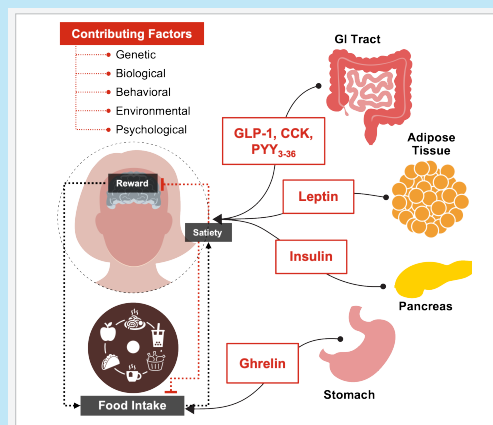


OBESITY IS A DISEASE

Obesity has been defined as “a chronic, progressive, relapsing, and treatable multi-factorial, neurobehavioral disease, wherein an increase in body fat promotes adipose tissue dysfunction and abnormal fat mass physical forces, resulting in adverse metabolic, biomechanical, and psychosocial health consequences”¹

- A BMI of ≥ 30 kg/m² is consistent with a diagnosis of obesity
- Obesity is categorized into 3 classes¹:
 - Class I Obesity: 30.0-34.9 kg/m²
 - Class II Obesity: 35.0-39.9 kg/m²
 - Class III Obesity: ≥ 40.0 kg/m²
- The complex biological systems that regulate energy balance are believed to be disrupted in people with obesity²

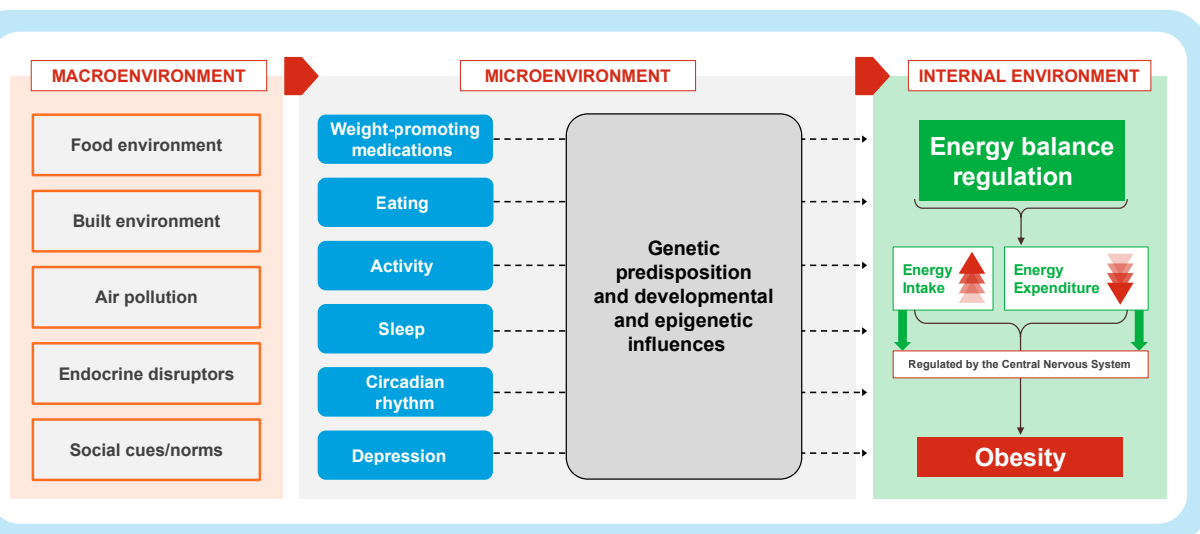
Dysregulated Energy Balance is Central to Obesity^{3,4}



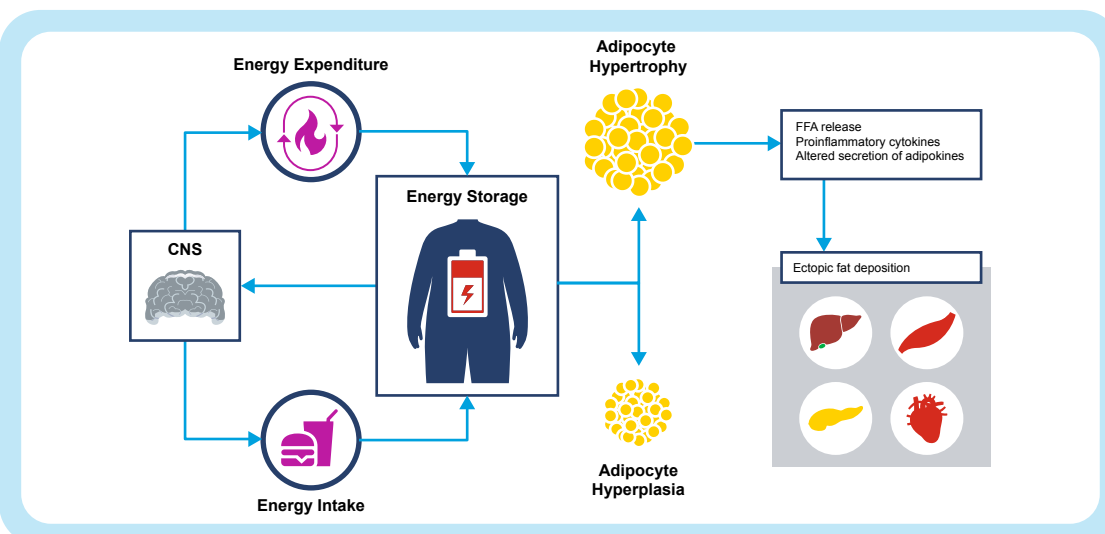
Factors Contributing to The Development of Obesity⁴

- **Food Intake:** Food intake may be affected by sociocultural determinants of health (e.g., social and community factors, economic and educational factors), the food environment or access to healthy food), mental health, hunger and satiety signaling, sleep, and medical conditions or medications that impact food intake⁴
- **Energy Expenditure:** Affected by age, sex, genetic/epigenetic factors, neuroendocrine factors, body composition, medications affecting metabolic rate, the thermic effect of food, and amount and activity of brown adipose tissue (BAT)⁴
- **Physical activity:** May be influenced by social determinants of health, physical limitations, chronic medical conditions, medications, or emotional barriers⁴

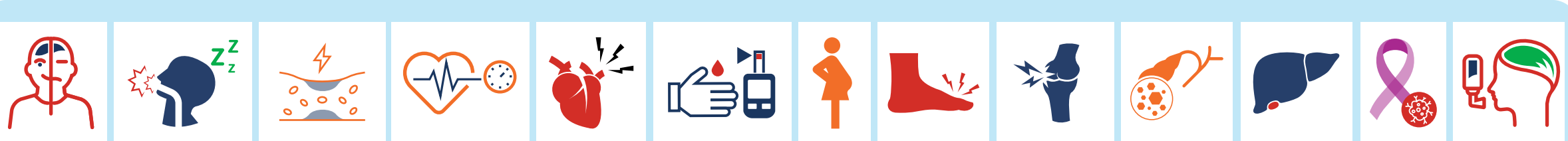
Multiple Environmental Factors Contribute to Altered Energy Balance⁵



Pathogenesis of Obesity⁶

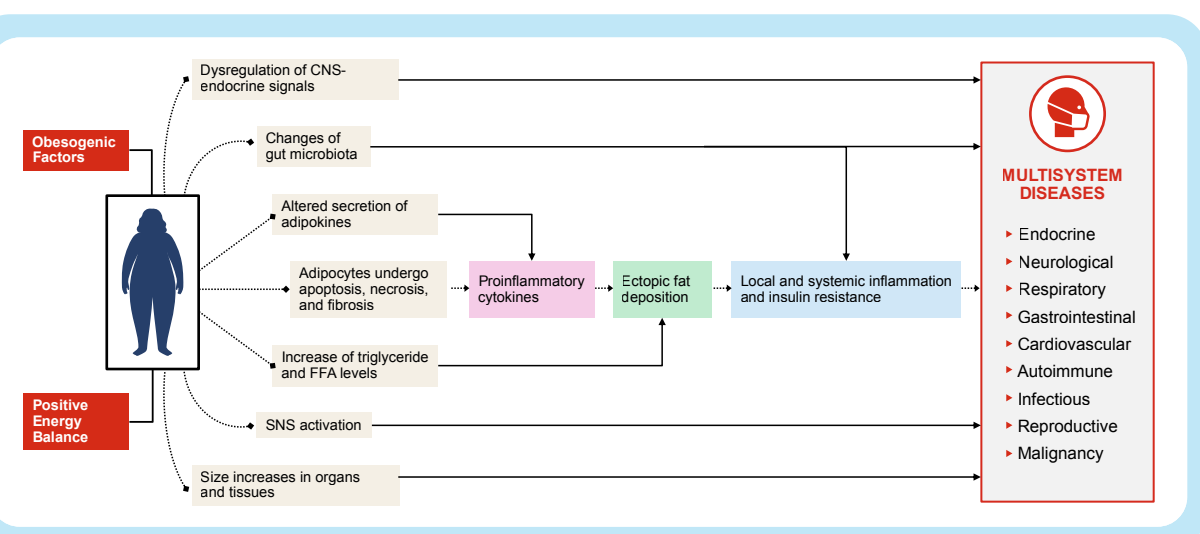


Complications of Obesity

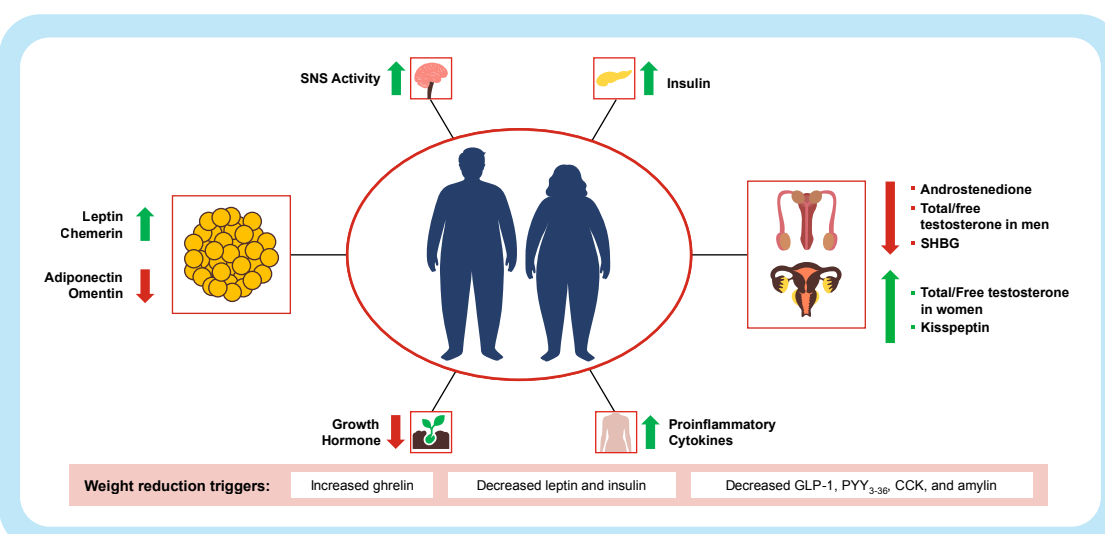


- Stroke⁷
- Obstructive Sleep Apnea⁸
- Dyslipidemia⁹
- Hypertension¹⁰
- Heart Disease¹¹
- Type 2 Diabetes¹²
- Reduced Fertility¹³
- Gout¹⁴
- Osteoarthritis¹⁵
- Gallbladder Disease¹⁶
- MASLD (formerly known as NAFLD)^{17,18}
- Cancer¹⁹
- Asthma²⁰

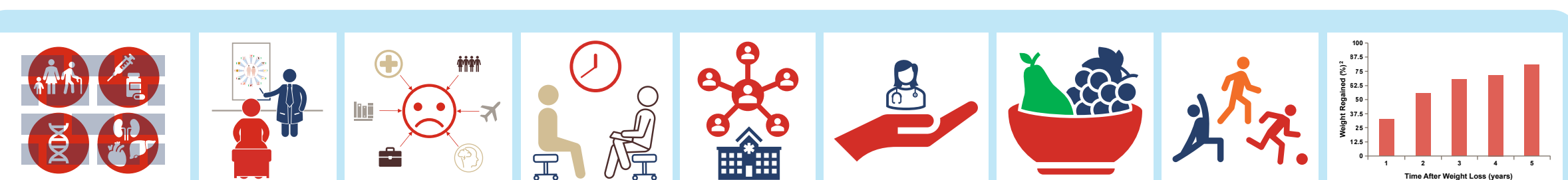
Complex Pathophysiology of Obesity Leads to a Variety of Diseases²¹



Physiological Changes Occurring Due to Obesity^{6,22,23}



Barriers in the Management of Obesity



- Biological barriers²⁴
- Gaps in Obesity Education and Training for Clinicians²⁵
- Weight Bias and Stigma²⁶
- Lack of Time During Office Visits²⁷
- Lack of Access to Specialized Obesity Healthcare²⁸
- Ability to Access Clinical Care²⁹
- Access to Healthy Foods³⁰
- Ability to Participate in Physical Activity³¹
- Metabolic Changes With Weight Loss Which Favor Weight Regain³²

Abbreviations and References

BAT=Brown Adipose Tissue; BMI=Body Mass Index; CCK=Cholecystokinin; CNS=Central Nervous System; FFA=Free Fatty Acid; GI=Gastrointestinal; GLP-1=Glucagon-Like Peptide-1; LH=Luteinizing Hormone; MASLD=Metabolic Dysfunction-Associated Steatotic Liver Disease; NAFLD=Non-Alcoholic Fatty Liver Disease; PYY₃₋₃₆=Peptide YY₃₋₃₆; SHBG=Sex Hormone-Binding Globulin; SNS=Sympathetic Nervous System; TSH=Thyroid Stimulating Hormone.

1. <https://obesitymedicine.org/definition-of-obesity/> (Accessed September 05, 2023).
2. Spiegelman BM, Flier JS. *Cell*. 2001;104(4):531-543.
3. Morton GJ, et al. *Nat Rev Neurosci*. 2014;15(6):367-378.
4. Sharma AM, Padwal R. *Obes Rev*. 2010;11(5):362-70.
5. <https://apps.who.int/iris/bitstream/handle/10665/353747/97892289057738-eng.pdf> (Accessed September 05, 2023).
6. Jin X, et al. *Acta Pharm Sin B*. 2023;13(6):2403-2424.
7. Suk SH, et al. *Stroke*. 2003;34(7):1586-1592.
8. Senaratna CV, et al. *Sleep Med Rev*. 2017;34:70-81.
9. Howard BV, et al. *Endocrinol Metab Clin North Am*. 2003;32(4):855-867.
10. Mokdad AH, et al. *JAMA*. 2003;289(1):76-79.
11. Kenchaiah S, et al. *N Engl J Med*. 2002;347(5):305-313.
12. Schnurr TM, et al. *Diabetologia*. 2020;63(7):1324-1332.
13. Silvestris E, et al. *Reprod Biol Endocrinol*. 2018;16(1):22.
14. Bai L, et al. *Arthritis Res Ther*. 2021;23(1):69.
15. King LK, et al. *Indian J Med Res*. 2013;138(2):185-193.
16. Stender S, et al. *Hepatology*. 2013;58(6):2133-2141.
17. Divella R, et al. *Int J Biol Sci*. 2019;15(3):610-616.
18. De A, et al. *J Hepatol*. 2023;S0168-8278(23)05044-4.
19. Calle EE, et al. *N Engl J Med*. 2003;348(17):1625-1638.
20. Peters U, et al. *J Allergy Clin Immunol*. 2018;141(4):1169-1179.
21. Gutiérrez-Cuevas J, et al. *Int J Mol Sci*. 2021;22(21):11629.
22. Heymsfield SB, Wadden TA. *N Engl J Med*. 2017;376:254-66.
23. Yli D, et al. *South Dartmouth (MA): MDText.com, Inc.; 2000-2022*.
24. Dent R, et al. *Metabolism*. 2020;113:154388.
25. Alexander SC, et al. *Am J Health Promot*. 2007;21(6):498-500.
26. Sabin JA, et al. *PLoS One*. 2012;7(11):e48448.
27. Butryn ML, et al. *Psychiatr Clin North Am*. 2011;34(4):841-859.
28. Washington TB, et al. *Gastroenterol Clin North Am*. 2023;52(2):429-441.
29. Kim TN. *J Obes Metab Syndr*. 2020;29(4):244-247.
30. Munt AE, et al. *Obes Rev*. 2017;18(1):1-17.
31. Lee A, et al. *South Dartmouth (MA): MDText.com, Inc.; 2000-2019*.
32. Hall KD, Kahan S. *Med Clin North Am*. 2018;102(1):183-197.

