18206|VINC_HUMAN	47201	48106	0.98	4.91	5.37
sp|P23142|FBLN1_HUMAN	271530	276825	0.98	3.74	2.32
sp|Q15942|ZYX_HUMAN	30486	31083	0.98	30.85	16.35
sp|Q96T60|PNKP_HUMAN	95280	97166	0.98	2.90	9.12
sp|P30305|MPIP2_HUMAN	195949	199862	0.98	11.72	8.41
sp|Q10713|MPPA_HUMAN	228998	233652	0.98	16.85	18.59
sp|P07942|LAMB1_HUMAN	105489	107647	0.98	6.51	4.58
sp|P42566|EPS15_HUMAN	1235568	1261371	0.98	1.51	2.54
sp|Q13112|CAF1B_HUMAN	202148	206423	0.98	7.59	5.40
sp|Q96KN2|CNDP1_HUMAN	31817	32498	0.98	1.56	6.71
tr|A0A075B6Z2|A0A075B6Z2_HUMAN	932461	952500	0.98	5.63	4.43
sp|Q13873|BMPR2_HUMAN	245146	250422	0.98	2.03	0.70
sp|O96017|CHK2_HUMAN	75580	77294	0.98	4.15	2.18
sp|P46939|UTRO_HUMAN	69811	71420	0.98	8.43	4.41
sp|Q04760|LGUL_HUMAN	429241	439363	0.98	3.60	0.91
sp|O43491|E41L2_HUMAN	150192	153744	0.98	15.87	10.50
sp|O15119|TBX3_HUMAN	508611	520732	0.98	2.78	1.66
sp|C9J069|CI172_HUMAN	3023396	3096084	0.98	0.90	2.59
sp|Q86XL3|ANKL2_HUMAN	279139	285912	0.98	1.13	5.19
sp|P01344|IGF2_HUMAN	66873	68517	0.98	11.32	5.51
sp|O00478|BT3A3_HUMAN	316206	324181	0.98	3.41	6.07
sp|P30085|KCY_HUMAN	87820	90036	0.98	4.78	0.35
sp|O75955|FLOT1_HUMAN	65908	67584	0.98	11.61	5.59
sp|Q8WWC4|MAIP1_HUMAN	357190	366325	0.98	19.73	9.65
sp|P29144|TPP2_HUMAN	152256	156154	0.98	7.27	6.18
sp|Q5J8X5|M4A13_HUMAN	459371	471198	0.97	3.99	7.91
sp|Q9HDC9|APMAP_HUMAN	1183697	1214505	0.97	1.64	3.30
sp|P38435|VKGC_HUMAN	100676	103298	0.97	9.22	13.05
sp|Q14587|ZN268_HUMAN	133655	137150	0.97	4.44	1.58
sp|P46821|MAP1B_HUMAN	668095	685602	0.97	4.51	2.34
sp|P51948|MAT1_HUMAN	64078	65783	0.97	10.14	15.57
sp|P36551|HEM6_HUMAN	855925	878898	0.97	2.90	4.36
sp|Q9NZB2|F120A_HUMAN	253447	260451	0.97	6.71	5.56
sp|P49327|FAS_HUMAN	229797	236541	0.97	14.67	5.70
sp|P01599|KV117_HUMAN	92041	94766	0.97	17.18	9.83
sp|Q86XZ4|SPAS2_HUMAN	561390	578301	0.97	8.08	7.35
sp|Q86WI1|PKHL1_HUMAN	375849	387476	0.97	1.47	3.44
sp|Q6WKZ4|RFIP1_HUMAN	223864	230814	0.97	3.37	2.38
sp|Q96HZ4|HES6_HUMAN	88371	91176	0.97	6.71	6.31
sp|P43246|MSH2_HUMAN	205015	211556	0.97	3.23	6.35
sp|P02746|C1QB_HUMAN	669322	690690	0.97	3.83	1.09
sp|Q9NSD9|SYFB_HUMAN	206333	213213	0.97	2.02	4.96
sp|Q9UGV2|NDRG3_HUMAN	632630	653766	0.97	4.48	3.22
sp|A0A0C4DH25|KVD20_HUMAN	4827543	4989687	0.97	0.70	2.59
sp|P09758|TACD2_HUMAN	729988	754618	0.97	6.91	5.33
sp|Q13356|PPIL2_HUMAN	457109	472613	0.97	17.76	13.22
sp|Q8N9R8|SCAI_HUMAN	1370884	1417512	0.97	1.29	3.20
sp|P02679|FIBG_HUMAN	57564579	59553657	0.97	0.82	0.37
sp|P05783|K1C18_HUMAN	237695	245914	0.97	5.43	4.88
sp|P03951|FA11_HUMAN	52702	54527	0.97	10.99	8.50
sp|Q9NZM1|MYOF_HUMAN	40503	41923	0.97	4.83	5.45
sp|A0A0A0MT36|KVD21_HUMAN	121858	126209	0.97	4.58	3.75
sp|Q99963|SH3G3_HUMAN	193573	200506	0.97	4.29	2.09
sp|Q99459|CDC5L_HUMAN	591724	613101	0.97	11.36	5.42
sp|P01877|IGHA2_HUMAN	494771	512657	0.97	1.98	1.62
sp|Q9ULC5|ACSL5_HUMAN	155381	161003	0.97	11.85	9.68
sp|Q14257|RCN2_HUMAN	510464	529117	0.96	7.88	7.58
tr|A0A0J9YY99|A0A0J9YY99_HUMAN	878239	910392	0.96	5.14	5.44
sp|Q15645|PCH2_HUMAN	230147	238603	0.96	11.27	17.80
sp|Q71RC2|LARP4_HUMAN	246505	255579	0.96	11.16	11.27
sp|Q9UG63|ABCF2_HUMAN	22575	23429	0.96	2.46	15.82
sp|O60240|PLIN1_HUMAN	359826	373605	0.96	4.02	1.37
sp|Q9Y6E2|BZW2_HUMAN	1156995	1201783	0.96	2.30	6.18
sp|P21964|COMT_HUMAN	928007	964142	0.96	2.69	1.77
sp|O14841|OPLA_HUMAN	1565350	1626744	0.96	4.52	5.24
sp|Q8N6L0|KASH5_HUMAN	4338668	4509485	0.96	3.67	2.45

sp|P40926|MDHM_HUMAN	609124	633140	0.96	17.70	3.31
sp|Q9BYX2|TBD2A_HUMAN	145890	151675	0.96	6.49	6.65
sp|P06865|HEXA_HUMAN	656375	682454	0.96	6.99	6.29
sp|Q14764|MVP_HUMAN	83175	86486	0.96	5.42	3.27
sp|Q9Y5Y7|LYVE1_HUMAN	30604	31828	0.96	11.43	9.39
sp|Q9BUL8|PDC10_HUMAN	655986	682270	0.96	3.13	1.62
sp|Q14137|BOP1_HUMAN	2145521	2232542	0.96	2.79	3.60
sp|P05107|ITB2_HUMAN	107436	111845	0.96	6.08	6.08
sp|Q9NRF8|PYRG2_HUMAN	177389	184670	0.96	3.29	7.05
sp|Q9Y490|TLN1_HUMAN	319209	332541	0.96	5.72	7.11
tr|K7ER74|K7ER74_HUMAN	630435	657053	0.96	0.58	3.28
sp|P43897|EFTS_HUMAN	354469	369478	0.96	13.61	6.98
sp|P62826|RAN_HUMAN	92617	96562	0.96	11.46	6.41
sp|O75420|GGYF1_HUMAN	185849	193866	0.96	1.70	6.08
sp|Q9BTW9|TBCD_HUMAN	197370	205892	0.96	5.50	8.39
sp|P00740|FA9_HUMAN	69688	72823	0.96	4.51	7.34
sp|Q5TKA1|LIN9_HUMAN	66253	69283	0.96	4.51	6.63
sp|P04220|MUCB_HUMAN	19992948	20908490	0.96	8.07	8.77
sp|P07305|H10_HUMAN	298692	312500	0.96	1.14	1.31
sp|P60228|EIF3E_HUMAN	86078	90060	0.96	6.12	7.71
sp|Q9H270|VPS11_HUMAN	464601	486175	0.96	1.81	4.85
sp|Q9Y3P9|RBGP1_HUMAN	126348	132267	0.96	6.80	4.45
sp|Q86W92|LIPB1_HUMAN	147543	154514	0.95	12.20	9.64
sp|O00291|HIP1_HUMAN	487714	511000	0.95	6.76	3.47
sp|Q8N4L2|TM55A_HUMAN	73066	76612	0.95	11.16	10.48
sp|Q9HCZ1|ZN334_HUMAN	684075	717285	0.95	1.44	1.57
sp|P43251|BTD_HUMAN	78088	81904	0.95	4.55	7.94
sp|Q9UGM5|FETUB_HUMAN	131740	138222	0.95	7.76	9.65
sp|O60942|MCE1_HUMAN	575682	604131	0.95	0.93	3.72
sp|P22234|PUR6_HUMAN	69331	72783	0.95	9.45	10.97
sp|Q96MM6|HS12B_HUMAN	643383	675691	0.95	6.67	8.60
sp|Q9Y4P8|WIPI2_HUMAN	11793667	12386819	0.95	6.76	6.13
sp|P01860|IGHG3_HUMAN	10044967	10556053	0.95	0.76	0.89
sp|Q643R3|LPCT4_HUMAN	254666	267632	0.95	8.79	6.92
sp|Q9H6Y2|WDR55_HUMAN	615166	646519	0.95	7.09	4.21
sp|P02652|APOA2_HUMAN	15096326	15875628	0.95	0.84	1.68
sp|Q9Y228|T3JAM_HUMAN	495886	521521	0.95	4.30	3.31
sp|P02786|TFR1_HUMAN	147860	155505	0.95	4.03	7.82
sp|P61626|LYSC_HUMAN	153739	161787	0.95	15.54	5.99
sp|P02675|FIBB_HUMAN	63359269	66677291	0.95	0.63	0.78
sp|Q9P0J1|PDP1_HUMAN	122874	129350	0.95	4.41	2.31
sp|Q7Z3C6|ATG9A_HUMAN	112269	118188	0.95	13.15	5.10
sp|Q92835|SHIP1_HUMAN	342452	360518	0.95	5.16	1.38
sp|Q9Y265|RUVB1_HUMAN	86117	90688	0.95	15.41	11.62
sp|P04180|LCAT_HUMAN	103805	109326	0.95	9.65	14.35
sp|Q76FK4|NOL8_HUMAN	556589	586295	0.95	5.90	3.13
sp|Q8IWE4|DCNL3_HUMAN	366998	386807	0.95	10.57	8.19
sp|P00748|FA12_HUMAN	237757	250595	0.95	9.37	9.37
sp|Q9NQ48|LZTL1_HUMAN	330600	348535	0.95	2.52	11.30
sp|P22692|IBP4_HUMAN	127088	134000	0.95	7.93	8.64
sp|Q9H0H5|RGAP1_HUMAN	96538	101874	0.95	6.76	2.31
sp|Q15582|BGH3_HUMAN	28220	29790	0.95	15.20	16.73
sp|Q66K66|TM198_HUMAN	692705	731391	0.95	6.92	2.73
sp|P05090|APOD_HUMAN	1597277	1688146	0.95	1.62	0.18
sp|Q15018|F175B_HUMAN	83609	88368	0.95	3.40	4.84
sp|P85037|FOXK1_HUMAN	71265	75322	0.95	18.54	4.51
sp|Q14204|DYHC1_HUMAN	682731	722172	0.95	8.85	1.95
sp|P49815|TSC2_HUMAN	65363	69140	0.95	3.01	11.49
sp|O75521|ECI2_HUMAN	304293	321942	0.95	9.94	7.81
sp|Q9H788|SH24A_HUMAN	71874	76065	0.94	24.86	29.76
sp|P01009|A1AT_HUMAN	95534910	101107378	0.94	0.91	0.57
sp|P13807|GYS1_HUMAN	1919621	2032015	0.94	1.75	3.40
sp|Q8WW38|FOG2_HUMAN	193414	204753	0.94	11.08	13.66
sp|Q8TB37|NUBPL_HUMAN	208939	221251	0.94	2.60	7.65
sp|P51659|DHB4_HUMAN	272185	288262	0.94	1.96	1.41
sp|P62495|ERF1_HUMAN	56931	60348	0.94	8.20	8.43
sp|Q9Y6K9|NEMO_HUMAN	129582	137400	0.94	2.62	2.22
sp|Q15166|PON3_HUMAN	330316	350364	0.94	2.21	1.46
sp|Q96EV2|RBM33_HUMAN	562005	596140	0.94	9.11	5.16
sp|Q96IY4|CBPB2_HUMAN	145881	154744	0.94	1.88	4.13
sp|Q9HAU0|PKHA5_HUMAN	152945	162331	0.94	6.27	5.63
sp|Q63HN8|RN213_HUMAN	11643	12358	0.94	5.64	13.06
sp|P15169|CBPN_HUMAN	95492	101514	0.94	8.73	3.84
sp|Q8N4T8|CBR4_HUMAN	363047	386260	0.94	13.32	9.96
tr|A0A096LPE2|A0A096LPE2_HUMAN	871837	927678	0.94	1.67	1.60
sp|P05155|IC1_HUMAN	8638146	9193994	0.94	1.94	0.70
sp|P01859|IGHG2_HUMAN	103961240	110652405	0.94	0.41	0.50
sp|P20851|C4BPB_HUMAN	195338	207935	0.94	11.54	9.31
sp|Q8IYB7|DI3L2_HUMAN	1465051	1560298	0.94	6.76	1.53
sp|P08684|CP3A4_HUMAN	494490	526880	0.94	6.11	7.91

sp|P01701|LV151_HUMAN	717886	765789	0.94	2.05	1.55
sp|P01766|HV313_HUMAN	140977	150407	0.94	0.49	3.99
sp|Q16537|2A5E_HUMAN	109873	117241	0.94	8.67	5.31
sp|Q92621|NU205_HUMAN	418085	446407	0.94	3.43	4.29
sp|P09871|C1S_HUMAN	972512	1038465	0.94	1.09	1.21
sp|Q6P1N0|C2D1A_HUMAN	130076	138949	0.94	8.66	13.48
sp|P15924|DESP_HUMAN	146947	156980	0.94	3.39	4.79
sp|Q8IWA0|WDR75_HUMAN	1604474	1714459	0.94	4.60	6.42
sp|Q9BXJ9|NAA15_HUMAN	5183891	5539474	0.94	7.05	4.78
sp|Q6ZUS5|CC121_HUMAN	291172	311430	0.93	5.43	3.20
sp|Q6P9F7|LRC8B_HUMAN	71165	76201	0.93	12.47	7.44
sp|O75015|FCG3B_HUMAN	151431	162158	0.93	6.51	3.33
sp|P35900|K1C20_HUMAN	341874	366252	0.93	2.45	2.22
sp|Q9Y6N5|SQOR_HUMAN	185996	199269	0.93	10.15	5.08
sp|Q9H4L5|OSBL3_HUMAN	66540	71368	0.93	8.59	7.24
sp|A0A075B6K4|LV310_HUMAN	643276	690065	0.93	1.88	1.74
sp|Q9Y3Z3|SAMH1_HUMAN	654532	702491	0.93	28.63	31.23
sp|P16144|ITB4_HUMAN	145683	156494	0.93	13.39	9.33
sp|A0A0B4J2H0|HV69D_HUMAN	1245881	1338386	0.93	1.44	0.96
sp|P01834|IGKC_HUMAN	207061590	222624319	0.93	0.59	0.47
sp|P01011|AACT_HUMAN	22679862	24398112	0.93	0.28	0.82
sp|P80108|PHLD_HUMAN	174021	187338	0.93	2.33	3.42
sp|A0A075B6I9|LV746_HUMAN	652589	703191	0.93	4.44	0.93
sp|P00736|C1R_HUMAN	1361683	1467398	0.93	1.55	1.95
sp|P06396|GELS_HUMAN	3722542	4011882	0.93	1.33	1.17
sp|P43490|NAMPT_HUMAN	1307502	1410325	0.93	4.47	7.48
sp|P30084|ECHM_HUMAN	172528	186101	0.93	4.29	10.70
sp|O43815|STRN_HUMAN	171252	184725	0.93	9.78	13.53
sp|P02765|FETUA_HUMAN	13351900	14404806	0.93	0.81	0.57
sp|Q16719|KYNU_HUMAN	58854	63555	0.93	22.29	27.51
sp|Q9BPZ7|SIN1_HUMAN	744098	803650	0.93	4.67	5.08
sp|A0A0B4J1V1|HV321_HUMAN	3148307	3401027	0.93	3.32	2.65
sp|P98082|DAB2_HUMAN	15110	16332	0.93	24.36	15.87
sp|P06727|APOA4_HUMAN	11777920	12735638	0.92	0.43	0.43
sp|Q13085|ACACA_HUMAN	63257	68435	0.92	7.18	14.37
sp|P01857|IGHG1_HUMAN	282945920	306206339	0.92	0.61	0.38
sp|Q13740|CD166_HUMAN	98775	106918	0.92	9.61	6.78
sp|P02747|C1QC_HUMAN	1840001	1992464	0.92	0.92	1.58
sp|A0M8Q6|IGLC7_HUMAN	62389408	67595641	0.92	0.41	0.70
sp|P61086|UBE2K_HUMAN	154645	167568	0.92	11.94	12.16
sp|P01871|IGHM_HUMAN	118045383	127939273	0.92	0.27	0.67
sp|P41252|SYIC_HUMAN	65907	71473	0.92	6.52	8.87
sp|Q96IU4|ABHEB_HUMAN	407976	442443	0.92	16.11	19.38
sp|P01591|IGJ_HUMAN	5275664	5724423	0.92	0.29	1.69
sp|Q8IWB7|WDFY1_HUMAN	136417	148058	0.92	16.19	13.25
sp|P05165|PCCA_HUMAN	100056	108596	0.92	4.53	4.83
sp|P02774|VTDB_HUMAN	26083764	28361370	0.92	1.83	0.86
sp|P02647|APOA1_HUMAN	228956904	249024503	0.92	0.19	0.47
sp|P08754|GNAI3_HUMAN	144099	156742	0.92	6.12	6.04
sp|P01593|KVD33_HUMAN	274084	298155	0.92	6.83	1.52
sp|P00747|PLMN_HUMAN	12306999	13391530	0.92	0.51	0.40
sp|P07358|CO8B_HUMAN	313180	340798	0.92	3.00	5.97
sp|P15814|IGLL1_HUMAN	156118	170207	0.92	4.49	10.67
sp|Q8N8Y2|VA0D2_HUMAN	645873	704294	0.92	3.85	3.01
sp|O14791|APOL1_HUMAN	369518	402992	0.92	3.57	4.23
sp|P13671|CO6_HUMAN	1236738	1350352	0.92	0.97	3.73
sp|O43866|CD5L_HUMAN	6148225	6718485	0.92	1.45	1.02
sp|A0A0C4DH31|HV118_HUMAN	1570570	1717815	0.91	1.65	2.21
sp|P01876|IGHA1_HUMAN	62182458	68030352	0.91	0.41	1.12
sp|P00738|HPT_HUMAN	59897249	65552583	0.91	0.41	0.59
sp|A0A075B6P5|KV228_HUMAN	4577454	5011164	0.91	0.48	1.36
sp|P02787|TRFE_HUMAN	266299003	291763062	0.91	0.49	0.21
sp|A0A0B4J1Y9|HV372_HUMAN	399198	437620	0.91	1.12	3.01
sp|P35240|MERL_HUMAN	179258	196512	0.91	13.66	12.94
sp|P20839|IMDH1_HUMAN	185522	203412	0.91	5.66	11.18
sp|Q9NZP8|C1RL_HUMAN	36878	40465	0.91	7.39	2.27
sp|P78527|PRKDC_HUMAN	236962	260224	0.91	26.43	31.49
sp|P18428|LBP_HUMAN	149273	164048	0.91	1.25	5.49
sp|P24821|TENA_HUMAN	38063	41851	0.91	11.70	7.52
sp|A0A0C4DH38|HV551_HUMAN	765949	843604	0.91	2.54	0.52
sp|P02649|APOE_HUMAN	4486954	4943307	0.91	0.79	0.52
sp|Q9UNS2|CSN3_HUMAN	83064	91534	0.91	23.02	24.86
sp|B9A064|IGLL5_HUMAN	31583572	34855714	0.91	2.66	3.13
sp|Q5VST9|OBSCN_HUMAN	3826748	4223476	0.91	2.72	1.32
tr|B4E1Z4|B4E1Z4_HUMAN	12287812	13569726	0.91	1.04	0.27
sp|Q14520|HABP2_HUMAN	50205	55443	0.91	5.22	8.45
sp|P01780|HV307_HUMAN	3325123	3674493	0.90	1.50	1.50
sp|P02748|CO9_HUMAN	1877806	2075299	0.90	1.24	0.29
sp|Q9BY77|PDIP3_HUMAN	194930	215520	0.90	1.54	4.18
sp|P05452|TETN_HUMAN	460502	509342	0.90	1.92	3.66

sp|A0A0B4J1X8|HV343_HUMAN	251261	278638	0.90	4.78	1.83
sp|O94874|UFL1_HUMAN	200134	222092	0.90	9.56	12.79
sp|O75636|FCN3_HUMAN	47889	53146	0.90	11.68	7.44
sp|P04004|VTNC_HUMAN	9618646	10675301	0.90	0.51	0.47
sp|P04114|APOB_HUMAN	52469979	58236787	0.90	0.14	0.47
sp|O43432|IF4G3_HUMAN	326601	362578	0.90	17.21	10.79
tr|A0A0C4DH35|A0A0C4DH35_HUMAN	494459	549173	0.90	4.16	0.59
sp|P01023|A2MG_HUMAN	144152654	160198437	0.90	0.45	0.57
sp|P35606|COPB2_HUMAN	248205	275852	0.90	11.85	12.95
tr|A0A075B7D8|A0A075B7D8_HUMAN	78124	86926	0.90	5.64	4.30
sp|P02760|AMBP_HUMAN	6247611	6956675	0.90	1.32	0.64
tr|A0A075B7B8|A0A075B7B8_HUMAN	1418887	1579970	0.90	1.47	0.74
sp|Q9NYU2|UGGG1_HUMAN	144164	160559	0.90	6.86	13.61
sp|Q13790|APOF_HUMAN	357718	398904	0.90	3.20	1.09
sp|P30825|CTR1_HUMAN	267090	298219	0.90	2.41	4.78
tr|A0A075B7E8|A0A075B7E8_HUMAN	1025517	1145335	0.90	1.39	1.12
sp|Q15848|ADIPO_HUMAN	37248	41604	0.90	8.32	2.85
sp|Q08426|ECHP_HUMAN	665514	743387	0.90	3.83	5.28
tr|A0A075B6K5|A0A075B6K5_HUMAN	435726	486951	0.89	0.19	2.74
sp|O95445|APOM_HUMAN	1991348	2226140	0.89	0.44	1.70
sp|P17936|IBP3_HUMAN	81772	91431	0.89	20.14	5.01
sp|P01042|KNG1_HUMAN	11403271	12754555	0.89	0.61	0.61
sp|P19823|ITIH2_HUMAN	11951646	13380639	0.89	0.39	0.35
sp|P00734|THRB_HUMAN	9545270	10688632	0.89	1.15	0.61
sp|O75147|OBSL1_HUMAN	139990	156860	0.89	24.84	19.07
sp|P01031|CO5_HUMAN	3692921	4138614	0.89	1.20	1.33
sp|P02749|APOH_HUMAN	10437994	11705861	0.89	0.73	0.32
sp|P01703|LV140_HUMAN	201615	226306	0.89	1.60	4.03
sp|P08603|CFAH_HUMAN	11254664	12641815	0.89	0.78	0.76
sp|P27918|PROP_HUMAN	34042	38240	0.89	5.63	7.60
sp|P03952|KLKB1_HUMAN	649647	729880	0.89	1.54	2.03
sp|P02768|ALBU_HUMAN	1995836945	2243447578	0.89	0.28	0.20
sp|P06681|CO2_HUMAN	115934	130381	0.89	4.97	5.48
sp|P01024|CO3_HUMAN	129140861	145243321	0.89	0.15	0.59
sp|P25789|PSA4_HUMAN	41773	46991	0.89	5.44	13.58
sp|A0A075B6J9|LV218_HUMAN	77019	86668	0.89	6.57	6.75
sp|Q96JH7|VCIP1_HUMAN	301898	339739	0.89	6.92	6.54
sp|P0C0L4|CO4A_HUMAN	35787175	40273470	0.89	0.72	1.14
sp|A0A0B4J1V0|HV315_HUMAN	2865168	3226625	0.89	1.76	1.83
sp|A0A075B6R2|HV404_HUMAN	684027	771012	0.89	3.06	4.15
sp|P12004|PCNA_HUMAN	149379	168608	0.89	3.43	16.00
sp|Q86WN1|FCSD1_HUMAN	52888	59728	0.89	10.61	7.97
sp|P01700|LV147_HUMAN	1175237	1327587	0.89	2.74	1.62
sp|P10643|CO7_HUMAN	1106669	1251016	0.88	0.81	1.63
sp|P05156|CFAI_HUMAN	407552	460858	0.88	0.48	3.09
sp|P01743|HV146_HUMAN	37297	42179	0.88	15.61	5.94
sp|Q08380|LG3BP_HUMAN	218298	246932	0.88	7.75	10.85
sp|P01619|KV320_HUMAN	3574467	4044022	0.88	2.59	0.65
sp|Q9BRK4|LZTS2_HUMAN	467008	528472	0.88	8.24	8.74
sp|P35858|ALS_HUMAN	1649981	1868751	0.88	1.73	3.12
sp|P27169|PON1_HUMAN	2555863	2902843	0.88	1.49	1.30
sp|Q05707|COEA1_HUMAN	65553	74489	0.88	13.74	11.32
sp|P08697|A2AP_HUMAN	3246567	3708142	0.88	1.44	0.30
sp|P07360|CO8G_HUMAN	317972	363636	0.87	1.00	4.36
sp|P43652|AFAM_HUMAN	2642752	3026845	0.87	0.34	0.28
sp|P02743|SAMP_HUMAN	1964824	2250513	0.87	0.48	1.02
sp|A0A0A0MRZ8|KVD11_HUMAN	3126707	3582833	0.87	0.69	0.83
sp|P04217|A1BG_HUMAN	11455708	13143630	0.87	0.58	0.94
sp|P05546|HEP2_HUMAN	3742979	4295234	0.87	0.79	0.78
sp|P26038|MOES_HUMAN	31660	36337	0.87	10.18	7.31
tr|A0A0B4J2B5|A0A0B4J2B5_HUMAN	8659664	9946235	0.87	1.57	2.25
sp|O43310|CTIF_HUMAN	587784	676306	0.87	2.77	5.41
sp|P19827|ITIH1_HUMAN	6379600	7342799	0.87	0.74	0.47
sp|P0C0L5|CO4B_HUMAN	752691	868432	0.87	2.46	1.97
sp|Q14624|ITIH4_HUMAN	8519516	9851045	0.86	0.34	0.62
sp|Q9Y4K4|M4K5_HUMAN	51833	59969	0.86	10.84	8.84
sp|P25311|ZA2G_HUMAN	3345468	3871301	0.86	0.66	0.75
sp|P02750|A2GL_HUMAN	1112694	1289830	0.86	1.16	2.06
sp|P36955|PEDF_HUMAN	1045133	1212093	0.86	0.81	1.69
sp|Q8NG78|OR8G5_HUMAN	49973	58156	0.86	11.40	20.46
sp|P29622|KAIN_HUMAN	449053	522868	0.86	0.72	4.80
sp|P01721|LV657_HUMAN	104560	121768	0.86	3.47	5.22
sp|P00739|HPTR_HUMAN	168783	196727	0.86	7.13	3.89
sp|P01861|IGHG4_HUMAN	5572396	6496121	0.86	2.25	1.37
sp|P83436|COG7_HUMAN	166302	194196	0.86	45.57	30.69
sp|P06276|CHLE_HUMAN	38979	45537	0.86	22.13	11.43
sp|P02790|HEMO_HUMAN	48678057	56947100	0.85	0.82	0.92
sp|O75882|ATRN_HUMAN	25644	30043	0.85	11.19	5.31
sp|P05160|F13B_HUMAN	125347	147013	0.85	3.65	2.10
sp|P02654|APOC1_HUMAN	1828617	2145032	0.85	0.50	0.54

sp|P51884|LUM_HUMAN	671098	787408	0.85	3.67	2.32
sp|P00450|CERU_HUMAN	17143953	20164939	0.85	0.29	0.82
sp|A0A0B4J1U7|HV601_HUMAN	963967	1134916	0.85	5.05	2.45
sp|Q96PD5|PGRP2_HUMAN	2172734	2558177	0.85	0.08	0.32
sp|Q9H814|PHAX_HUMAN	60130	70806	0.85	0.83	8.40
sp|P10909|CLUS_HUMAN	5562828	6558793	0.85	0.28	0.89
sp|P01019|ANGT_HUMAN	3201233	3775342	0.85	1.24	0.65
sp|P01008|ANT3_HUMAN	9156370	10803183	0.85	1.96	1.13
sp|P04278|SHBG_HUMAN	374965	443088	0.85	2.72	3.17
sp|Q92973|TNPO1_HUMAN	49745	58788	0.85	8.35	12.47
sp|P04003|C4BPA_HUMAN	5127202	6060557	0.85	0.48	0.49
sp|Q9BRK3|MXRA8_HUMAN	64578	76540	0.84	12.79	16.82
sp|P07225|PROS_HUMAN	350498	415586	0.84	0.50	1.77
sp|P05543|THBG_HUMAN	376589	446820	0.84	2.66	4.58
sp|A0A0C4DH72|KV106_HUMAN	520726	618949	0.84	1.99	2.55
sp|Q06033|ITIH3_HUMAN	268203	318878	0.84	2.55	2.73
sp|P21810|PGS1_HUMAN	20525	24415	0.84	8.87	15.58
sp|P22792|CPN2_HUMAN	274588	327823	0.84	0.38	4.49
tr|A0A075B6H7|A0A075B6H7_HUMAN	4333281	5184433	0.84	2.67	3.37
sp|P08185|CBG_HUMAN	830861	1000498	0.83	4.82	3.18
sp|P19652|A1AG2_HUMAN	3841399	4632813	0.83	0.72	2.24
sp|Q8N7P1|PLD5_HUMAN	200232	241495	0.83	2.44	1.70
sp|Q13617|CUL2_HUMAN	94990	114741	0.83	45.13	38.09
sp|P05154|IPSP_HUMAN	37499	45402	0.83	7.16	14.77
sp|A0A075B6S5|KV127_HUMAN	706098	860802	0.82	4.03	2.26
sp|P02656|APOC3_HUMAN	5264098	6436086	0.82	1.87	1.47
sp|P02753|RET4_HUMAN	437716	535970	0.82	1.74	3.04
sp|Q86VK4|ZN410_HUMAN	1047535	1286686	0.81	33.50	31.20
sp|P55058|PLTP_HUMAN	57622	70970	0.81	8.08	7.63
sp|P02763|A1AG1_HUMAN	19549125	24131440	0.81	0.81	1.30
sp|P01715|LV301_HUMAN	35616	44125	0.81	1.98	2.72
sp|Q8TE73|DYH5_HUMAN	205038	254410	0.81	1.60	3.91
sp|P12814|ACTN1_HUMAN	985829	1223807	0.81	44.65	36.69
sp|A0A0C4DH67|KV108_HUMAN	123512	153568	0.80	10.18	6.12
sp|Q14185|DOCK1_HUMAN	887645	1109402	0.80	34.43	38.17
sp|A0A0A0MS15|HV349_HUMAN	489809	617181	0.79	2.34	3.15
sp|A0A0B4J1U3|LV136_HUMAN	53606	67625	0.79	23.44	7.83
sp|Q9UIA9|XPO7_HUMAN	56927	71921	0.79	13.58	9.36
sp|Q8NI35|INADL_HUMAN	217591	276431	0.79	2.15	3.77
sp|Q9BQG0|MBB1A_HUMAN	27871	36073	0.77	37.77	45.55
sp|P06312|KV401_HUMAN	3798814	5007902	0.76	1.26	1.69
sp|Q14676|MDC1_HUMAN	264297	351712	0.75	51.44	42.10
sp|Q9NXG0|CNTLN_HUMAN	1571893	2096425	0.75	2.17	0.74
sp|P04196|HRG_HUMAN	3888074	5250210	0.74	2.49	0.91
sp|A0A075B6S2|KVD29_HUMAN	429719	593873	0.72	0.98	2.92
sp|P49908|SEPP1_HUMAN	47778	66740	0.72	8.37	4.99

Lipds detected in fingertip and venous plasma were listed in **Table S1**. The peak area of each lipid was normalized to that of the internal standard, and the avarage values (n=3) were shown. The ratio for the value of fingertip plasma to venous plasma and the value of RSD% in fingertip and venous plasma were also calculated. Ether-linked lipid species are labeled with 'e' (plasmanyl) or 'p' (plasmenyl). LPC, lysophosphatidylcholine; PC, phosphatidylcholine; LPE, lysophosphatidylethanolamine; PE, phosphatidylethanolamine.

Table S2. Comparision between fingertip and venous plasma in cationic metabolites.

Name	Average			RSD%	
	Fingertip plasma	Venous plasma	Fingertip/Venous	Fingertip plasma	Venous plasma
Betaine	3.993	2.853	1.40	6.33	21.34
Carnitine	3.178	3.613	0.88	12.37	3.43
Choline	0.284	0.274	1.04	6.84	5.41
Creatine	0.349	0.154	2.27	8.65	21.49
Creatinine	5.031	5.544	0.91	5.96	5.29
Cytidine	0.025	0.067	0.38	57.65	12.55
Glycine	1.167	1.063	1.10	5.38	7.66
4-Hydroxy-L-proline	0.407	0.412	0.99	9.21	5.25
L-Alanine + Sarcosine	5.445	6.468	0.84	11.28	3.44
beta-Alanine	6.447	7.120	0.91	7.26	4.86
L-Arginine	2.096	2.414	0.87	9.48	4.39
L-Asparate	0.475	0.195	2.43	18.67	7.00
L-Asparagine	1.266	1.194	1.06	7.14	0.95
L-Citrulline	3.817	3.334	1.15	3.51	3.46
L-Lysine	0.656	1.242	0.53	19.30	10.06
L-Glutamine	38.812	36.778	1.06	8.65	2.04
L-Glutamate	2.208	0.972	2.27	8.48	5.04
L-Histidine	1.032	1.231	0.84	13.51	5.17
L-Homoserine + D-Homoserine	1.727	1.532	1.13	8.18	10.21
L-Isoleucine	4.572	5.458	0.84	9.94	6.48
L-Leucine	6.814	7.268	0.94	9.61	1.35
L-Methionine	0.672	0.741	0.91	9.26	3.55
L-Ornithine	0.378	0.223	1.69	6.42	15.63
L-Phenylalanine	2.527	2.769	0.91	12.84	0.67
L-Proline	1.504	1.389	1.08	9.58	7.75
L-Serine	4.062	3.100	1.31	10.81	4.87
L-Threonine	1.289	1.178	1.09	8.53	0.69
L-Tryptophan	1.066	1.382	0.77	13.40	7.56
L-Tyrosine	1.917	1.963	0.98	7.31	3.21
L-Valine	12.868	14.703	0.88	7.63	3.46
Dimethylglycine	0.556	0.509	1.09	9.71	2.27
Uridine	0.160	0.180	0.89	25.22	9.82
L-Cystine	1.735	1.848	0.94	3.61	4.74
L-Pyroglutamic acid	1.627	0.960	1.70	12.83	1.91
N-Acetyl-DL-alanine	0.125	0.153	0.82	14.93	10.96
L-Kynurenine	0.050	0.059	0.84	41.82	13.23
Phosphocholine	0.038	0.012	3.07	24.05	20.64
L-2-Aminobutyric acid	0.360	0.344	1.05	33.53	3.50
Uric Acid	0.130	0.140	0.93	11.95	3.79
N-Acetylneuraminic acid	0.088	0.032	2.71	26.38	6.95
2-Bromohypoxanthine (Internal standard)	-	-	-	-	-

The cationic metabolites detected in fingertip and venous plasma were listed in **Table S2**. The peak area of each cationic metabolite was normalized to that of the internal standard, and the avarage values (n=3) were shown. The ratio for the value of fingertip plasma to venous plasma and the value of RSD% in fingertip and venous plasma were also calculated.

Table S3. Comparision between fingertip and venous plasma in anionic metabolites.

Name	Average			RSD%	
	Fingertip plasma	Venous plasma	Fingertip/Venous	Fingertip plasma	Venous plasma
Lactic acid	0.7071	0.8039	0.88	7.62	4.46
3-Hydroxy-butyric acid	0.7729	0.6354	1.22	10.92	4.11
3-Hydroxy-2-methyl-butanoic acid	0.2478	0.2097	1.18	13.10	6.77
Mesaconic acid	0.1608	0.1319	1.22	5.21	6.77
o-Toluic acid	0.0345	0.0424	0.82	7.29	7.02
Uric acid	0.3458	0.2846	1.21	18.87	1.75
Oxalic acid	0.1227	0.0595	2.06	10.21	4.82
2-Hydroxy-isobutyric acid	0.2237	0.2118	1.06	12.46	10.98
Fumaric acid	0.0462	0.0607	0.76	27.40	13.34
4-Methyl-2-oxovaleric acid	0.0390	0.0462	0.84	6.74	12.98
2-Ethylhexanoic acid	0.2473	0.2196	1.13	6.77	3.72
Phthalic acid	0.8980	0.8659	1.04	0.34	3.33
Glycerol-P	0.0547	0.0652	0.84	14.78	13.35
2-Isopropyl-malic acid	0.0275	0.0309	0.89	10.61	25.26
Isocitric acid	0.0441	0.0410	1.08	10.58	14.99
Phosphoric acid	0.9726	0.4669	2.08	14.56	1.90
Citraconic acid	0.1627	0.1489	1.09	13.44	12.38
Malic acid	0.1630	0.0690	2.36	21.38	22.66
Octanoic acid	0.0597	0.0694	0.86	20.77	14.97
p-Toluenesulfonic acid	0.0114	0.0129	0.88	15.94	21.08
2-Propylglutaric acid	0.1542	0.1460	1.06	9.03	13.86
Hippuric acid	0.0151	0.0193	0.78	21.44	15.24
Citric acid	2.2354	1.9883	1.12	10.70	4.63
3-Hydroxy-propionic acid	0.0881	0.0260	3.39	43.52	43.79
3-Hydroxy-isobutyric acid	0.0655	0.0522	1.26	3.39	21.48
Glyceric acid	0.0865	0.0516	1.68	26.05	57.40
Succinic acid	0.4793	0.4147	1.16	10.27	6.06
2-Hydroxy-3-methyl-butyric acid	0.1060	0.1218	0.87	4.68	7.23
Glutaconic acid	0.0630	0.0570	1.10	10.84	6.55
Glutaric acid	0.0898	0.0740	1.21	13.60	12.65
Threonic acid	1.2247	0.7352	1.67	4.01	5.34
2-Ketoglutaric acid	0.0687	0.0671	1.02	7.38	5.20
cis-Aconitic acid	0.2305	0.2577	0.89	10.44	1.58
Gluconic acid	0.3781	n.d.	-	24.57	-
Dodecanedioic acid	0.0083	n.d.	-	15.32	-
10-Camphorsulfonic acid (Internal standard)	-	-	-	-	-

The anionic metabolites detected in fingertip and venous plasma were listed in **Table S3**. The peak area of each anionic metabolite was normalized to that of the internal standard, and the avarage values (n=3) were shown. The ratio for the value of fingertip plasma to venous plasma and the value of RSD% in fingertip and venous plasma were also calculated. n.d., not detected.

Table S4. Comparision between fingertip and venous plasma in lipids.

Name	Average			RSD%	
	Fingertip plasma	Venous plasma	Fingertip/Venous	Fingertip plasma	Venous plasma
LPC_14:0 (sn-1)	0.0264	0.0257	1.03	17.49	7.54
LPC_14:0 (sn-2)	0.0685	0.0678	1.01	6.90	5.64
LPC_16:0p	0.0147	0.0149	0.99	1.93	9.30
LPC_15:0 (sn-1)	0.0194	0.0231	0.84	14.90	29.44
LPC_15:0 (sn-2)	0.0483	0.0550	0.88	10.19	21.47
LPC_16:0e	0.0092	0.0087	1.05	9.69	29.59
LPC_16:1 (sn-1)	0.0542	0.0726	0.75	4.54	8.00
LPC_16:1 (sn-2)	0.2040	0.2137	0.95	11.21	4.37
LPC_16:0 (sn-1)	4.4075	5.7226	0.77	3.40	1.21
LPC_16:0 (sn-2)	13.5281	14.1798	0.95	3.20	0.25
LPC_17:1 (sn-1)	0.0060	0.0048	1.25	47.60	62.72
LPC_17:1 (sn-2)	0.0181	0.0173	1.04	26.76	9.13
LPC_17:0 (sn-1)	0.0871	0.0813	1.07	4.65	17.80
LPC_17:0 (sn-2)	0.1406	0.1573	0.89	2.45	9.32
LPC_18:3 (sn-1)	0.0200	0.0248	0.80	28.33	2.29
LPC_18:3 (sn-2)	0.0346	0.0354	0.98	7.54	23.57
LPC_18:2 (sn-1)	2.4264	2.9936	0.81	4.04	2.16
LPC_18:2 (sn-2)	5.9147	5.9942	0.99	4.97	0.50
LPC_18:1 (sn-1)	1.5658	1.9424	0.81	3.34	3.95
LPC_18:1 (sn-2)	4.2843	4.4907	0.95	6.32	0.23
LPC_18:0 (sn-1)	2.3608	3.0313	0.78	1.17	2.40
LPC_18:0 (sn-2)	7.3926	7.3970	1.00	5.74	1.11
LPC_19:0 (sn-1)	0.0071	0.0091	0.79	42.54	47.09
LPC_19:0 (sn-2)	0.0114	0.0176	0.65	19.49	32.73
LPC_20:5 (sn-1)	0.0302	0.0282	1.07	19.78	10.66
LPC_20:5 (sn-2)	0.0468	0.0513	0.91	0.63	10.28
LPC_20:4 (sn-1)	0.4775	0.5838	0.82	9.33	4.52
LPC_20:4 (sn-2)	0.9326	0.9592	0.97	4.22	1.70
LPC_20:3 (sn-1)	0.1654	0.2315	0.71	2.19	2.42
LPC_20:3 (sn-2)	0.2781	0.2878	0.97	9.38	3.78
LPC_20:2 (sn-1)	0.0219	0.0282	0.78	23.01	4.24
LPC_20:2 (sn-2)	0.0333	0.0363	0.92	28.29	9.37
LPC_20:1 (sn-1)	0.0211	0.0263	0.80	32.68	12.88
LPC_20:1 (sn-2)	0.0474	0.0608	0.78	11.90	7.41
LPC_20:0 (sn-1)	0.0149	0.0209	0.71	34.20	12.57
LPC_20:0 (sn-2)	0.0540	0.0489	1.10	11.06	14.91
LPC_22:6 (sn-1)	0.1002	0.1258	0.80	4.77	7.89
LPC_22:6 (sn-2)	0.1579	0.1849	0.85	9.20	4.75
LPC_22:4 (sn-1)	0.0116	0.0148	0.78	6.76	12.78
LPC_22:4 (sn-2)	0.0120	0.0141	0.85	19.17	11.24
LPC_22:0 (sn-1)	0.0049	0.0065	0.75	8.69	26.26
LPC_22:0 (sn-2)	0.0106	0.0139	0.77	8.39	17.55
PC_14:0_16:1	27.1950	27.9317	0.97	2.77	0.93
PC_16:0_14:0	1.5425	1.5666	0.98	5.28	3.28
PC_15:0_16:1	0.0469	0.0419	1.12	16.10	6.50
PC_16:0p_16:0	0.5392	0.5003	1.08	5.80	2.87
PC_16:0_15:0	0.2010	0.2110	0.95	7.86	2.16
PC_16:0e_16:0	0.9414	0.9235	1.02	6.71	2.21
PC_14:0_18:2 + PC_16:1_16:1	1.9031	2.1012	0.91	2.96	2.62
PC_14_0:18_1 + PC_16:0_16:1	7.9609	8.6286	0.92	4.60	0.22
PC_16:0_16:0	5.0563	5.0690	1.00	1.04	2.27
PC_15:0_18:2	1.1899	1.2712	0.94	2.85	3.04
PC_16:0e_18:2	1.5541	1.5461	1.01	3.14	3.04
PC_16:1e_18:1	2.0082	2.0541	0.98	2.47	1.51
PC_15:0_18:1 + PC_16:0_17:1	0.5256	0.5485	0.96	4.21	1.32
PC_18:1e_16:0 + PC_18:0e_16:1	4.0514	4.2214	0.96	1.42	1.39
PC_17:0_16:0 + PC_18:0_15:0	0.3508	0.3687	0.95	5.79	2.19
PC_18:0e_16:0	0.4784	0.5156	0.93	4.09	1.40
PC_14:0_20:5	0.0281	0.0358	0.78	16.21	10.48
PC_16:1_18:3 + PC_14:0_20:4	0.6139	0.7204	0.85	4.19	1.07
PC_14:0_20:3	5.6674	6.1704	0.92	3.21	0.41
PC_16:1_18:2 + PC_16:0_18:3	5.5158	5.9517	0.93	3.11	4.10
PC_16:0_18:2 + PC_16:1_18:1	82.0900	80.3997	1.02	4.30	0.71
PC_16:0_18:1	70.2880	70.4361	1.00	3.20	1.82
PC_16:0_18:0	2.6970	2.8229	0.96	3.98	1.52
PC_15:0_20:5	0.0328	0.0427	0.77	12.69	2.75
PC_16:0e_20:5	4.0169	4.1279	0.97	4.13	1.62
PC_16:0p_20:4	4.0169	4.1279	0.97	4.13	1.62
PC_15:0_20:4	0.3413	0.3560	0.96	7.53	1.80
PC_16:1e_20:3	6.0702	6.0289	1.01	3.56	2.17
PC_17:1_18:2	0.6994	0.7281	0.96	6.06	5.97
PC_18:1e_18:2	1.2462	1.1983	1.04	7.27	5.61
PC_18:2e_18:1	2.2571	2.4598	0.92	5.24	1.38
PC_17:1_18:1 + PC_17:0_18:2	3.0791	3.1635	0.97	4.49	1.66
PC_18:0p_18:1 + PC_18:1e_18:1	2.2734	2.3224	0.98	4.43	2.86
PC_16:0e_20:2	0.6589	0.7663	0.86	3.74	2.82
PC_17:0_18:1 + PC_17:1_18:0 + PC_16:0_19:1	1.5934	1.6570	0.96	4.76	4.73

PC_16:1_20:5	0.0542	0.0711	0.76	5.85	14.15
PC_14:0_22:6	0.3033	0.3356	0.90	5.55	6.24
PC_18:2_18:3	1.5895	1.6294	0.98	2.57	2.32
PC_14:0_22:5 + PC_16:1_20:4 + PC_16:0_20:5	6.5933	6.7224	0.98	3.83	0.81
PC_18:2_18:2 + PC_18:1_18:3	15.0243	15.1246	0.99	3.57	4.26
PC_16:0_20:4 + PC_16:1_20:3	34.6773	34.1028	1.02	3.96	2.31
PC_18:1_18:2 + PC_16:0_20:3 + PC_18:0_18:3	51.8464	51.2327	1.01	3.94	0.34
PC_18:1_18:1 + PC_18:0_18:2	95.3649	91.0179	1.05	4.85	1.37
PC_18:0_18:1	35.5671	35.5578	1.00	2.14	0.94
PC_16:0p_22:6	0.5601	0.5504	1.02	8.07	2.52
PC_18:0_18:0	0.3946	0.4857	0.81	18.17	6.46
PC_15:0_22:6	0.1942	0.2051	0.95	8.12	7.38
PC_18:1e_20:5	0.1994	0.1730	1.15	7.55	3.22
PC_16:0e_22:6	1.9542	1.8952	1.03	4.83	0.67
PC_17:0_20:5 + PC_17:1_20:4	0.2823	0.3098	0.91	6.26	3.20
PC_16:0e_22:5 + PC_18:0e_20:5	4.9808	4.7386	1.05	5.59	0.70
PC_18:0p_20:4	2.2717	2.2637	1.00	3.10	3.09
PC_17:0_20:4	0.9197	0.8884	1.04	6.47	0.71
PC_18:1e_20:3	1.5287	1.4821	1.03	3.74	4.94
PC_18:0e_20:4	7.1229	7.1904	0.99	3.79	0.96
PC_17:0_20:3 + PC_19:1_18:2	0.4642	0.4504	1.03	4.56	4.80
PC_19:1_18:1 + PC_19:0_18:2	0.8551	0.8624	0.99	5.41	4.82
PC_19:0_18:1 + PC_18:0_19:1	0.4257	0.4952	0.86	3.32	6.53
PC_18:2_20:5 + PC_16:1_22:6	0.9428	1.0072	0.94	0.64	2.25
PC_18:2_20:4 + PC_16:0_22:6	38.0958	38.2984	0.99	4.24	1.91
PC_18:1_20:4	8.4136	8.2020	1.03	4.12	0.25
PC_18:0_20:5	7.6072	7.3574	1.03	4.90	1.55
PC_18:1_20:3	3.2693	3.2160	1.02	7.82	4.95
PC_18:0_20:4	32.1890	30.5084	1.06	5.15	0.96
PC_18:1_20:2 + PC_18:0_20:3	25.4670	25.6055	0.99	3.39	0.35
PC_16:0_22:2	2.8385	2.8025	1.01	2.10	2.06
PC_18:0_20:2	4.5905	5.1643	0.89	5.75	1.58
PC_20:0_18:1	13.2990	16.7900	0.79	10.61	1.83
PC_18:1e_22:6	0.6943	0.6991	0.99	4.61	4.48
PC_17:0_22:6	0.3570	0.3098	1.15	7.42	14.15
PC_18:1e_22:5	0.3519	0.3900	0.90	7.90	13.98
PC_18:0p_22:5	1.5242	1.5623	0.98	5.38	1.24
PC_19:0_20:3	0.2651	0.3410	0.78	9.06	1.04
PC_20:4_20:4	0.7831	0.7711	1.02	8.64	2.50
PC_20:3_20:4	0.5028	0.4811	1.05	2.62	2.81
PC_18:1_22:6	0.8385	0.8158	1.03	4.01	3.33
PC_20:2_20:4 + PC_18:1_22:5	0.8704	0.8366	1.04	5.95	2.74
PC_18:0_22:6	9.0377	8.7440	1.03	5.40	0.45
PC_18:0_22:5	3.0641	3.0667	1.00	5.35	0.27
PC_20:1_20:3 + PC_18:0_22:4	2.7326	2.7965	0.98	1.31	2.35
PC_18:1_22:0	0.0362	0.0421	0.86	3.80	7.02
PC_19:0_22:6	0.0519	0.0592	0.88	12.51	2.52
LPE_16:0 (sn-1)	0.0263	0.0414	0.64	23.38	7.53
LPE_16:0 (sn-2)	0.0543	0.0727	0.75	5.17	17.04
LPE_18:2 (sn-1)	0.0802	0.1052	0.76	8.94	8.64
LPE_18:2 (sn-2)	0.1311	0.1436	0.91	11.92	10.84
LPE_18:1 (sn-1)	0.0327	0.0434	0.75	7.31	12.12
LPE_18:1 (sn-2)	0.0866	0.0851	1.02	8.30	12.02
LPE_18:0 (sn-1)	0.0737	0.0977	0.75	4.47	6.93
LPE_18:0 (sn-2)	0.1596	0.1693	0.94	8.38	3.99
LPE_20:4 (sn-1)	0.0405	0.0394	1.03	9.96	3.72
LPE_20:4 (sn-2)	0.0439	0.0554	0.79	6.02	24.63
LPE_20:3 (sn-2)	0.0042	0.0044	0.96	65.57	55.84
LPE_22:6 (sn-1)	0.0200	0.0243	0.82	15.84	10.83
LPE_22:6 (sn-2)	0.0174	0.0142	1.22	20.35	33.72
PE_16:0_16:1 + PE_14:0_18:1	0.0108	0.0174	0.62	12.68	45.26
PE_16_1_18_2	0.0159	0.0184	0.86	37.43	27.39
PE_16:0p_18:1	0.0108	0.0108	1.00	6.17	13.57
PE_16:0e_18:1	0.0509	0.0493	1.03	4.26	10.29
PE_16:1_18:2	0.0020	0.0019	1.04	26.14	45.55
PE_16:0_18:3	0.0033	0.0026	1.26	36.38	22.29
PE_16:1_18:1 + PE_16:0_18:2	0.0823	0.0808	1.02	18.15	9.69
PE_16:0_18:1	0.0572	0.0508	1.12	15.34	11.42
PE_16:0_18:0	0.0028	0.0039	0.71	43.36	38.31
PE_16:0p_20:4	0.0486	0.0477	1.02	17.19	9.02
PE_16:0p_20:3 + PE_16:0e_20:4	0.1389	0.1218	1.14	4.94	9.25
PE_18:1p_18:1 + PE_18:0p_18:2 + PE_18:0e_18:3	0.0891	0.0989	0.90	11.60	16.17
PE_17:0_18:2	0.0083	0.0049	1.71	29.09	46.57
PE_18:0e_18:2	0.0587	0.0610	0.96	13.51	18.70
PE_18:0p_18:1	0.0475	0.0531	0.89	21.03	4.06
PE_17:0_18:1	0.0026	0.0031	0.84	35.99	28.81
PE_18:0e_18:1	0.0484	0.0518	0.93	7.80	10.27
PE_18:2_18:3	0.0030	0.0058	0.52	42.96	27.39
PE_16:0_20:5	0.0092	0.0121	0.76	20.40	17.05
PE_18:2_18:2	0.0418	0.0384	1.09	10.45	17.73

PE_16:0_20:4	0.0785	0.0838	0.94	15.00	9.28
PE_18:1_18:2	0.1260	0.1213	1.04	5.98	5.44
PE_18:1_18:1 + PE_18:0_18:2	0.3045	0.3035	1.00	2.32	3.81
PE_16:0_20:1 + PE_18:0_18:1	0.0929	0.0973	0.96	12.49	1.59
PE_16:0p_22:6	0.0183	0.0167	1.10	12.20	21.60
PE_18:0p_20:5 + PE_18:1p_20:4 + PE_16:0e_22:6	0.1292	0.1086	1.19	2.04	4.77
PE_18:1p_20:3 + PE_16:0p_22:4	0.0965	0.0877	1.10	12.25	13.67
PE_18:0p_20:4	0.1337	0.1291	1.04	6.02	2.16
PE_17:0_20:4	0.0058	0.0058	0.99	51.35	29.16
PE_18:1e_20:3	0.3499	0.3359	1.04	9.47	5.84
PE_18:0e_20:4 + PE_20:0e_18:4 + PE_20:1e_18:3	0.0235	0.0316	0.74	27.85	24.58
PE_18:2_20:4 + PE_18:1_20:5	0.2598	0.2875	0.90	3.01	9.97
PE_16:0_22:6 + PE_16:1_22:5 + PE_20:2_18:4	0.2598	0.2875	0.90	3.01	9.97
PE_18:1_20:4	0.0566	0.0600	0.94	0.24	5.00
PE_18:0_20:5	0.0571	0.0562	1.02	7.39	10.25
PE_18:0_20:4	0.2508	0.2484	1.01	9.04	5.04
PE_20:1_18:2	0.0157	0.0165	0.95	14.58	15.51
PE_18:0_20:3	0.0614	0.0622	0.99	11.93	19.45
PE_20:0_18:2	0.0106	0.0117	0.91	32.21	16.07
PE_18:0p_22:6 + PE_18:1p_22:5	0.0373	0.0333	1.12	27.66	10.02
PE_18:0p_22:5 + PE_18:1p_22:4	0.1234	0.1232	1.00	2.31	6.27
PE_20:0e_20:4 + PE_18:0e_22:4	0.0121	0.0179	0.67	24.84	28.86
PE_18:1_22:6	0.0080	0.0091	0.88	20.31	45.63
PE_18:0_22:6	0.0653	0.0615	1.06	10.29	7.44
PE_18:0_22:5	0.0116	0.0201	0.58	35.49	4.67
Fatty acid_12:0	0.1128	0.0366	3.09	21.78	12.16
Fatty acid_14:1 (n-5)	0.0748	0.0603	1.24	3.43	5.04
Fatty acid_14:0	0.3184	0.2363	1.35	24.56	27.59
Fatty acid_16:1 (n-7)	1.3065	0.7986	1.64	3.61	3.99
Fatty acid_16:0	8.5950	5.9644	1.44	4.97	6.71
Fatty acid_17:1 (n-7)	0.1165	0.0771	1.51	16.67	10.53
Fatty acid_17:0	0.0605	0.0433	1.40	10.33	25.15
Fatty acid_18:4 (n-3)	0.0165	0.0092	1.81	20.21	11.67
Fatty acid_18:3 (n-3) + Fatty acid_18:3 (n-6)	0.5874	0.3861	1.52	10.41	2.57
Fatty acid_18:2 (n-6)	6.0628	3.9839	1.52	9.46	2.39
Fatty acid_18:1 (n-9)_cis + Fatty acid_18:1 (n-7)_cis	8.9184	5.7371	1.55	5.71	2.81
Fatty acid_18:1 (n-9)_trans + Fatty acid_18:1 (n-7)_trans	23.4138	15.3829	1.52	5.84	1.86
Fatty acid_18:0	10.2627	8.1134	1.26	15.01	7.53
Fatty acid_20:5 (n-3)	0.0160	0.0125	1.28	39.04	9.40
Fatty acid_20:4 (n-6)	0.2359	0.1929	1.22	7.64	16.17
Fatty acid_20:3 (n-6) + Fatty acid_20:3 (n-9)	0.1176	0.0802	1.47	6.39	2.98
Fatty acid_20:2 (n:6)	0.2155	0.1471	1.46	9.86	5.52
Fatty acid_20:1 (n-9)	0.4523	0.3061	1.48	11.93	3.73
Fatty acid_22:6 (n-3)	0.1139	0.1144	1.00	16.14	12.72
Fatty acid_22:5 (n-6)	0.1442	0.1283	1.12	7.00	2.51
Fatty acid_22:4 (n-6)	0.0880	0.0653	1.35	11.72	0.75
Fatty acid_22:1 (n-9)	0.0253	0.0205	1.24	16.16	13.61
Fatty acid_24:1 (n-9)	0.1350	0.0986	1.37	2.01	16.30
Glycodeoxycholic acid	0.0105	0.0073	1.43	30.04	27.56
Acylcarnitine_2:0	0.6546	0.6134	1.07	10.24	5.41
Acylcarnitine_8:0	0.0206	0.0298	0.69	5.39	18.17
Acylcarnitine_10:0	0.0635	0.0869	0.73	10.30	4.03
Acylcarnitine_12:0	0.0241	0.0303	0.80	32.89	5.83
Acylcarnitine_14:0	0.0098	0.0121	0.81	16.07	20.91
Acylcarnitine_14:1	0.0477	0.0518	0.92	9.97	13.20
Acylcarnitine_16:0	0.0385	0.0413	0.93	23.29	9.24
Acylcarnitine_18:0	0.0244	0.0232	1.05	14.69	21.27
Acylcarnitine_18:1	0.0591	0.0628	0.94	17.39	7.71
Acylcarnitine_18:2	0.0167	0.0165	1.02	26.31	22.19
PC_12:0_12:0 (Internal standartd)	-	-	-	-	-

Lipds detected in fingertip and venous plasma were listed in **Table S4**. The peak area of each lipid was normalized to that of the internal standard, and the avarage values (n=3) were shown. The ratio for the value of fingertip plasma to venous plasma and the value of RSD% in fingertip and venous plasma were also calculated. Ether-linked lipid species are labeled with 'e' (plasmanyl) or 'p' (plasmenyl). '+' means that multiple metabolites were detected at the same retention time, because their metabolites were not separated in our analyzing conditions. LPC, lysophosphatidylcholine; PC, phosphatidylcholine; LPE, lysophosphatidylethanolamine; PE, phosphatidylethanolamine.