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| **Table S2** Differential metabolites of cecal content in different group sets |
| **Compound** | **VIP value** | **Fold change (FT-NT)** |
| LysoPE(0:0/16:0) | 1.39611 | 1.829127912 |
| Phytosphingosine | 1.82172 | 2.391519065 |
| Kynurenic acid | 1.58781 | 1.32017953 |
| Stearidonic acid | 1.45078 | 0.762002229 |
| Octadecanamide | 1.50001 | 1.048119468 |
| Stearoylcarnitine | 1.69755 | 2.230264288 |
| L-Glutamate | 1.69534 | 2.647962778 |
| Tetracosahexaenoic acid | 1.37745 | -4.256204048 |
| 3-Indolepropionic acid | 1.48629 | 1.654602046 |
| Syringic acid | 1.9675 | 2.591620047 |
| Methamphetamine | 1.38677 | -4.294895853 |
| L-Palmitoylcarnitine | 1.3594 | 2.433415468 |
| Dodecanedioic acid | 1.81947 | -2.553967404 |
| Anandamide | 1.72204 | -4.126681323 |
| hydrocinnamic acid | 1.56801 | 0.956241528 |
| Linoleic acid | 1.55562 | 3.036584872 |
| Ricinoleic acid | 1.4407 | 2.541515312 |
| p-Aminobenzoic acid | 1.59528 | 1.416099173 |
| 13-HDoHE | 1.5072 | 1.614593796 |
| N-Acetyl-L-methionine | 1.51667 | 0.77972235 |
| Androstenol | 1.48051 | 1.805266093 |
| L-Isoleucine | 1.59496 | 1.432195562 |
| Cinnamic acid | 1.50697 | 1.472848477 |
| Creatine | 1.49684 | 1.06131712 |
| Pantothenic Acid | 1.67721 | 2.57961707 |
| L-Tryptophan | 1.63324 | 1.449201617 |
| 12,13-EpOME | 1.62341 | 4.469650467 |
| L-Tyrosine | 1.40308 | 0.699634193 |
| Adenosine | 1.47445 | 2.243025557 |
| N6,N6,N6-Trimethyl-L-lysine | 1.42211 | -1.689249154 |
| 3-Hydroxyanthranilic acid | 1.69687 | 1.719421014 |
| Glycylleucine | 1.55493 | 1.659377013 |
| 12,13-diHOME | 1.56895 | 7.994652917 |
| LysoPE(20:0/0:0) | 1.89989 | 1.809808066 |
| Xanthurenic acid | 2.0962 | 1.717569376 |
| Acetylcarnitine | 1.62655 | 0.827224224 |
| LysoPC(14:0) | 1.59089 | 1.293272182 |
| 1-Methylguanine | 1.37433 | -1.271014565 |
| Vitamin A | 1.53692 | 1.126347198 |
| Hexanoylcarnitine | 1.51544 | 1.381526102 |
| Acetylcholine | 1.53842 | 1.440701802 |
| L-Phenylalanine | 1.50505 | 1.470457546 |
| Adenine | 1.45115 | 2.837115373 |
| LysoPE(18:0/0:0) | 1.80815 | 1.431342848 |
| QH(2) | 1.4405 | 2.052805741 |
| N-Acetyl-D-glucosamine | 1.36669 | -0.575336932 |
| L-Dopa | 1.60085 | 1.13622862 |
| L-Arginine | 1.47707 | 1.135803137 |
| MG(P-18:0e/0:0/0:0) | 1.48374 | 2.372686188 |
| L-Valine | 1.36891 | 1.218955241 |
| Pyroglutamic acid | 1.36302 | 0.443618789 |
| 5-Aminopentanoic acid | 1.61074 | 0.984877935 |
| acetophenone | 1.50397 | 2.077766733 |
| gamma-Aminobutyric acid | 1.65933 | 1.315620616 |
| DHAP(10:0) | 1.38044 | 0.783071918 |
| Benzoic acid | 1.83512 | 1.264673024 |
| Niacinamide | 1.46789 | 0.904334539 |
| Choline | 1.40391 | 1.271636765 |
| gamma-Glutamylcysteine | 1.96829 | 0.689634575 |
| Xanthosine | 1.59451 | -1.121281824 |
| Taurocholic acid | 1.58083 | 2.700112967 |
| Tetradecanedioic acid | 1.87358 | -4.548811504 |
| Tauroursodeoxycholic acid | 1.97904 | 2.998046677 |
| Sebacic acid | 2.33912 | -1.991768331 |
| Ribonic acid | 1.66162 | 3.146818765 |
| L-Ascorbic acid | 1.78324 | -1.881321665 |
| Oxoadipic acid | 1.65964 | 1.179545557 |
| DL-2-Aminoadipic acid | 1.80898 | 1.146523006 |
| Pimelic acid | 1.46471 | -0.637229481 |
| 3-Hydroxypicolinic acid | 2.0197 | -0.790658614 |
| L-Arabitol | 1.45687 | 2.266739636 |
|  |  |  |
| **Compound** | **VIP value** | **Fold change (ST-NT)** |
| LysoPE(0:0/16:0) | 1.4496 | 3.481737371 |
| Phytosphingosine | 1.52776 | 1.592384062 |
| Alpha-Tocotrienol | 1.7476 | -1.785491958 |
| Palmitic amide | 1.43074 | 0.778172326 |
| Glucose 6-phosphate | 1.43218 | 2.277174679 |
| Octadecanamide | 1.70732 | 0.982474063 |
| MG(0:0/14:0/0:0) | 1.80987 | 2.680202659 |
| Methamphetamine | 1.37498 | -6.311569107 |
| Anandamide | 1.65535 | -3.882060603 |
| 3-Oxohexadecanoic acid | 1.57015 | 3.850803532 |
| Prostaglandin F1a | 1.52815 | 2.46413986 |
| p-Aminobenzoic acid | 1.48707 | 1.954157026 |
| 13-HDoHE | 1.40768 | 1.918124518 |
| N-Acetyl-L-methionine | 1.40131 | 0.754827151 |
| Phosphocholine | 1.55202 | 3.438641792 |
| Androstenol | 1.42131 | 2.13902204 |
| Pantothenic Acid | 1.50101 | 2.195213934 |
| L-Glutamate | 1.38699 | 2.211475066 |
| 3-Hydroxypicolinic acid | 2.06276 | -1.813504968 |
| Xanthurenic acid | 1.66744 | 1.370329373 |
| Acetylcarnitine | 1.6146 | 1.756399319 |
| Hexanoylcarnitine | 1.55398 | 2.618099366 |
| Agmatine | 1.41379 | -1.548909222 |
| Acetylcholine | 1.52897 | 1.533418091 |
| L-Arginine | 1.58816 | 1.295701572 |
| Jasmonic acid | 1.60925 | -1.580062717 |
| Gamma-Tocotrienol | 2.00752 | -2.31237927 |
| 3-Indoleacetic Acid | 1.52672 | -1.589484144 |
| N-Acetylputrescine | 1.40706 | -0.906352868 |
| L-Proline | 1.92109 | -1.228515711 |
| Maltitol | 1.52127 | -1.895084115 |
| Deoxycholic acid | 1.419 | -4.040597938 |
| Vitamin A | 1.52456 | -0.867762178 |
| Prostaglandin A2 | 1.88831 | -1.150186154 |
| Riboflavin | 1.72363 | -1.802289433 |
| Lithocholic acid | 1.44492 | -5.87927103 |
| Abscisic acid | 1.78497 | -0.756908613 |
| Sebacic acid | 2.16878 | -1.598290569 |
| Oxoadipic acid | 1.60838 | 1.24635069 |
| DL-2-Aminoadipic acid | 1.59324 | 1.030199257 |
| Mevalonic acid | 1.48103 | 1.563893484 |
| L-Arabitol | 1.72051 | 4.158005369 |
|  |  |  |
| **Compound** | **VIP value** | **Fold change (FST-NT)** |
| Cinnamic acid | 1.43992 | 2.703635592 |
| LysoPE(0:0/16:0) | 1.43182 | 2.5117326 |
| Phytosphingosine | 2.04975 | 1.986185762 |
| Leucylproline | 1.98478 | 1.851524634 |
| Kynurenic acid | 1.7098 | 1.219018183 |
| DL-2-Aminooctanoic acid | 1.38835 | 0.768609868 |
| 3-Indolepropionic acid | 1.90076 | 4.461901507 |
| Syringic acid | 2.23866 | 3.078865508 |
| Methamphetamine | 1.39256 | -4.55929079 |
| L-Palmitoylcarnitine | 1.47038 | 2.629265249 |
| Alanylproline | 1.5974 | 0.510109715 |
| Anandamide | 1.72808 | -4.291065328 |
| Linoleic acid | 1.45238 | 1.478622708 |
| p-Aminobenzoic acid | 1.72266 | 0.85562942 |
| N-Acetyl-L-methionine | 1.74627 | 0.879515457 |
| Dodecanoylcarnitine | 1.57485 | -4.497912518 |
| L-Isoleucine | 1.67578 | 2.211052657 |
| L-Phenylalanine | 1.43065 | 2.686265148 |
| Pantothenic Acid | 2.0976 | 2.30738253 |
| L-Norleucine | 1.40984 | 1.155267625 |
| L-Tryptophan | 1.60781 | 2.297523805 |
| 12,13-EpOME | 1.60988 | 2.448364017 |
| L-Methionine | 1.5779 | 1.819252502 |
| Urocanic acid | 1.76454 | 0.942676897 |
| L-Tyrosine | 1.78508 | 1.557881882 |
| Glycylleucine | 1.43032 | 3.581452911 |
| N6,N6,N6-Trimethyl-L-lysine | 1.67502 | -3.210622506 |
| 12,13-diHOME | 1.53023 | 5.649873041 |
| Bilirubin | 1.3852 | -1.064770931 |
| 5'-Methylthioadenosine | 1.55559 | 0.495600108 |
| Glutamylleucine | 1.39844 | 2.673354257 |
| LysoPE(20:0/0:0) | 1.39773 | 2.946797528 |
| Norepinephrine  | 1.39502 | 0.444847909 |
| Acetylcarnitine | 1.46912 | 0.638635163 |
| 4-Pyridoxic acid | 1.51644 | -0.716787952 |
| LysoPE(18:0/0:0) | 1.46056 | 2.545971698 |
| N-Acetyl-D-glucosamine | 1.42657 | -0.699549345 |
| L-Valine | 1.51147 | 0.800046414 |
| Thymine | 1.70023 | 1.063475055 |
| Pyroglutamic acid | 1.62851 | 0.578966596 |
| Uracil | 1.52934 | 0.276832643 |
| Anthranilic acid | 1.87681 | 1.472959506 |
| Acetoacetic acid | 1.36386 | -0.96299723 |
| L-Proline | 1.90616 | 0.655623559 |
| gamma-Aminobutyric acid | 1.40762 | 0.550493831 |
| Benzoic acid | 1.92242 | 1.971645349 |
| Choline | 1.61916 | 2.227098982 |
| Cholic acid | 1.59267 | 1.721624591 |
| 9,12,13-TriHOME | 1.76847 | 0.909013359 |
| 7-Ketodeoxycholic acid | 1.47884 | 3.057090822 |
| Prostaglandin A2 | 1.46131 | -0.729895116 |
| gamma-Glutamylcysteine | 1.47696 | 0.44016878 |
| Taurocholic acid | 1.46752 | 2.695106091 |
| MG(0:0/15:0/0:0) | 1.6415 | 1.404584772 |
| Abscisic acid | 1.46093 | -1.571901825 |
| Tauroursodeoxycholic acid | 1.85322 | 2.470980718 |
| N-Acetyl-L-phenylalanine | 1.47184 | 1.114728441 |
| Xanthurenic acid | 1.55581 | 0.773738658 |
| Caffeic Acid | 1.45106 | 1.156454677 |
| Citric acid | 1.59456 | 1.478525358 |
| Ribonic acid | 1.4903 | 1.641496722 |
| L-Ascorbic acid | 1.99091 | -3.321106442 |
| L-3-Phenyllactic acid | 1.5724 | 1.60013447 |
| Oxoadipic acid | 1.48361 | 1.14726273 |
| Oxoglutaric acid | 1.54047 | 1.68390509 |
| DL-2-Aminoadipic acid | 2.13987 | 1.19424498 |
| Pimelic acid | 2.09643 | -1.028867534 |
| D-2-Hydroxyglutaric acid | 2.27341 | 1.300347595 |
| Fumaric acid | 1.59133 | -0.856132678 |
|  |  |  |
| **Compound** | **VIP value** | **Fold change (FST-ST)** |
| 9-HOTE | 1.48485 | 0.303790663 |
| Leucylproline | 1.70616 | 1.144383582 |
| Glucose 6-phosphate | 1.51163 | -2.326664278 |
| Octadecanamide | 1.87365 | -0.507471409 |
| DL-2-Aminooctanoic acid | 1.73001 | 1.145522942 |
| Inosine | 1.60348 | 0.488953943 |
| 3-Indolepropionic acid | 1.98678 | 4.448026386 |
| Abscisic acid | 1.94412 | 0.693852937 |
| MG(0:0/14:0/0:0) | 1.88269 | -2.396425517 |
| Sphinganine | 1.46259 | -1.353688662 |
| Alpha-Tocotrienol | 1.78427 | 1.573340492 |
| MG(0:0/16:0/0:0) | 1.75446 | -1.173105075 |
| Docosanamide | 1.94906 | -1.623745682 |
| 3-Oxohexadecanoic acid | 1.67798 | -4.140822579 |
| Phosphocholine | 1.53266 | -2.469506451 |
| Dodecanoylcarnitine | 1.77728 | -3.172944392 |
| Creatine | 1.51359 | -0.640881169 |
| 12,13-EpOME | 1.61941 | 3.823295465 |
| 12,13-diHOME | 1.54795 | 6.178657304 |
| Cholestenone | 1.65806 | 1.411480517 |
| Stigmasterol | 1.76371 | 0.812126162 |
| Alanylproline | 1.59357 | 0.510184612 |
| 3-Hydroxypicolinic acid | 1.5083 | 1.31676859 |
| Acetylcarnitine | 1.494 | -1.117764156 |
| Agmatine | 1.59512 | 1.906900037 |
| Acetylcholine | 1.65862 | -1.674756867 |
| Leukotriene A4 | 1.82758 | 0.875895561 |
| Jasmonic acid | 1.60353 | 3.291211347 |
| Gamma-Tocotrienol | 1.54301 | 3.294728599 |
| 3-Indoleacetic Acid | 2.20801 | 1.887321531 |
| Tyramine | 1.52292 | 1.129114722 |
| Thymine | 1.86664 | 1.449681321 |
| Indole | 1.78473 | 0.41691403 |
| Anthranilic acid | 2.05673 | 1.873975616 |
| L-Proline | 1.60613 | 0.463939663 |
| Maltitol | 2.20513 | 2.16449355 |
| alpha-Tocopherol | 1.70547 | -1.373407256 |
| Octadecanedioic acid | 1.46753 | 0.764335022 |
| Deoxycholic acid | 1.85869 | 4.260337761 |
| Urobilin | 1.68187 | 1.792473085 |
| gamma-Glutamylcysteine | 2.00579 | 0.554982865 |
| Nutriacholic acid | 1.49181 | 1.67148456 |
| Prostaglandin G2 | 1.48664 | 0.700765456 |
| Prostaglandin E1 | 1.63335 | 0.890821767 |
| Abscisic acid | 1.89171 | 0.999427992 |
| 12-Hydroxystearic acid | 1.72965 | -1.090242628 |
| Jasmonic acid | 1.67078 | 2.943268971 |
| Sebacic acid | 1.49948 | 1.093535982 |
| Decenedioic acid | 1.55915 | 1.196605122 |
| Xanthurenic acid | 1.65874 | -0.791642226 |
| Kynurenic acid | 1.58615 | 0.906834108 |
| D-Mannitol | 1.54799 | -1.883904931 |
| Caffeic Acid | 1.85991 | 1.956615942 |
| L-Ascorbic acid | 1.51678 | -4.243989453 |
| 3-Hydroxypicolinic acid | 2.06757 | 2.366329392 |
| L-Arabitol | 1.75568 | -4.03475644 |
| Fumaric acid | 1.47533 | -1.038164572 |