

## Potential Biomarkers for Lipid/Carbohydrate Metabolism <sup>13,21,22</sup>

### Considerations for Potential Biomarkers

(Please determine whether the parameters identified in each column would/would not apply to the biomarker.)

Potential Biomarkers	Useful for predicting human disease or increased risk of disease	Useful for rodents	Detects tissue injury or altered function	Useful for detection of alterations across many diseases	Methods for human samples applicable to rodent specimens	Other Special Concerns: e.g., specific time(s) for biomarker measurement; additional animals needed
<i>Serum/Plasma Analyses</i>						
Cholesterol/triglycerides <sup>5-8,10,15,17,19</sup>						
Fatty acids <sup>6-8,10,15</sup>						
Lipoproteins <sup>5-7,15,17,19</sup>						
Glucose <sup>4,5,8,10,12,15,20</sup>						
Insulin <sup>4,5,8,10,12,15,20</sup>						
Leptin <sup>6,13,15</sup>						
Adiponectin <sup>5,6,13</sup>						
Retinol-binding protein 4 <sup>6,16</sup>						
Resistin <sup>5</sup>						
Tumor necrosis factor alpha <sup>5,15</sup>						

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<b>Potential Biomarkers</b>						
<i>Serum/Plasma Analyses Cont'd</i>						
Interleukin-6 <sup>5,6,15</sup>						
Plasminogen activator inhibitor-1 <sup>15</sup>						
C-reactive protein <sup>5,6</sup>						
<i>Tissue Analyses</i>						
Body composition (fat/lean) <sup>1,18,23</sup>						
Triglyceride/cholesterol/fatty acid (liver) <sup>7,8,10,17,19,21,24</sup>						
Phospholipids (liver) <sup>21</sup>						
Fatty acid binding proteins (adipose) <sup>11</sup>						
Sterol regulatory element-binding proteins-1 & 2 (SREBP-1 & 2) (liver, adipose) <sup>7,8,10,14</sup>						
SREBP cleavage-activating protein (liver) <sup>10,14</sup>						
beta-Adrenergic receptors (adipose) <sup>3,4</sup>						
Glucose transporter 4 (adipose) <sup>6,16</sup>						
Uncoupling protein 1 (adipose) <sup>2,9</sup>						

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<b>Potential Biomarkers</b>						
<i>Tissue Morphology</i> <sup>8</sup>						
Oil red-O stain						
Enzyme/immunohistochemistry <sup>17</sup>						

## Lipid/Carbohydrate References

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