



Blood-based biomarkers for obesity and metabolic conditions in clinical research

Obesity and related cardiometabolic conditions are key targets for the development of new therapeutics. Diabetes and cardiovascular rank among the top therapeutic areas with the highest forecast spending by 2028.¹ Obesity clinical trials increased 68% from 2022 to 2023, with 124 drugs in active development.²

Biomarkers associated with obesity and related metabolic conditions, include:³⁻⁷

Adipokines

- Proteins secreted by adipose tissue — such as adiponectin, leptin, and resistin — that play roles in regulating energy balance and metabolism.⁴
- Fatty-Acid-Binding Protein-4 (FABP4) plays a role in lipid metabolism and is associated with obesity and metabolic syndrome.³

Inflammatory Markers

- Proteins like C-reactive protein (CRP) and interleukin-6 (IL-6), which are linked to the chronic low-grade inflammation observed in obesity.⁴
- Tumor Necrosis Factor Alpha (TNF α) is also implicated in systemic inflammation and obesity.^{4,5}

Metabolic Markers

- Proteins involved in glucose-insulin homeostasis and lipid metabolism, such as insulin, insulin-like growth factors and fatty-acid-binding proteins.^{3,4}
- C-peptide — a byproduct of insulin production — that is used to measure natural insulin production and is also associated with colon cancer.⁴

Metabolic-related conditions may benefit from the use of multiple analytes or multiplex assays for a comprehensive understanding of the predispositions and pathophysiological events associated with dysregulation.³⁻⁷ Metabolic biomarkers are also a useful tool to screen for potential drug targets and evaluate the efficacy of drug candidates.⁶

These biomarkers are valuable for understanding the complex pathophysiology of obesity and related metabolic disorders, such as type 2 diabetes and cardiovascular diseases. They can guide more effective therapeutic interventions and may also help inform risk stratification and early screening/intervention.

Rules-Based Medicine (RBM) offers a broad menu of metabolic-associated analytes to support the early evaluation of therapeutic targets for obesity and metabolic conditions.

Metabolic-associated Analytes		
Adiponectin	Growth Hormone	Insulin
Apolipoprotein(a)	Growth-Regulated alpha protein	Leptin
B-Cell Activating Factor	IFN-gamma	Luteinizing Hormone
Brain-Derived Neurotrophic Factor	InterCellular Adhesion Molecule 1	Macrophage Inflammatory Protein-1 alpha
C-Reactive Protein	IL-1 alpha	Matrix Metalloproteinase-3
Clusterin	IL-1 beta	Matrix Metalloproteinase-9
Eotaxin-1	IL-1 receptor alpha	Neutrophil Gelatinase-Associated Lipocalin
Epithelial-Derived Neutrophil-Activating Protein 78	IL-2	Monocyte Chemotactic Protein 1
Erythropoietin	IL-3	Plasminogen Activator Inhibitor 1
Factor VII	IL-4	Pulmonary and Activation-Regulated Chemokine
Fibroblast Growth Factor 21	IL-5	Resistin
Fibroblast Growth Factor 23	IL-6	Stem Cell Factor
Follicle-Stimulating Hormone	IL-7	Thyroid-Stimulating Hormone
Ghrelin	IL-8	Tumor Necrosis Factor alpha
Glucagon-like Peptide 1, total	IL-10	Tumor Necrosis Factor beta
Granulocyte Colony-Stimulating Factor	IL-17	Vascular Endothelial Growth Factor
Granulocyte-Macrophage Colony-Stimulating Factor	IL-18	

References

1. Global Use of Medicines 2024; Outlook to 2028. IQVIA Institute.
2. Global Trends in R&D 2024; Activity, Productivity, and Enablers. IQVIA Institute.
3. Cao, M. et al. Clinically relevant plasma proteome for adiposity depots: evidence from systematic mendelian randomization and colocalization analyses. *Cardiovasc Diabetol* (2024) 23, 126. <https://doi.org/10.1186/s12933-024-02222-1>
4. Aleksandrova, K, et al. Addressing the Perfect Storm: Biomarkers in Obesity and Pathophysiology of Cardiometabolic Risk, *Clin Chem* (2018) 64(1):142–153. <https://doi.org/10.1373/clinchem.2017.275172>
5. Cobos-Palacios, L. et al. Metabolically healthy obesity: Inflammatory biomarkers and adipokines in elderly population. *PLOS ONE* (2022) 17(6): e0265362. <https://doi.org/10.1371/journal.pone.0265362>
6. Aleksandrova, K, et al. Addressing the Perfect Storm: Biomarkers in Obesity and Pathophysiology of Cardiometabolic Risk, *Clin Chem* (2018) 64(1):142–153. <https://doi.org/10.1373/clinchem.2017.275172>
7. Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults. Executive Summary of the Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). *JAMA* 2001;285(19):2486–2497. doi:10.1001/jama.285.19.2486

Contact us

Email: RBM_clientservices@iqvia.com

Website: rbm.iqvia.com