

1 **Chemical characterization, pathway enrichments and bioactive potentials of**  
2 **catechin-producing endophytic fungi isolated from tea leaves**

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## Supplementary data

**Table S1. Compounds identified in CSPL6. The corresponding chromatogram is in Fig. 3B.**

| S.No. | Name of Compound         | Retention time (min) | Relative area (%) | Chemical formula                               | M.W.   |
|-------|--------------------------|----------------------|-------------------|--|--------|
| 1     | Propanoate               | 5.28                 | 0.14              | C <sub>3</sub> H <sub>6</sub> O <sub>2</sub>   | 74.08  |
| 2     | Butanoic acid            | 8.63                 | 1.12              | C <sub>4</sub> H <sub>8</sub> O <sub>2</sub>   | 88.11  |
| 3     | Butane                   | 11.92                | 0.23              | C <sub>4</sub> H <sub>10</sub>                 | 58.12  |
| 4     | Decane                   | 12.42                | 0.07              | C <sub>10</sub> H <sub>22</sub>                | 142.28 |
| 5     | Propanoic acid           | 12.53                | 0.75              | C <sub>3</sub> H <sub>6</sub> O <sub>2</sub>   | 74.08  |
| 6     | Undecane                 | 13.88                | 0.09              | C <sub>11</sub> H <sub>24</sub>                | 156.31 |
| 7     | 2-Methyl-pyridine        | 16.50                | 0.10              | C <sub>6</sub> H <sub>7</sub> N                | 93.13  |
| 8     | Pantoyl lactone          | 16.52                | 0.06              | C <sub>6</sub> H <sub>10</sub> O <sub>3</sub>  | 130.14 |
| 9     | Dodecane                 | 17.05                | 0.15              | C <sub>12</sub> H <sub>26</sub>                | 170.33 |
| 10    | Pentanoic acid           | 18.06                | 0.32              | C <sub>5</sub> H <sub>10</sub> O <sub>2</sub>  | 102.13 |
| 11    | Glycerol                 | 19.22                | 0.15              | C <sub>3</sub> H <sub>8</sub> O <sub>3</sub>   | 92.09  |
| 12    | 2-methylpyran-4-one      | 19.52                | 0.16              | C <sub>6</sub> H <sub>6</sub> O <sub>2</sub>   | 110.11 |
| 13    | Butanedioic acid         | 20.41                | 2.51              | C <sub>4</sub> H <sub>6</sub> O <sub>4</sub>   | 118.09 |
| 14    | Pentadecane              | 20.65                | 0.09              | C <sub>15</sub> H <sub>32</sub>                | 212.41 |
| 15    | Benzaldehyde             | 22.09                | 0.07              | C <sub>7</sub> H <sub>6</sub> O                | 106.12 |
| 16    | 1-Dodecene               | 22.67                | 1.33              | C <sub>12</sub> H <sub>24</sub>                | 168.32 |
| 17    | Tetradecane              | 22.87                | 0.25              | C <sub>14</sub> H <sub>30</sub>                | 198.39 |
| 18    | Pentanedioic acid        | 22.94                | 0.07              | C <sub>5</sub> H <sub>8</sub> O <sub>4</sub>   | 132.11 |
| 19    | Methylmaleic acid        | 23.43                | 0.19              | C <sub>5</sub> H <sub>6</sub> O <sub>4</sub>   | 130.10 |
| 20    | 3-ketobutyrate           | 23.98                | 0.24              | C <sub>4</sub> H <sub>6</sub> O <sub>3</sub>   | 102.09 |
| 21    | Octanoic acid            | 24.17                | 0.11              | C <sub>8</sub> H <sub>16</sub> O <sub>2</sub>  | 144.21 |
| 22    | Phenol                   | 25.80                | 0.83              | C <sub>6</sub> H <sub>6</sub> O                | 94.11  |
| 23    | L-Proline                | 25.98                | 0.11              | C <sub>5</sub> H <sub>9</sub> NO <sub>2</sub>  | 115.13 |
| 24    | 4-Pyrimidinamine         | 26.40                | 0.08              | C <sub>4</sub> H <sub>5</sub> N <sub>3</sub>   | 95.10  |
| 25    | Acetic acid              | 27.12                | 1.07              | C <sub>2</sub> H <sub>4</sub> O <sub>2</sub>   | 60.05  |
| 26    | 1-Dodecanol              | 27.26                | 0.26              | C <sub>12</sub> H <sub>26</sub> O              | 186.33 |
| 27    | 4-Hydroxyphenylethanol   | 27.30                | 2.84              | C <sub>8</sub> H <sub>10</sub> O <sub>2</sub>  | 138.16 |
| 28    | Hexadecen-1-ol           | 27.91                | 1.71              | C <sub>16</sub> H <sub>32</sub> O              | 240.42 |
| 29    | Phloroglucinol           | 28.05                | 0.16              | C <sub>6</sub> H <sub>6</sub> O <sub>3</sub>   | 126.11 |
| 30    | Hexadecane               | 28.06                | 0.29              | C <sub>16</sub> H <sub>34</sub>                | 226.44 |
| 31    | Heptadecane              | 28.07                | 0.27              | C <sub>17</sub> H <sub>36</sub>                | 240.47 |
| 32    | Benzoic acid             | 28.68                | 1.61              | C <sub>7</sub> H <sub>6</sub> O <sub>2</sub>   | 122.12 |
| 33    | Benzeneacetic acid       | 28.98                | 3.30              | C <sub>8</sub> H <sub>8</sub> O <sub>2</sub>   | 136.15 |
| 34    | Dodecanoic acid          | 29.27                | 0.08              | C <sub>12</sub> H <sub>24</sub> O <sub>2</sub> | 200.32 |
| 35    | L-Threonic acid          | 29.91                | 0.11              | C <sub>4</sub> H <sub>8</sub> O <sub>5</sub>   | 136.10 |
| 36    | 11,14-Eicosadienoic acid | 30.45                | 0.12              | C <sub>20</sub> H <sub>36</sub> O <sub>2</sub> | 308.50 |
| 37    | Phosphorin               | 30.76                | 0.05              | C <sub>5</sub> H <sub>5</sub> P                | 96.07  |
| 38    | Glutaconic acid          | 31.06                | 0.23              | C <sub>5</sub> H <sub>6</sub> O <sub>4</sub>   | 130.10 |
| 39    | Nonanedioic acid         | 31.31                | 0.05              | C <sub>9</sub> H <sub>16</sub> O <sub>4</sub>  | 188.22 |

|    |                                 |        |      |   |        |
|----|---------------------------------|--------|------|---|--------|
| 40 | Hydrocinnamic acid              | 31.75  | 0.12 | C <sub>9</sub> H <sub>10</sub> O <sub>2</sub>                 | 150.17 |
| 41 | Azelaic acid                    | 32.59  | 0.11 | C <sub>9</sub> H <sub>16</sub> O <sub>4</sub>                 | 188.22 |
| 42 | 1-Nonadecene                    | 32.60  | 1.27 | C <sub>19</sub> H <sub>38</sub>                               | 266.50 |
| 43 | Carbamic acid                   | 33.89  | 0.05 | CH <sub>3</sub> NO <sub>2</sub>                               | 61.04  |
| 44 | D-Mannopyranose                 | 33.97  | 0.08 | C <sub>6</sub> H <sub>12</sub> O <sub>6</sub>                 | 180.16 |
| 45 | 13-cis-Retinoic acid            | 34.42  | 0.21 | C <sub>20</sub> H <sub>28</sub> O <sub>2</sub>                | 300.44 |
| 46 | α-D-Glucopyranoside             | 34.88  | 0.13 | C <sub>6</sub> H <sub>11</sub> O <sub>6</sub> <sup>-</sup>    | 179.15 |
| 47 | 3-Hydroxyanthranilic acid       | 34.93  | 0.07 | C <sub>7</sub> H <sub>7</sub> NO <sub>3</sub>                 | 153.14 |
| 48 | Methylglutaconic acid           | 35.27  | 0.26 | C <sub>6</sub> H <sub>8</sub> O <sub>4</sub>                  | 144.13 |
| 49 | Cinnamic acid                   | 35.67  | 0.12 | C <sub>9</sub> H <sub>8</sub> O <sub>2</sub>                  | 148.16 |
| 50 | n-Pentadecanoic acid            | 35.84  | 0.06 | C <sub>15</sub> H <sub>30</sub> O <sub>2</sub>                | 242.40 |
| 51 | 2-Undecenoic acid               | 35.94  | 0.32 | C <sub>11</sub> H <sub>20</sub> O <sub>2</sub>                | 184.28 |
| 52 | 10-Undecenoic acid              | 35.94  | 0.27 | C <sub>11</sub> H <sub>20</sub> O <sub>2</sub>                | 184.28 |
| 53 | D-(+)-trehalose                 | 35.967 | 0.06 | C <sub>12</sub> H <sub>22</sub> O <sub>11</sub>               | 342.30 |
| 54 | 2-Quinolinecarboxylic acid      | 36.71  | 0.50 | C <sub>10</sub> H <sub>7</sub> NO <sub>2</sub>                | 173.17 |
| 55 | Heneicosane                     | 36.98  | 0.15 | C <sub>21</sub> H <sub>44</sub>                               | 296.57 |
| 56 | Palmitelaidic acid              | 37.41  | 0.50 | C <sub>16</sub> H <sub>30</sub> O <sub>2</sub>                | 254.41 |
| 57 | Hexadecanoic acid               | 37.91  | 4.44 | C <sub>16</sub> H <sub>32</sub> O <sub>2</sub>                | 256.42 |
| 58 | Trinexapac-ethyl                | 38.67  | 0.06 | C <sub>13</sub> H <sub>16</sub> O <sub>5</sub>                | 252.26 |
| 59 | 2-Hydroxy-5-nitrobenzyl alcohol | 39.42  | 0.18 | C <sub>7</sub> H <sub>7</sub> NO <sub>4</sub>                 | 169.13 |
| 60 | D-Galactopyranose               | 39.73  | 0.29 | C <sub>6</sub> H <sub>12</sub> O <sub>6</sub>                 | 180.16 |
| 61 | 1,2,4-Triazole                  | 40.05  | 0.06 | C <sub>2</sub> H <sub>3</sub> N <sub>3</sub>                  | 69.07  |
| 62 | 1-Docosene                      | 40.74  | 0.47 | C <sub>22</sub> H <sub>44</sub>                               | 308.59 |
| 63 | Glycine                         | 40.87  | 0.91 | C <sub>2</sub> H <sub>5</sub> NO <sub>2</sub>                 | 75.07  |
| 64 | 9,12-Octadecadienoic acid       | 40.96  | 0.09 | C <sub>18</sub> H <sub>32</sub> O <sub>2</sub>                | 280.40 |
| 65 | 11-cis-Octadecenoic acid        | 41.21  | 0.11 | C <sub>18</sub> H <sub>34</sub> O <sub>2</sub>                | 282.50 |
| 66 | 3-methylvaleric acid            | 41.27  | 0.08 | C <sub>6</sub> H <sub>12</sub> O <sub>2</sub>                 | 116.16 |
| 67 | Camphoric acid                  | 41.32  | 0.13 | C <sub>10</sub> H <sub>16</sub> O <sub>4</sub>                | 200.23 |
| 68 | Octadecanoic acid               | 41.63  | 2.12 | C <sub>18</sub> H <sub>36</sub> O <sub>2</sub>                | 284.48 |
| 69 | Tetratriacontane                | 41.66  | 0.08 | C <sub>34</sub> H <sub>70</sub>                               | 478.92 |
| 70 | 2,5-Piperazinedione             | 42.13  | 0.05 | C <sub>4</sub> H <sub>6</sub> N <sub>2</sub> O <sub>2</sub>   | 114.10 |
| 71 | Tetradecanoic acid              | 42.98  | 0.78 | C <sub>14</sub> H <sub>28</sub> O <sub>2</sub>                | 228.37 |
| 72 | Octacosanol                     | 44.29  | 0.29 | C <sub>28</sub> H <sub>58</sub> O                             | 410.76 |
| 73 | Uridine                         | 45.13  | 0.18 | C <sub>9</sub> H <sub>12</sub> N <sub>2</sub> O <sub>6</sub>  | 244.20 |
| 74 | Linolenic acid                  | 45.68  | 0.07 | C <sub>18</sub> H <sub>30</sub> O <sub>2</sub>                | 278.43 |
| 75 | 5α-Androstan-17-one             | 45.95  | 0.09 | C <sub>19</sub> H <sub>30</sub> O                             | 274.40 |
| 76 | 1-Methyladenosine               | 47.44  | 0.78 | C <sub>11</sub> H <sub>15</sub> N <sub>5</sub> O <sub>4</sub> | 281.27 |
| 77 | Pregn-4-ene-3,20-dione          | 47.94  | 0.14 | C <sub>21</sub> H <sub>30</sub> O <sub>2</sub>                | 316.46 |
| 78 | 2-Amino-1-phenylethanol         | 49.79  | 0.12 | C <sub>8</sub> H <sub>11</sub> NO                             | 137.18 |
| 79 | Benzeneethanamine               | 49.79  | 0.16 | C <sub>8</sub> H <sub>11</sub> N                              | 121.18 |

**Table S2. Compounds identified in CSPL5b. The corresponding chromatogram is in Fig. 3C.**

| S.No. | Compound Name             | Retention time (min) | Relative area (%) | Molecular formula  | M.W.   |
|-------|---------------------------|----------------------|-------------------|--|--------|
| 1     | 2-Propenoic acid          | 5.17                 | 0.29              | C <sub>3</sub> H <sub>4</sub> O <sub>2</sub>                 | 72.06  |
| 2     | Propanoate                | 5.35                 | 0.83              | C <sub>3</sub> H <sub>6</sub> O <sub>2</sub>                 | 74.08  |
| 3     | L-(+)-Lactic acid         | 7.64                 | 0.07              | C <sub>3</sub> H <sub>6</sub> O <sub>3</sub>                 | 90.08  |
| 4     | 2,3-Butanediol            | 7.83                 | 0.11              | C <sub>4</sub> H <sub>10</sub> O <sub>2</sub>                | 90.12  |
| 5     | Butanoic acid             | 8.33                 | 4.75              | C <sub>4</sub> H <sub>8</sub> O <sub>2</sub>                 | 88.11  |
| 6     | Propanoic acid            | 12.62                | 7.50              | C <sub>3</sub> H <sub>6</sub> O <sub>2</sub>                 | 74.08  |
| 7     | Butane                    | 16.38                | 5.40              | C <sub>4</sub> H <sub>10</sub>                               | 58.12  |
| 8     | n-octene                  | 16.46                | 0.18              | C <sub>8</sub> H <sub>16</sub>                               | 112.21 |
| 9     | 1-Dodecene                | 16.80                | 0.26              | C <sub>12</sub> H <sub>24</sub>                              | 168.32 |
| 10    | Dodecane                  | 17.05                | 0.07              | C <sub>12</sub> H <sub>26</sub>                              | 170.33 |
| 11    | Pentanoic acid            | 18.03                | 1.42              | C <sub>5</sub> H <sub>10</sub> O <sub>2</sub>                | 102.13 |
| 12    | 5-Nonanol                 | 18.09                | 0.28              | C <sub>9</sub> H <sub>20</sub> O                             | 144.25 |
| 13    | Ethyl succinate           | 18.45                | 0.05              | C <sub>6</sub> H <sub>8</sub> O <sub>4</sub> <sup>-2</sup>   | 144.12 |
| 14    | Glycerol                  | 19.24                | 0.31              | C <sub>3</sub> H <sub>8</sub> O <sub>3</sub>                 | 92.09  |
| 15    | 3-Pyridinecarboxylic acid | 19.79                | 0.32              | C <sub>6</sub> H <sub>5</sub> NO <sub>2</sub>                | 123.11 |
| 16    | 1,3-Dioxolane             | 19.92                | 0.14              | C <sub>3</sub> H <sub>6</sub> O <sub>2</sub>                 | 74.08  |
| 17    | Benzeneacetic acid        | 19.96                | 4.54              | C <sub>8</sub> H <sub>8</sub> O <sub>2</sub>                 | 136.15 |
| 18    | Valproic acid             | 20.27                | 0.34              | C <sub>8</sub> H <sub>16</sub> O <sub>2</sub>                | 144.21 |
| 19    | Butanedioic acid          | 20.51                | 8.15              | C <sub>4</sub> H <sub>6</sub> O <sub>4</sub>                 | 118.09 |
| 20    | Benzaldehyde              | 22.10                | 0.13              | C <sub>7</sub> H <sub>6</sub> O                              | 106.12 |
| 21    | 1-Tridecene               | 22.67                | 0.91              | C <sub>13</sub> H <sub>26</sub>                              | 182.35 |
| 22    | Tetradecane               | 22.87                | 0.13              | C <sub>14</sub> H <sub>30</sub>                              | 198.39 |
| 23    | Pentanedioic acid         | 22.95                | 0.16              | C <sub>5</sub> H <sub>8</sub> O <sub>4</sub>                 | 132.11 |
| 24    | D-Isoleucine              | 23.83                | 0.15              | C <sub>6</sub> H <sub>13</sub> NO <sub>2</sub>               | 131.17 |
| 25    | 3-ketobutyrate            | 23.99                | 0.23              | C <sub>4</sub> H <sub>6</sub> O <sub>3</sub>                 | 102.09 |
| 26    | 4H-Pyran-4-one            | 24.89                | 0.60              | C <sub>5</sub> H <sub>4</sub> O <sub>2</sub>                 | 96.08  |
| 27    | Gly-leu                   | 25.11                | 0.08              | C <sub>8</sub> H <sub>16</sub> N <sub>2</sub> O <sub>3</sub> | 188.22 |
| 28    | Phenol                    | 25.81                | 0.87              | C <sub>6</sub> H <sub>6</sub> O                              | 94.11  |
| 29    | 4-Pyrimidinamine          | 26.41                | 0.05              | C <sub>4</sub> H <sub>5</sub> N <sub>3</sub>                 | 95.10  |
| 30    | Acetic acid               | 27.13                | 1.37              | C <sub>2</sub> H <sub>4</sub> O <sub>2</sub>                 | 60.05  |
| 31    | 1-Dodecanol               | 27.26                | 0.23              | C <sub>12</sub> H <sub>26</sub> O                            | 186.33 |
| 32    | 4-Hydroxyphenylethanol    | 27.30                | 2.59              | C <sub>8</sub> H <sub>10</sub> O <sub>2</sub>                | 138.16 |
| 33    | 1-Hexadecene              | 27.92                | 1.23              | C <sub>16</sub> H <sub>32</sub>                              | 224.42 |
| 34    | Hexadecane                | 28.07                | 0.15              | C <sub>16</sub> H <sub>34</sub>                              | 226.44 |
| 35    | 6-Amino-1-hexanol         | 28.33                | 0.14              | C <sub>6</sub> H <sub>15</sub> NO                            | 117.19 |
| 36    | Heptanedioic acid         | 28.43                | 0.05              | C <sub>7</sub> H <sub>12</sub> O <sub>4</sub>                | 160.17 |
| 37    | Benzoic acid              | 28.68                | 1.30              | C <sub>7</sub> H <sub>6</sub> O <sub>2</sub>                 | 122.12 |
| 38    | Dodecanoic acid           | 29.27                | 0.07              | C <sub>12</sub> H <sub>24</sub> O <sub>2</sub>               | 200.32 |
| 39    | Ala-Thr                   | 29.43                | 0.10              | C <sub>7</sub> H <sub>14</sub> N <sub>2</sub> O <sub>4</sub> | 190.20 |
| 40    | Octanedioic acid          | 30.33                | 0.11              | C <sub>8</sub> H <sub>14</sub> O <sub>4</sub>                | 174.19 |
| 41    | Azelaic acid              | 32.58                | 0.24              | C <sub>9</sub> H <sub>16</sub> O <sub>4</sub>                | 188.22 |
| 42    | 1-Nonadecene              | 32.61                | 1.23              | C <sub>19</sub> H <sub>38</sub>                              | 266.50 |
| 43    | Octadecane                | 32.74                | 0.13              | C <sub>18</sub> H <sub>38</sub>                              | 254.49 |

|    |                           |       |      |   |        |
|----|---------------------------|-------|------|---|--------|
| 44 | N-Acetyl-L-phenylalanine  | 32.85 | 0.09 | C <sub>11</sub> H <sub>13</sub> NO <sub>3</sub>               | 207.23 |
| 45 | 3-(2-Hydroxyethyl)indole  | 33.45 | 0.34 | C <sub>10</sub> H <sub>11</sub> NO                            | 161.20 |
| 46 | Tetradecanoic acid        | 33.74 | 0.17 | C <sub>14</sub> H <sub>28</sub> O <sub>2</sub>                | 228.37 |
| 47 | Hydrocinnamic acid        | 34.25 | 0.11 | C <sub>9</sub> H <sub>10</sub> O <sub>2</sub>                 | 150.17 |
| 48 | 3-Hydroxyanthranilic acid | 34.93 | 0.08 | C <sub>7</sub> H <sub>7</sub> NO <sub>3</sub>                 | 153.14 |
| 49 | 2,5-Piperazinedione       | 36.12 | 0.05 | C <sub>4</sub> H <sub>6</sub> N <sub>2</sub> O <sub>2</sub>   | 114.10 |
| 50 | 4-Aminobenzoic acid       | 36.83 | 0.20 | C <sub>7</sub> H <sub>7</sub> NO <sub>2</sub>                 | 137.14 |
| 51 | Indole-3-carboxylic acid  | 36.92 | 0.12 | C <sub>9</sub> H <sub>7</sub> NO <sub>2</sub>                 | 161.16 |
| 52 | Heneicosane               | 36.97 | 0.08 | C <sub>21</sub> H <sub>44</sub>                               | 296.57 |
| 53 | Eicosane                  | 36.97 | 0.08 | C <sub>20</sub> H <sub>42</sub>                               | 282.55 |
| 54 | 2-Mercaptobenzothiazole   | 37.32 | 0.38 | C <sub>7</sub> H <sub>5</sub> NS <sub>2</sub>                 | 167.25 |
| 55 | Hexadecanoic acid         | 37.88 | 3.07 | C <sub>16</sub> H <sub>32</sub> O <sub>2</sub>                | 256.42 |
| 56 | Methyl stearate           | 39.42 | 0.15 | C <sub>19</sub> H <sub>38</sub> O <sub>2</sub>                | 298.50 |
| 57 | 1-Docosene                | 40.73 | 0.45 | C <sub>22</sub> H <sub>44</sub>                               | 308.59 |
| 58 | 9,12-Octadecadienoic acid | 40.95 | 0.09 | C <sub>18</sub> H <sub>32</sub> O <sub>2</sub>                | 280.40 |
| 59 | Androst-2-en-17-amine     | 41.04 | 0.13 | C <sub>19</sub> H <sub>31</sub> N                             | 273.50 |
| 60 | trans-9-Octadecenoic acid | 41.06 | 0.32 | C <sub>18</sub> H <sub>34</sub> O <sub>2</sub>                | 282.46 |
| 61 | Octadecanoic acid         | 41.59 | 1.87 | C <sub>18</sub> H <sub>36</sub> O <sub>2</sub>                | 284.48 |
| 62 | Mannopyranose             | 44.26 | 0.24 | C <sub>6</sub> H <sub>12</sub> O <sub>6</sub>                 | 180.16 |
| 63 | Octacosanol               | 44.28 | 0.36 | C <sub>28</sub> H <sub>58</sub> O                             | 410.76 |
| 64 | Uridine                   | 45.11 | 0.28 | C <sub>9</sub> H <sub>12</sub> N <sub>2</sub> O <sub>6</sub>  | 244.20 |
| 65 | 2'-Deoxyadenosine         | 47.22 | 0.06 | C <sub>10</sub> H <sub>13</sub> N <sub>5</sub> O <sub>3</sub> | 251.24 |
| 66 | 1-Methyladenosine         | 47.45 | 1.61 | C <sub>11</sub> H <sub>15</sub> N <sub>5</sub> O <sub>4</sub> | 281.27 |

**Phytochemical sub-classes identified in CSPL6. Data corresponds to Fig. 4A. Color shade (red to white) indicates a high to low level of abundance.**

|  | <b>Metabolite Set</b>      | <b>Total</b> | <b>Hits</b> | <b>Expect</b> | <b>P value</b> | <b>Holm P</b> | <b>FDR</b> |
|--|----------------------------|--------------|-------------|---------------|----------------|---------------|------------|
|  | Saturated Fatty Acids      | 38           | 9           | 0.0103        | 6.6E-25        | 4.82E-22      | 4.82E-22   |
|  | Hydrocarbons               | 52           | 6           | 0.0142        | 6.17E-15       | 4.5E-12       | 2.26E-12   |
|  | Alkanes                    | 42           | 5           | 0.0114        | 1.05E-12       | 7.62E-10      | 2.55E-10   |
|  | Organic dicarboxylic acids | 23           | 3           | 0.00626       | 3.37E-8        | 2.45E-5       | 6.15E-6    |
|  | Unsaturated Fatty Acids    | 267          | 4           | 0.0727        | 9.64E-7        | 7.01E-4       | 1.33E-4    |
|  | Straight chain Fatty Acids | 6            | 2           | 0.00163       | 1.09E-6        | 7.92E-4       | 1.33E-4    |
|  | Dicarboxylic acids         | 140          | 3           | 0.0381        | 8.32E-6        | 0.00603       | 8.69E-4    |
|  | Pyridoxines                | 2            | 1           | 5.45E-4       | 5.45E-4        | 0.394         | 0.0442     |
|  | Tyrosols                   | 2            | 1           | 5.45E-4       | 5.45E-4        | 0.394         | 0.0442     |
|  | Phenols                    | 3            | 1           | 8.17E-4       | 8.17E-4        | 0.59          | 0.0498     |
|  | Aminopyrimidines           | 3            | 1           | 8.17E-4       | 8.17E-4        | 0.59          | 0.0498     |
|  | Benzenetriols              | 3            | 1           | 8.17E-4       | 8.17E-4        | 0.59          | 0.0498     |
|  | Cinnamic acids             | 4            | 1           | 0.00109       | 0.00109        | 0.783         | 0.0569     |
|  | Biopterins                 | 4            | 1           | 0.00109       | 0.00109        | 0.783         | 0.0569     |
|  | Hydroxybenzoic acids       | 6            | 1           | 0.00163       | 0.00163        | 1.0           | 0.0746     |
|  | Pyrimidine ribonucleosides | 6            | 1           | 0.00163       | 0.00163        | 1.0           | 0.0746     |
|  | Purine ribonucleosides     | 8            | 1           | 0.00218       | 0.00218        | 1.0           | 0.0808     |
|  | Quinoline carboxylic acids | 8            | 1           | 0.00218       | 0.00218        | 1.0           | 0.0808     |
|  | Disaccharides              | 9            | 1           | 0.00245       | 0.00245        | 1.0           | 0.0808     |
|  | TCA acids                  | 9            | 1           | 0.00245       | 0.00245        | 1.0           | 0.0808     |
|  | Phenethylamines            | 9            | 1           | 0.00245       | 0.00245        | 1.0           | 0.0808     |
|  | Benzyl alcohols            | 9            | 1           | 0.00245       | 0.00245        | 1.0           | 0.0808     |
|  | Hydroxy Fatty Acids        | 274          | 2           | 0.0746        | 0.0026         | 1.0           | 0.0808     |
|  | Amino acids                | 277          | 2           | 0.0754        | 0.00265        | 1.0           | 0.0808     |
|  | Sugar alcohols             | 12           | 1           | 0.00327       | 0.00326        | 1.0           | 0.0954     |
|  | Phenylacetic acids         | 15           | 1           | 0.00408       | 0.00408        | 1.0           | 0.115      |
|  | Monosaccharides            | 18           | 1           | 0.0049        | 0.00489        | 1.0           | 0.132      |
|  | Phenylpropanoic acids      | 23           | 1           | 0.00626       | 0.00625        | 1.0           | 0.163      |
|  | Benzoic acids              | 24           | 1           | 0.00654       | 0.00652        | 1.0           | 0.164      |
|  | Fatty alcohols             | 452          | 2           | 0.123         | 0.00686        | 1.0           | 0.167      |
|  | Oxo Fatty Acids            | 43           | 1           | 0.0117        | 0.0116         | 1.0           | 0.275      |
|  | Retinoids                  | 70           | 1           | 0.0191        | 0.0189         | 1.0           | 0.431      |
|  | C21 steroids               | 148          | 1           | 0.0403        | 0.0395         | 1.0           | 0.861      |
|  | Oxo Fatty Acids            | 150          | 1           | 0.0408        | 0.04           | 1.0           | 0.861      |
|  | Branched Fatty Acids       | 372          | 1           | 0.101         | 0.0964         | 1.0           | 1.0        |

**Table S4. Phytochemical sub-classes identified in CSPL5b. Data corresponds to Fig. 4B. Color shade (red to white) indicates a high to low level of abundance.**

|  | <b>Metabolite Set</b>              | <b>Total</b> | <b>Hits</b> | <b>Expect</b> | <b>P value</b> | <b>Holm P</b> | <b>FDR</b> |
|--|------------------------------------|--------------|-------------|---------------|----------------|---------------|------------|
|  | Saturated Fatty Acids              | 38           | 8           | 0.00939       | 3.7E-22        | 2.71E-19      | 2.71E-19   |
|  | Alkanes                            | 42           | 4           | 0.0104        | 3.66E-10       | 2.67E-7       | 1.34E-7    |
|  | Hydrocarbons                       | 52           | 4           | 0.0128        | 8.83E-10       | 6.44E-7       | 2.15E-7    |
|  | Organic dicarboxylic acids         | 23           | 3           | 0.00568       | 2.5E-8         | 1.82E-5       | 4.57E-6    |
|  | Straight chain Fatty Acids         | 6            | 2           | 0.00148       | 8.97E-7        | 6.52E-4       | 1.31E-4    |
|  | Unsaturated aliphatic hydrocarbons | 12           | 2           | 0.00297       | 3.94E-6        | 0.00286       | 4.8E-4     |
|  | Tyrosols                           | 2            | 1           | 4.94E-4       | 4.94E-4        | 0.358         | 0.0493     |
|  | Dicarboxylic acids                 | 140          | 2           | 0.0346        | 5.7E-4         | 0.412         | 0.0493     |
|  | Phenols                            | 3            | 1           | 7.41E-4       | 7.41E-4        | 0.536         | 0.0493     |
|  | Aminopyrimidines                   | 3            | 1           | 7.41E-4       | 7.41E-4        | 0.536         | 0.0493     |
|  | Benzenetriols                      | 3            | 1           | 7.41E-4       | 7.41E-4        | 0.536         | 0.0493     |
|  | Indolecarboxylic acids             | 4            | 1           | 9.88E-4       | 9.88E-4        | 0.711         | 0.0602     |
|  | Purine deoxyribonucleosides        | 5            | 1           | 0.00124       | 0.00123        | 0.888         | 0.0645     |
|  | Medium-chain keto acids            | 5            | 1           | 0.00124       | 0.00123        | 0.888         | 0.0645     |
|  | Hydroxybenzoic acids               | 6            | 1           | 0.00148       | 0.00148        | 1.0           | 0.0677     |
|  | Pyrimidine ribonucleosides         | 6            | 1           | 0.00148       | 0.00148        | 1.0           | 0.0677     |
|  | Aminobenzoic acids                 | 7            | 1           | 0.00173       | 0.00173        | 1.0           | 0.0743     |
|  | Purine ribonucleosides             | 8            | 1           | 0.00198       | 0.00198        | 1.0           | 0.0784     |
|  | Unsaturated Fatty Acids            | 267          | 2           | 0.066         | 0.00204        | 1.0           | 0.0784     |
|  | TCA acids                          | 9            | 1           | 0.00222       | 0.00222        | 1.0           | 0.0812     |
|  | Sugar alcohols                     | 12           | 1           | 0.00297       | 0.00296        | 1.0           | 0.103      |
|  | Pyridinecarboxylic acids           | 14           | 1           | 0.00346       | 0.00345        | 1.0           | 0.113      |
|  | Phenylacetic acids                 | 15           | 1           | 0.00371       | 0.0037         | 1.0           | 0.113      |
|  | Indoles                            | 15           | 1           | 0.00371       | 0.0037         | 1.0           | 0.113      |
|  | Monosaccharides                    | 18           | 1           | 0.00445       | 0.00444        | 1.0           | 0.13       |
|  | Dipeptides                         | 416          | 2           | 0.103         | 0.00484        | 1.0           | 0.136      |
|  | Phenylpropanoic acids              | 23           | 1           | 0.00568       | 0.00567        | 1.0           | 0.148      |
|  | Fatty alcohols                     | 452          | 2           | 0.112         | 0.00568        | 1.0           | 0.148      |
|  | Benzoic acids                      | 24           | 1           | 0.00593       | 0.00591        | 1.0           | 0.149      |
|  | Branched Fatty Acids               | 38           | 1           | 0.00939       | 0.00935        | 1.0           | 0.228      |
|  | Oxo Fatty Acids                    | 43           | 1           | 0.0106        | 0.0106         | 1.0           | 0.249      |
|  | Fatty acid esters                  | 133          | 1           | 0.0329        | 0.0323         | 1.0           | 0.739      |
|  | Oxo Fatty Acids                    | 150          | 1           | 0.0371        | 0.0364         | 1.0           | 0.806      |
|  | Amino acids                        | 277          | 1           | 0.0685        | 0.0662         | 1.0           | 1.0        |
|  | Unsaturated Fatty Acids            | 911          | 1           | 0.225         | 0.202          | 1.0           | 1.0        |
|  | Wax monoesters                     | 949          | 1           | 0.235         | 0.21           | 1.0           | 1.0        |

**Table S5. Metabolic pathway impact for CSPL6. Data corresponds to Fig. 4D.**

| Pathway Name                                 | Match Status | p         | -log(p) | Holm p   | FDR      | Impact  |
|--|--------------|-----------|---------|----------|----------|---------|
| Biosynthesis of unsaturated fatty acids      | 4/22         | 2.2349E-4 | 3.6507  | 0.021455 | 0.021455 | 0.0     |
| Butanoate metabolism                         | 3/17         | 0.001686  | 2.7731  | 0.16017  | 0.080928 | 0.07143 |
| Fatty acid biosynthesis                      | 4/56         | 0.0080343 | 2.0951  | 0.75523  | 0.19366  | 0.01429 |
| Glyoxylate and dicarboxylate metabolism      | 3/29         | 0.0080691 | 2.0932  | 0.75523  | 0.19366  | 0.09678 |
| Phenylalanine metabolism                     | 2/11         | 0.01066   | 1.9722  | 0.98072  | 0.20467  | 0.125   |
| Sulfur metabolism                            | 2/15         | 0.019633  | 1.707   | 1.0      | 0.31412  | 0.0     |
| Propanoate metabolism                        | 2/20         | 0.033971  | 1.4689  | 1.0      | 0.46588  | 0.04545 |
| Synthesis and degradation of ketone bodies   | 1/4          | 0.058089  | 1.2359  | 1.0      | 0.61962  | 0.0     |
| Linoleic acid metabolism                     | 1/4          | 0.058089  | 1.2359  | 1.0      | 0.61962  | 0.66667 |
| C5-Branched dibasic acid metabolism          | 1/6          | 0.085912  | 1.0659  | 1.0      | 0.82475  | 0.25    |
| Aminoacyl-tRNA biosynthesis                  | 2/46         | 0.14701   | 0.83264 | 1.0      | 1.0      | 0.07408 |
| Vitamin B6 metabolism                        | 1/11         | 0.15208   | 0.81793 | 1.0      | 1.0      | 0.14286 |
| Nitrogen metabolism                          | 1/12         | 0.16475   | 0.78317 | 1.0      | 1.0      | 0.0     |
| Tyrosine metabolism                          | 1/16         | 0.21366   | 0.67028 | 1.0      | 1.0      | 0.0     |
| Cutin, suberine, and wax biosynthesis        | 1/18         | 0.23707   | 0.62512 | 1.0      | 1.0      | 0.07143 |
| Citrate cycle (TCA cycle)                    | 1/20         | 0.25982   | 0.58532 | 1.0      | 1.0      | 0.07143 |
| Glycerolipid metabolism                      | 1/21         | 0.27095   | 0.56711 | 1.0      | 1.0      | 0.03704 |
| Alanine, aspartate and glutamate metabolism  | 1/22         | 0.28192   | 0.54987 | 1.0      | 1.0      | 0.0     |
| Starch and sucrose metabolism                | 1/22         | 0.28192   | 0.54987 | 1.0      | 1.0      | 0.02857 |
| Pyruvate metabolism                          | 1/22         | 0.28192   | 0.54987 | 1.0      | 1.0      | 0.03448 |
| Valine, leucine, and isoleucine biosynthesis | 1/22         | 0.28192   | 0.54987 | 1.0      | 1.0      | 0.05    |
| Thiamine metabolism                          | 1/22         | 0.28192   | 0.54987 | 1.0      | 1.0      | 0.05263 |
| Fatty acid elongation                        | 1/23         | 0.29274   | 0.53352 | 1.0      | 1.0      | 0.0     |
| Glycolysis / Gluconeogenesis                 | 1/26         | 0.32425   | 0.48912 | 1.0      | 1.0      | 0.02941 |
| Glutathione metabolism                       | 1/26         | 0.32425   | 0.48912 | 1.0      | 1.0      | 0.0303  |
| Galactose metabolism                         | 1/27         | 0.33445   | 0.47566 | 1.0      | 1.0      | 0.0     |
| Tryptophan metabolism                        | 1/28         | 0.34451   | 0.4628  | 1.0      | 1.0      | 0.04348 |
| alpha-Linolenic acid metabolism              | 1/28         | 0.34451   | 0.4628  | 1.0      | 1.0      | 0.08333 |
| Cyanoamino acid metabolism                   | 1/29         | 0.35442   | 0.45048 | 1.0      | 1.0      | 0.05    |
| Glycine, serine and threonine metabolism     | 1/33         | 0.39265   | 0.40599 | 1.0      | 1.0      | 0.13514 |
| Arginine and proline metabolism              | 1/34         | 0.40187   | 0.39592 | 1.0      | 1.0      | 0.05714 |
| Valine, leucine and isoleucine degradation   | 1/37         | 0.42872   | 0.36783 | 1.0      | 1.0      | 0.0     |
| Fatty acid degradation                       | 1/37         | 0.42872   | 0.36783 | 1.0      | 1.0      | 0.02174 |
| Pyrimidine metabolism                        | 1/38         | 0.43741   | 0.35911 | 1.0      | 1.0      | 0.04    |



**Table S6. Metabolic impact pathway for CSPL5b. Data corresponds to Fig. 4E.**

| Pathway Name                                | Match Status | p         | -log(p) | Holm p   | FDR      | Impact  |
|---|--------------|-----------|---------|----------|----------|---------|
| Butanoate metabolism                        | 3/17         | 9.1919E-4 | 3.0366  | 0.088242 | 0.088242 | 0.07143 |
| Biosynthesis of unsaturated fatty acids     | 3/22         | 0.0020038 | 2.6982  | 0.19036  | 0.09618  | 0.0     |
| Fatty acid biosynthesis                     | 4/56         | 0.0037623 | 2.4245  | 0.35366  | 0.12039  | 0.01429 |
| Sulfur metabolism                           | 2/15         | 0.013311  | 1.8758  | 1.0      | 0.31947  | 0.0     |
| Propanoate metabolism                       | 2/20         | 0.023237  | 1.6338  | 1.0      | 0.44558  | 0.04545 |
| Pyruvate metabolism                         | 2/22         | 0.027849  | 1.5552  | 1.0      | 0.44558  | 0.06896 |
| Glycolysis / Gluconeogenesis                | 2/26         | 0.038075  | 1.4194  | 1.0      | 0.45812  | 0.05882 |
| Glyoxylate and dicarboxylate metabolism     | 2/29         | 0.046555  | 1.332   | 1.0      | 0.45812  | 0.03226 |
| Synthesis and degradation of ketone bodies  | 1/4          | 0.047721  | 1.3213  | 1.0      | 0.45812  | 0.0     |
| Linoleic acid metabolism                    | 1/4          | 0.047721  | 1.3213  | 1.0      | 0.45812  | 0.66667 |
| Phenylalanine metabolism                    | 1/11         | 0.1261    | 0.89929 | 1.0      | 1.0      | 0.0     |
| Nicotinate and nicotinamide metabolism      | 1/13         | 0.14735   | 0.83166 | 1.0      | 1.0      | 0.0     |
| Tyrosine metabolism                         | 1/16         | 0.17831   | 0.74883 | 1.0      | 1.0      | 0.0     |
| Cutin, suberine and wax biosynthesis        | 1/18         | 0.19836   | 0.70255 | 1.0      | 1.0      | 0.07143 |
| Citrate cycle (TCA cycle)                   | 1/20         | 0.21794   | 0.66166 | 1.0      | 1.0      | 0.07143 |
| Glycerolipid metabolism                     | 1/21         | 0.22756   | 0.6429  | 1.0      | 1.0      | 0.03704 |
| Alanine, aspartate and glutamate metabolism | 1/22         | 0.23707   | 0.62512 | 1.0      | 1.0      | 0.0     |
| Fatty acid elongation                       | 1/23         | 0.24647   | 0.60823 | 1.0      | 1.0      | 0.0     |
| Galactose metabolism                        | 1/27         | 0.28299   | 0.54823 | 1.0      | 1.0      | 0.0     |
| Folate biosynthesis                         | 1/27         | 0.28299   | 0.54823 | 1.0      | 1.0      | 0.03448 |
| Tryptophan metabolism                       | 1/28         | 0.29185   | 0.53484 | 1.0      | 1.0      | 0.04348 |
| Valine, leucine and isoleucine degradation  | 1/37         | 0.3671    | 0.43521 | 1.0      | 1.0      | 0.0     |
| Fatty acid degradation                      | 1/37         | 0.3671    | 0.43521 | 1.0      | 1.0      | 0.02174 |
| Pyrimidine metabolism                       | 1/38         | 0.37498   | 0.42599 | 1.0      | 1.0      | 0.04    |
| Purine metabolism                           | 1/63         | 0.54434   | 0.26413 | 1.0      | 1.0      | 0.01333 |

**Table S7. Bioactivities of identified compounds. ▲ means increase; ▼ means decrease; ● means no change.**

| <b>Compounds</b>                                   | <b>Bioactivities</b>  | <b>References</b>   |
|--|---|---|
| <b>Palmitic acid<br/>(hexadecanoic acid)</b>       | PLA <sub>2</sub> ▼ (enzyme kinetic study)   | (Aparna et al., 2012)   |
| <b>Phenylacetic acid,<br/>(Benzeneacetic acid)</b> | Aux/IAAAs ▼, TIR1/AFB ▼   | (Shimizu-Mitao & Kakimoto, 2014)  |
|  | Phytotoxin, Benzoic acid ▲  | (Kawazu, Zhang, & Kanzaki, 1996)  |
|  | Antimicrobial activity  | (Kim et al., 2004)  |
|  | Antifungal activity   | (Hwang, Lim, Kim, Lee, & Moon, 2001; Slininger, Burkhead, & Schisler, 2004) |
|  | Myeloperoxidase ▼, PGE <sub>2</sub> ▼, NFκB ▼, COX-2 ▼, and mast cell activation ▼  | (K. M. Kwon et al., 2024)   |
| <b>Succinic acid<br/>(Butanedioic acid)</b>        | Antioxidant, protein SH groups ▼, ceruloplasmin ▲   | (Bespyatykh, Kokorina, & Domskii, 2011)                                     |
|  | Cardiomyocyte Akt ▲   | (Tang et al., 2013)   |
| <b>Stearic acid<br/>(Octadecanoic acid)</b>        | Lipid peroxidation ▼, PPAR-γ ▲, SOD ▲, CAT ▲  | (Z.-j. Wang, Liang, Li, Yu, & Yin, 2007)                                    |
|  | NFκB ▼  | (Pan et al., 2010)  |
| <b>Tetradecanoic acid<br/>(myristic acid)</b>      | Free radical scavenging ▲, COX ▼  | (Henry, Momin, Nair, & Dewitt, 2002)  |
|  | Scavenger receptor BI ▼, cholesteryl ester ▼, sterol 27 hydroxylase ▲, 3-hydroxy-3-methyl glutaryl coenzyme A reductase ● | (Loison, Mendy, Sérougne, & Lutton, 2002)                                   |
|  | Modulation ▼▲ of IL-1, TNF-α, IL-8, p38, JNK kinases  | (Håversen, Danielsson, Fogelstrand, & Wiklund, 2009)                        |
| <b>Propionic acid<br/>(Propanoic acid)</b>         | Leptin mRNA expression ▲  | (S. a. H. Al-Lahham et al., 2010)   |
|  | Lipoprotein lipase ▲, TNF-α ▼, IL-4 ▼, IL-10 ▼, IL-8 ▼, MIP-1α ▼, MIP-1β ▼, CCL5 ▼, and CXCL10 ▼                          | (S. a. Al-Lahham et al., 2012)  |
|  | T-cell numbers ▲, IL-10 ▲, and NPC1 1 ▼   | (Haghikia et al., 2022)   |
|  | Gluconeogenic enzymes ▼; AMPK ▲   | (Yoshida, Ishii, & Akagawa, 2019)   |
| <b>Butyrate (Butanoic acid)</b>                    | IL-6 ▼, IL-1β ▼, and IL-10 ▲  | (F. Wang et al., 2017)  |
|  | Cholesterol absorption ▼, NPC111 ▼, ABCG5 ▲,  | (Y. Chen et al., 2018)  |

|  |  |   |
|--|--|---|
|  | and ABCG8 ▲  |   |
|  | AKT ▲, and NF-κB signaling ▲   | (He et al., 2020)                             |
|  | IL-22 ▲ by CD4 <sup>+</sup> T cells and ILCs   | (Yang et al., 2020)                           |
| <b>Tryptophol (3-(2-Hydroxyethyl)indole)</b>       | Anti-inflammatory properties, IFN-γ ▼, TNF-α ▼   | (Schirmer et al., 2016)                       |
| <b>3-Hydroxyanthranilic acid</b>                   | TNF-α ▼, IP-10 ▼, IL-8 ●, HO-1 ▼   | (Krause et al., 2011)                         |
|  | inhibits the PI3K/Akt/mTOR and NF-κB signaling pathways, IL-6 ▼, and TNF-α ▼   | (K. Lee, Kwak, & Pyo, 2016)                   |
| <b>Cinnamic acid</b>                               | Obesity ▼, epididymal fat accumulation ▼, insulin resistance ▼, glucose intolerance ▼, dyslipidemia ▼  | (A. G. Lee, Kang, Im, & Pak, 2022)            |
|  | TNF-α ▼, and macrophage infiltration ▼<br>Reduced Ly6c <sup>high</sup> monocytes, M1 adipose tissue macrophages, and hypothalamus microglial activation<br>TNF-α ▼, IL-6 ▼, MPO ▼, and TLR-4 ▼ | (Rezaei et al., 2024)                         |
| <b>Isotretinoin (13-cis-Retinoic acid)</b>         | Antimicrobial activity against <i>Propionibacterium acnes</i>  | (Raza et al., 2013)                           |
| <b>Camphoric acid</b>                              | Antifungal activity against <i>Physalospora piricola</i>   | (Ma et al., 2014)                             |
| <b>Phloroglucinol</b>                              | Inhibits VEGF-dependent migration, EPCs, tumor growth, angiogenesis, and CD45(-)/CD34(+) progenitor mobilization   | (Y.-H. Kwon et al., 2012)                     |
|  | iNOS ▼, and NF-κB ▼  | (Li, Khan, Qiu, & Li, 2018)                   |
|  | ROS ▼, NF-κB ▼, Bcl-2 ▼, MMP-2 ▼, VEGF ▼; TNF-α ▼, IL-6 ▼, IL-1β ▼, and NO ▼   | (Veena, Popavath, Kennedy, & Sakthivel, 2015) |
| <b>Quinaldic acid (2-Quinolinecarboxylic acid)</b> | Anti-microbial agent: ▼ <i>Clostridium difficile</i> and <i>C. perfringens</i> , <i>C. difficile</i> , and <i>C. perfringens</i>   | (C.-H. Lee & Lee, 2009)                       |
| <b>Valproate (Valproic acid)</b>                   | TNF-α ▼, leukocyte infiltration ▼, and MPO ▼   | (Ximenes et al., 2013)                        |
|  | Inflammatory proteins ▼ (pNFκB, iNOS, and COX-2), pro-apoptotic proteins ▼ (pAKT/AKT and pGSK-3β/GSK-3β), and proinflammatory cytokines ▼ (TNF-α and IL-1β)                                    | (J.-Y. Chen et al., 2018)                     |
| <b>Azelaic acid</b>                                | IL-1β ▼, IL-6 ▼, TNF-α ▼, and NF-κB ▼  | (Mastrofrancesco et al., 2010)                |
|  | Antioxidant and free radical scavengers  | (Passi et al., 1991; Spaggiari et al., 2023)  |

**PLA<sub>2</sub>**= Phospholipase A<sub>2</sub>; **Aux**= Auxin; **IAA**= Indole-3-acetic acid; **TIR1**= Transport inhibitor response 1; **AFB**= Auxin signaling F-box; **PGE<sub>2</sub>**= Prostaglandin E<sub>2</sub>; **NF-κβ**= Nuclear factor kappa beta; **COX**= Cyclooxygenase; **PPAR-γ**= peroxisome proliferator-activated receptor γ; **SOD**= Superoxide dismutase; **CAT**= Catalase; **IL**= Interleukin; **TNF-α**= Tumor necrosis factor alpha; **JNK**= Jun N-terminal kinase; **MIP**=

macrophage inflammatory protein; **CCL5**=;chemokine (C-C motif) ligand 5; **CXCL10**= C-X-C motif chemokine ligand 10; **NPC111**= Niemann-Pick C1-like 1; **AMPK**= AMP-activated protein kinase; **ABCG5**= ATP-binding cassette transporters G5; **ABCG8**= ATP-binding cassette transporters G8; **ILCs**= Innate lymphoid cells; **IFN- $\gamma$** = Interferon gamma; **IP-10**= interferon gamma-induced protein 10; **HO-1**= Heme oxygenase 1; **PI3K**= phosphoinositide-3-kinase; **mTOR**= mammalian target of rapamycin; **MPO**= Myeloperoxidase; **TLR4**= Toll-like receptor 4; **iNOS**= Inducible nitric oxide synthase; **ROS**= Reactive oxygen species; **Bcl-2**= B-cell lymphoma 2; **MMP-2**= matrix metalloproteinase-2; **EPCs**= endothelial progenitor cells; **VEGF**= vascular endothelial growth factor; **NO**= Nitric oxide; **GSK-3**= glycogen synthase kinase-3

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