

Adipose tissue dysfunction in obesity: a driver for cardiometabolic complications

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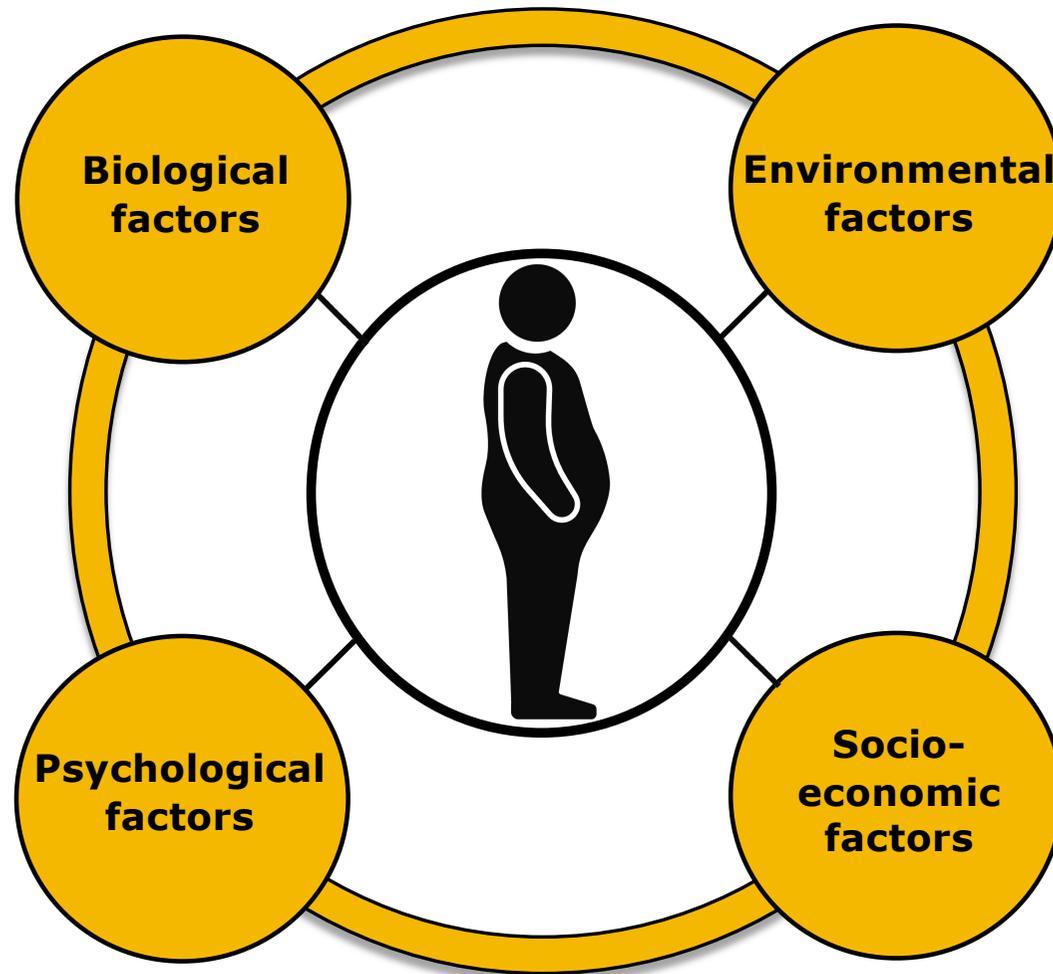
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Obesity: a complex multifactorial chronic disease



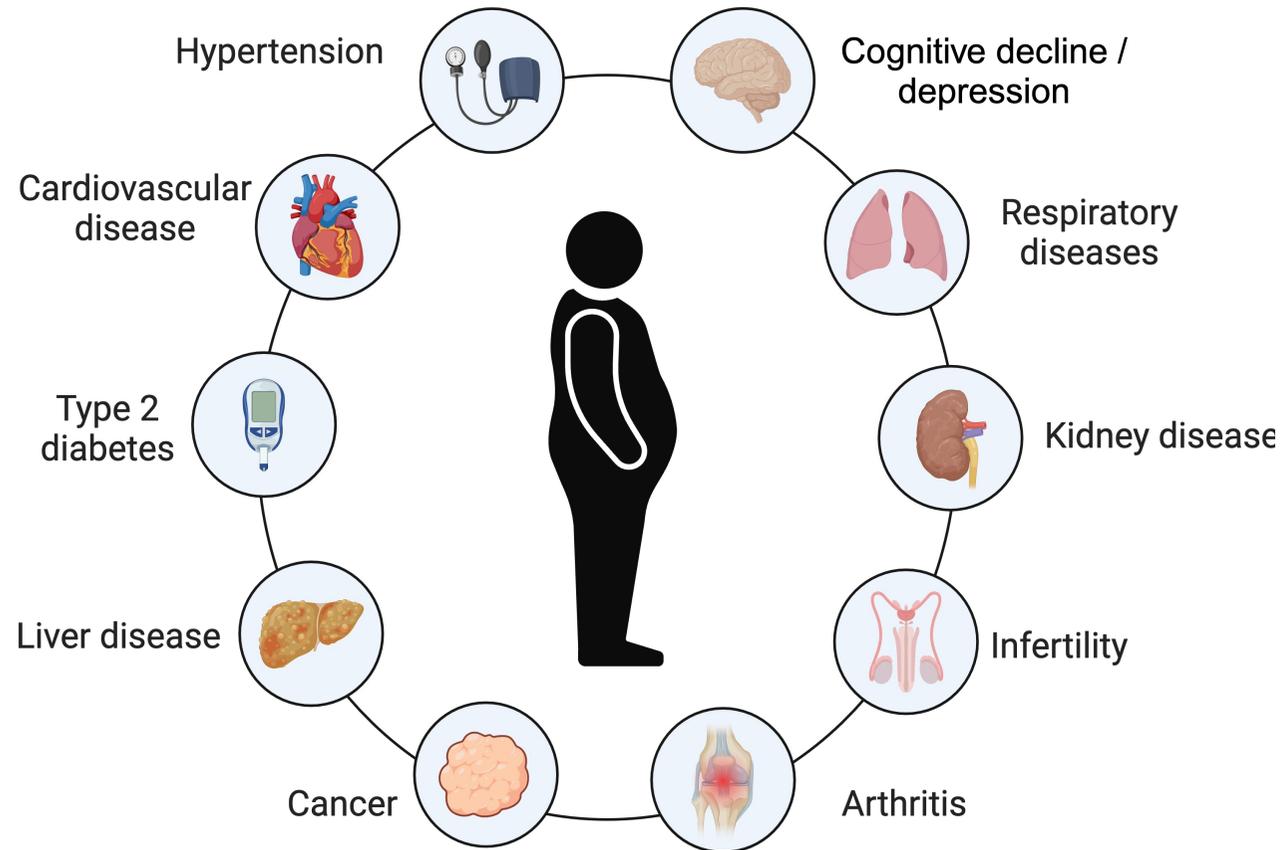
Obesity is a major public health issue



Consequences

- ↓ Life expectancy
- ↓ Healthy life-years
- ↓ Quality of life
- ↑ Health care costs

Obesity: a gateway to many health complications



BMI is not a good measure of cardiometabolic disease risk at the individual level



Similar BMI



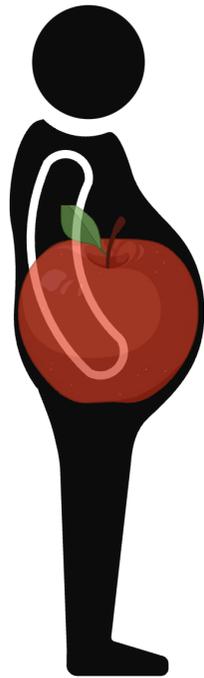
Look beyond BMI...

Dissociation between fat mass and metabolic health in humans

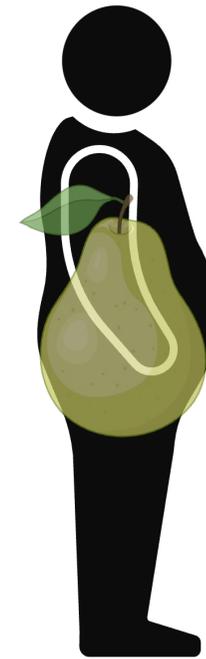
- Women (premenopausal) → ↑ insulin sensitivity
- Liposuction → ↔ insulin sensitivity
- Lipodystrophy → severe insulin resistance

No tight relationship between the adipose tissue mass and metabolic health of an individual

Body fat distribution is an important determinant of cardiometabolic complications in obesity



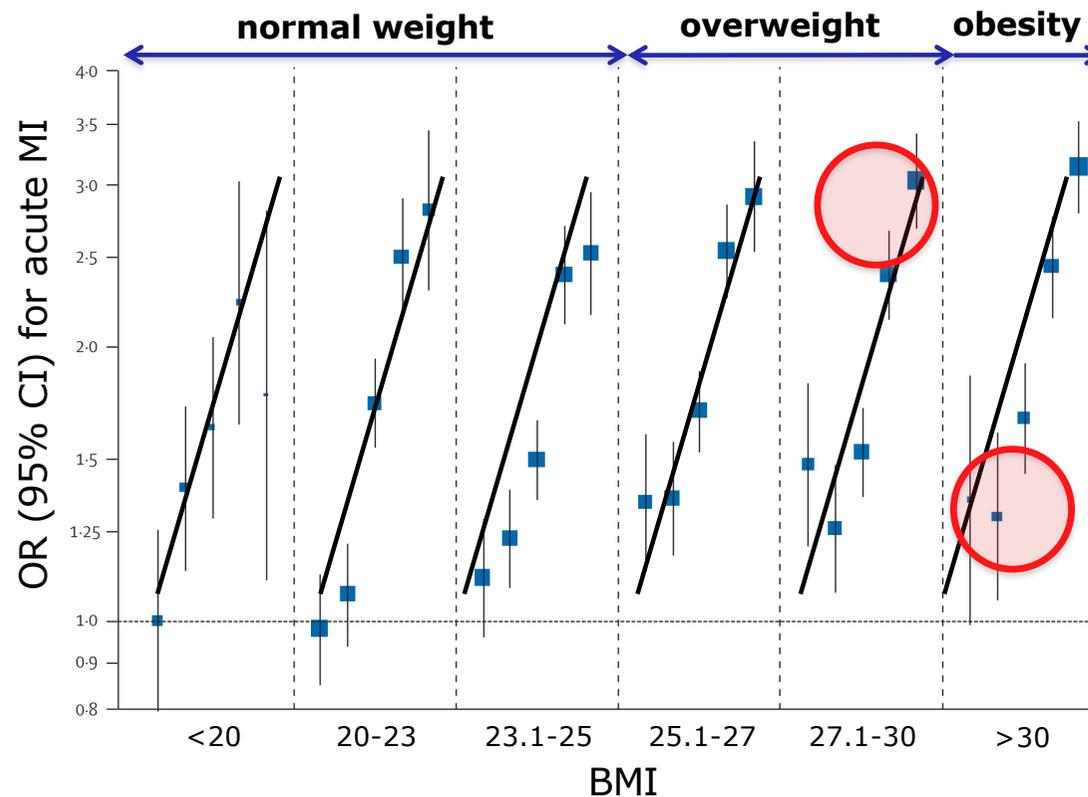
Similar BMI
Similar fat mass



**Abdominal fat accumulation increases
cardiometabolic disease risk**

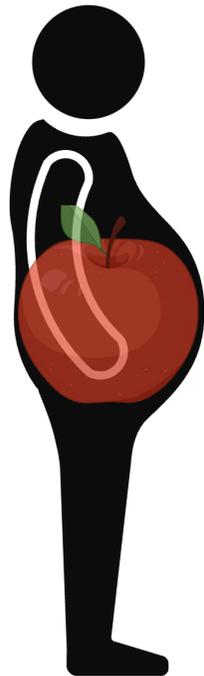
Body fat distribution and myocardial infarction

INTERHEART case-control study of acute MI (n=27,098 participants from 52 countries)



Quintiles of waist-to-hip ratio per BMI category

Body fat distribution is a stronger determinant of cardiometabolic complications in obesity than fat mass

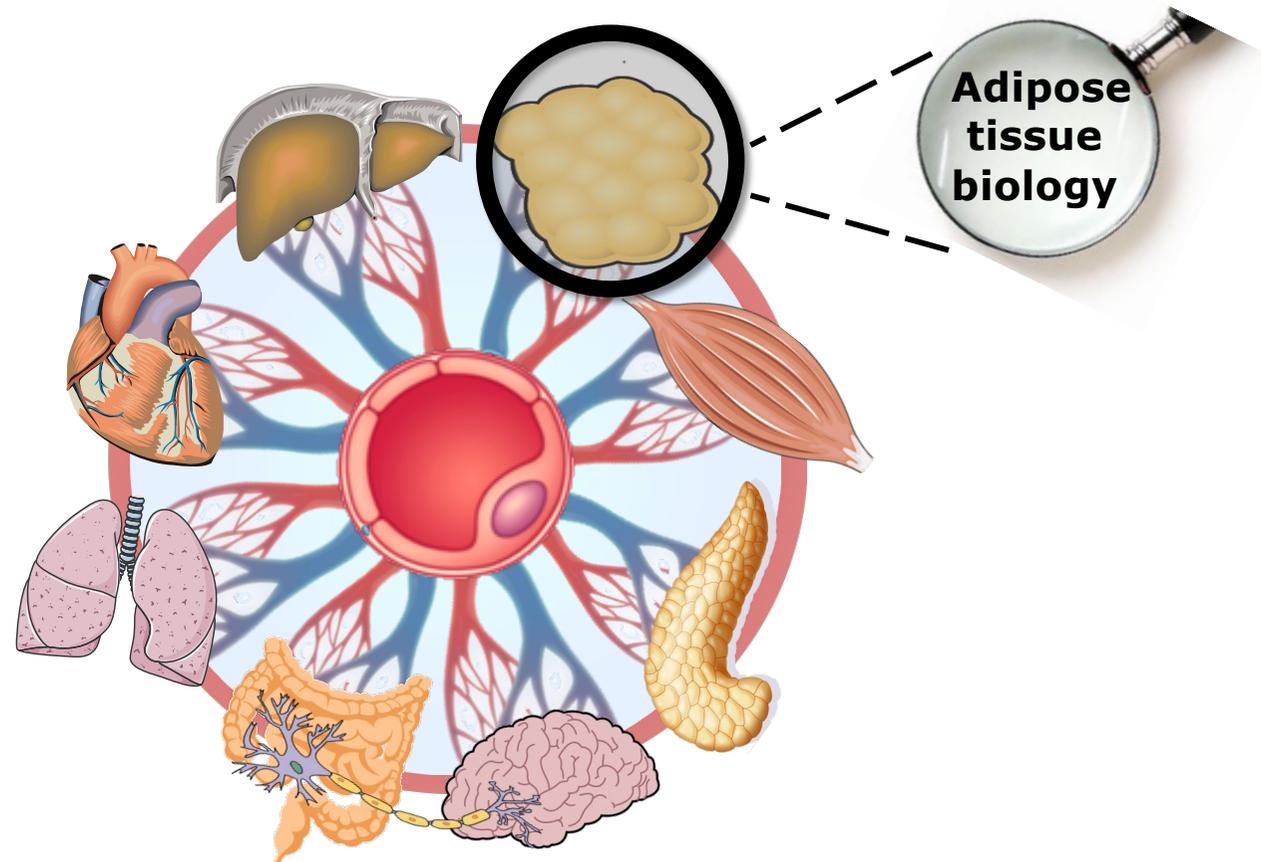


Similar BMI
Similar fat mass



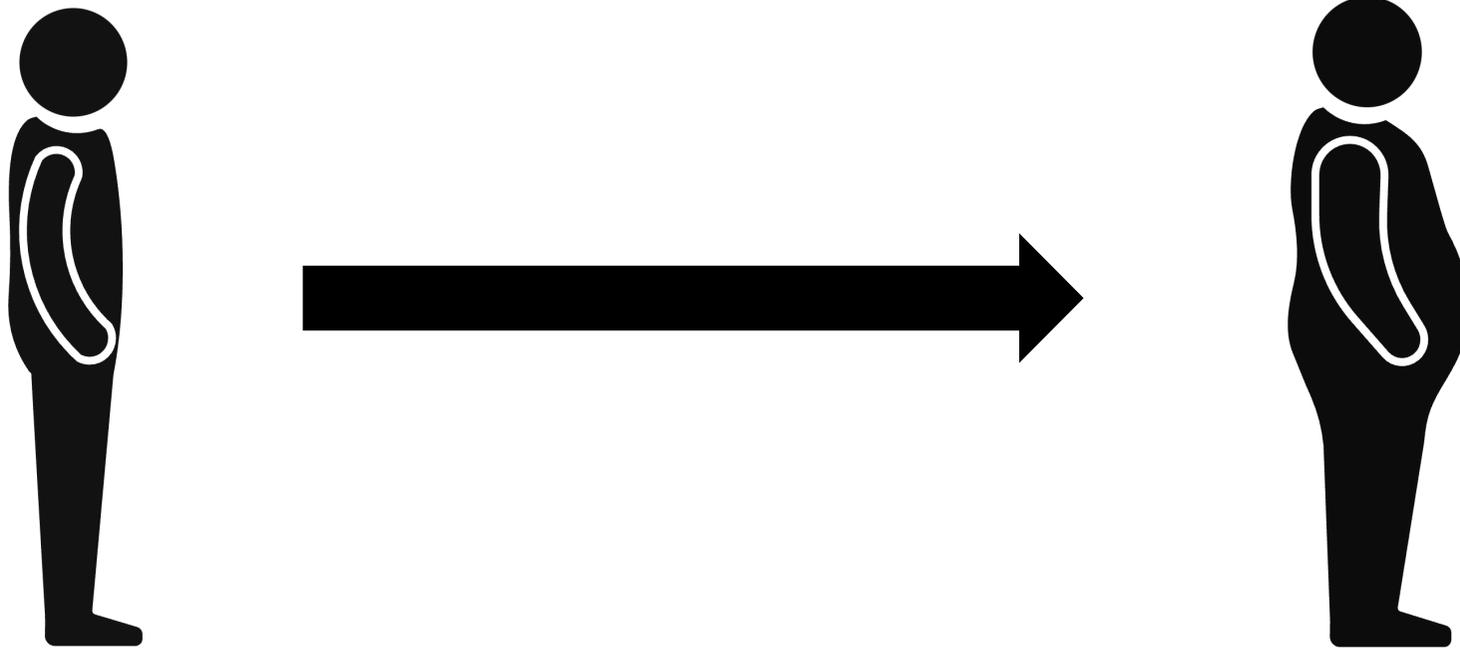
Look beyond BMI and fat mass

Inter-organ crosstalk in health and disease

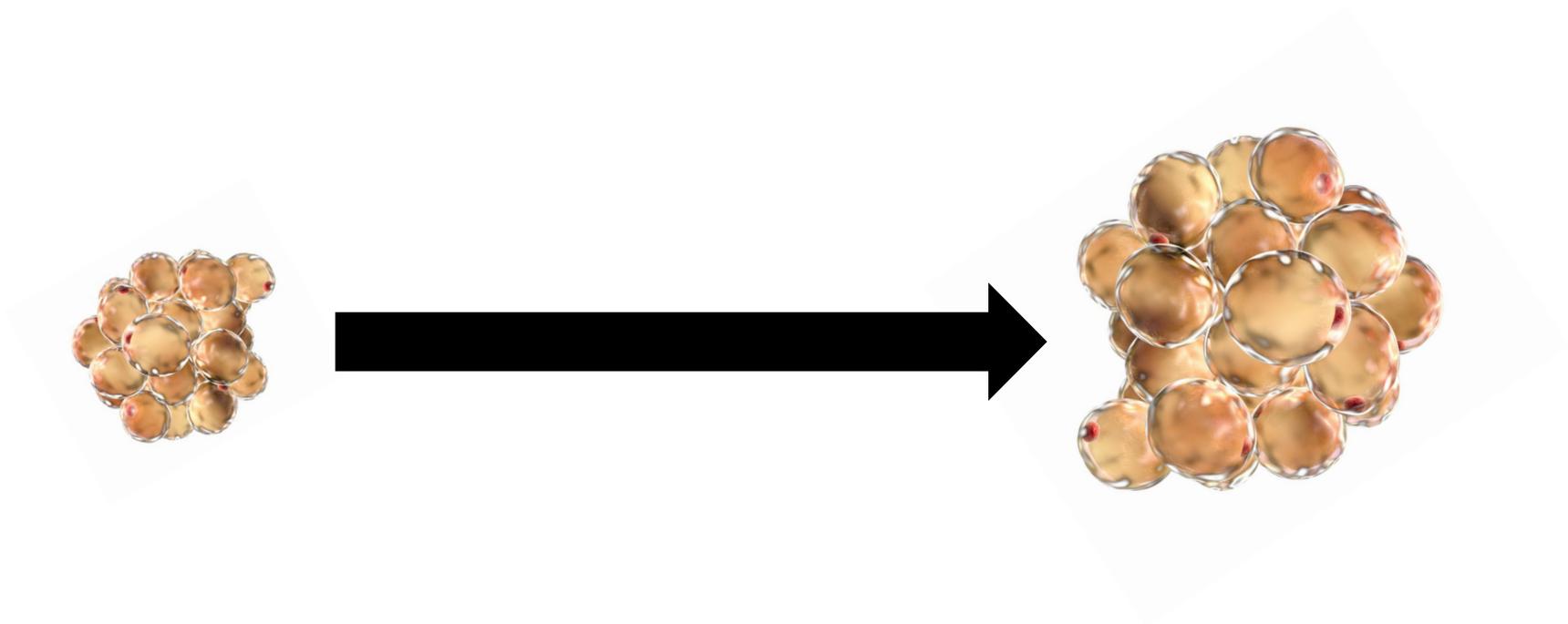


How does abdominal obesity increase cardiometabolic disease risk?

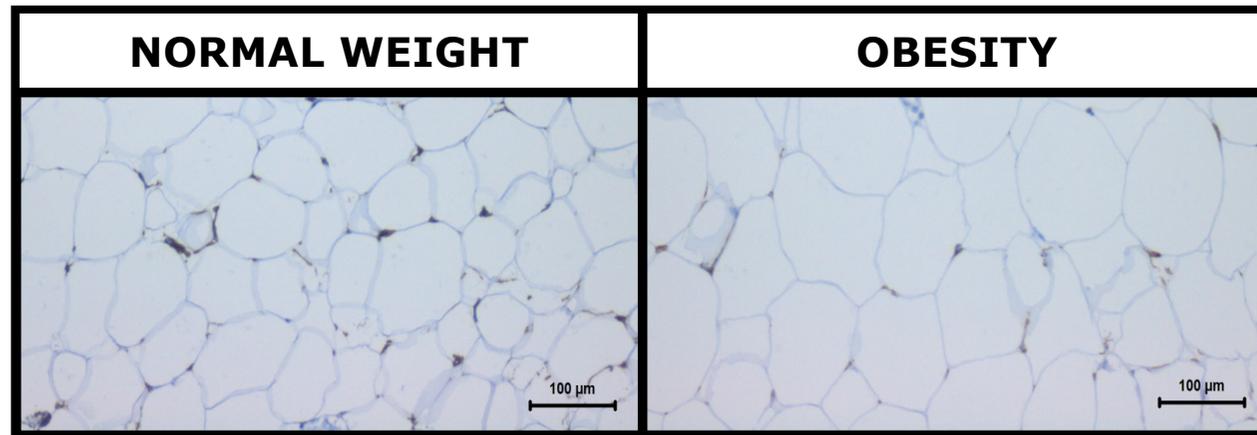
Abdominal fat cell enlargement in obesity



Abdominal fat cell enlargement in obesity

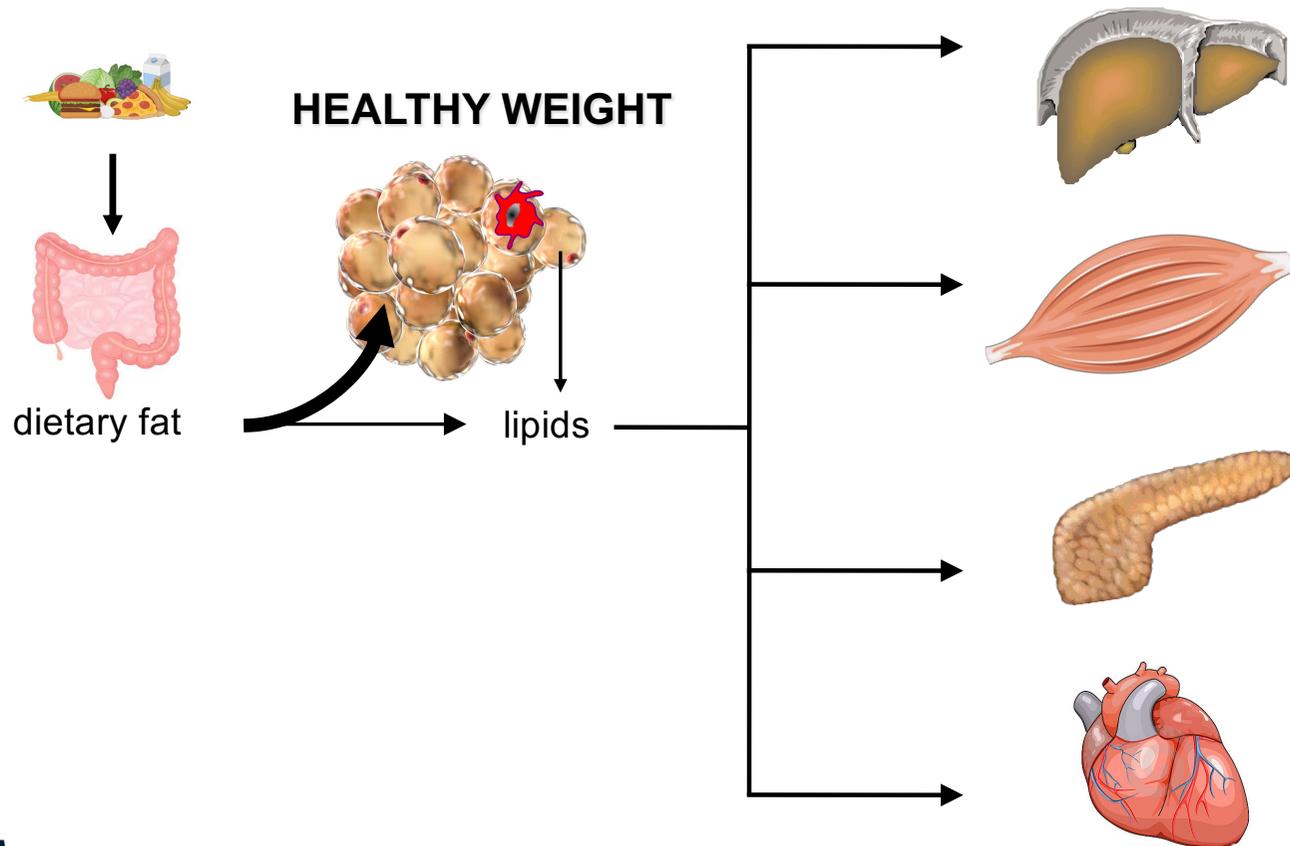


Abdominal fat cell enlargement in obesity

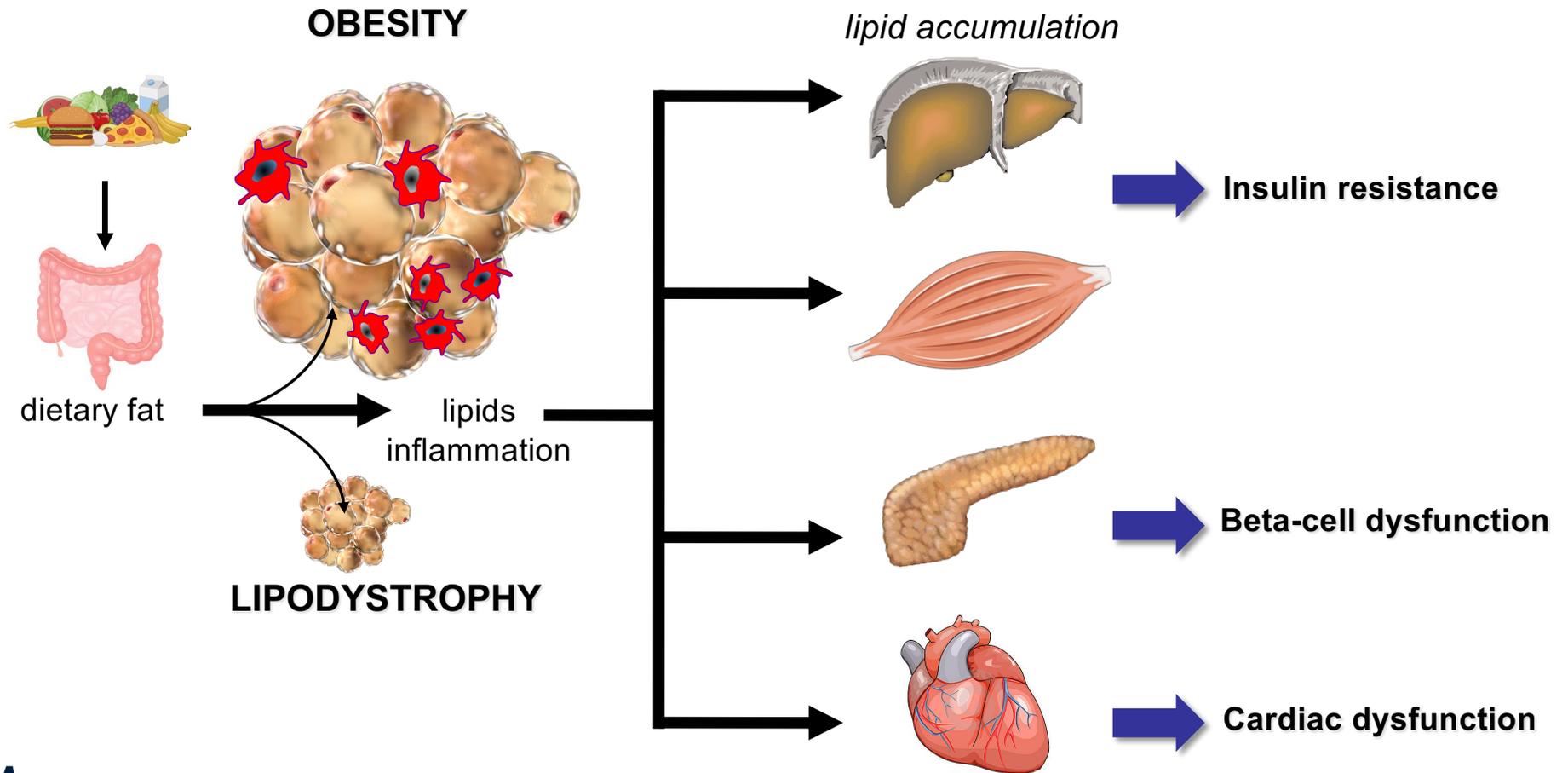


Abdominal sc adipocyte enlargement is an independent marker of insulin resistance and predicts type 2 diabetes

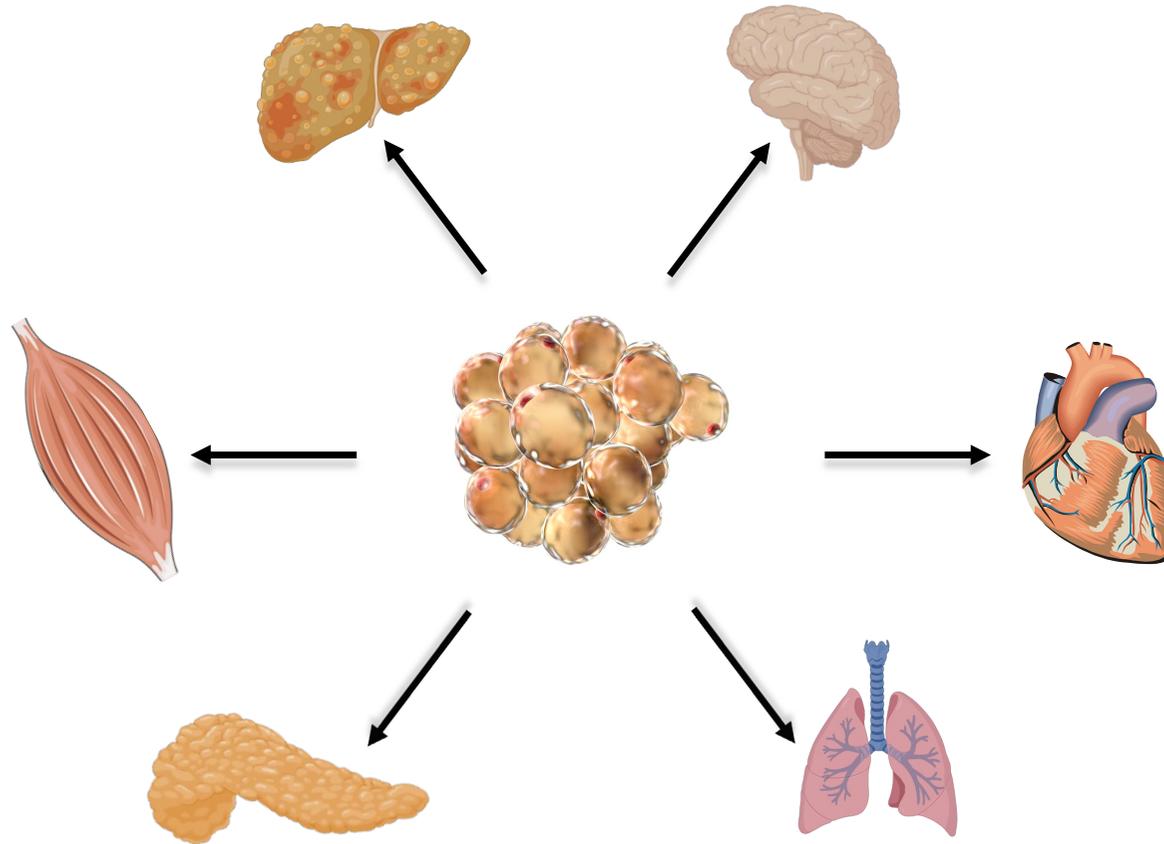
Healthy adipose tissue buffers the daily influx of dietary fatty acids



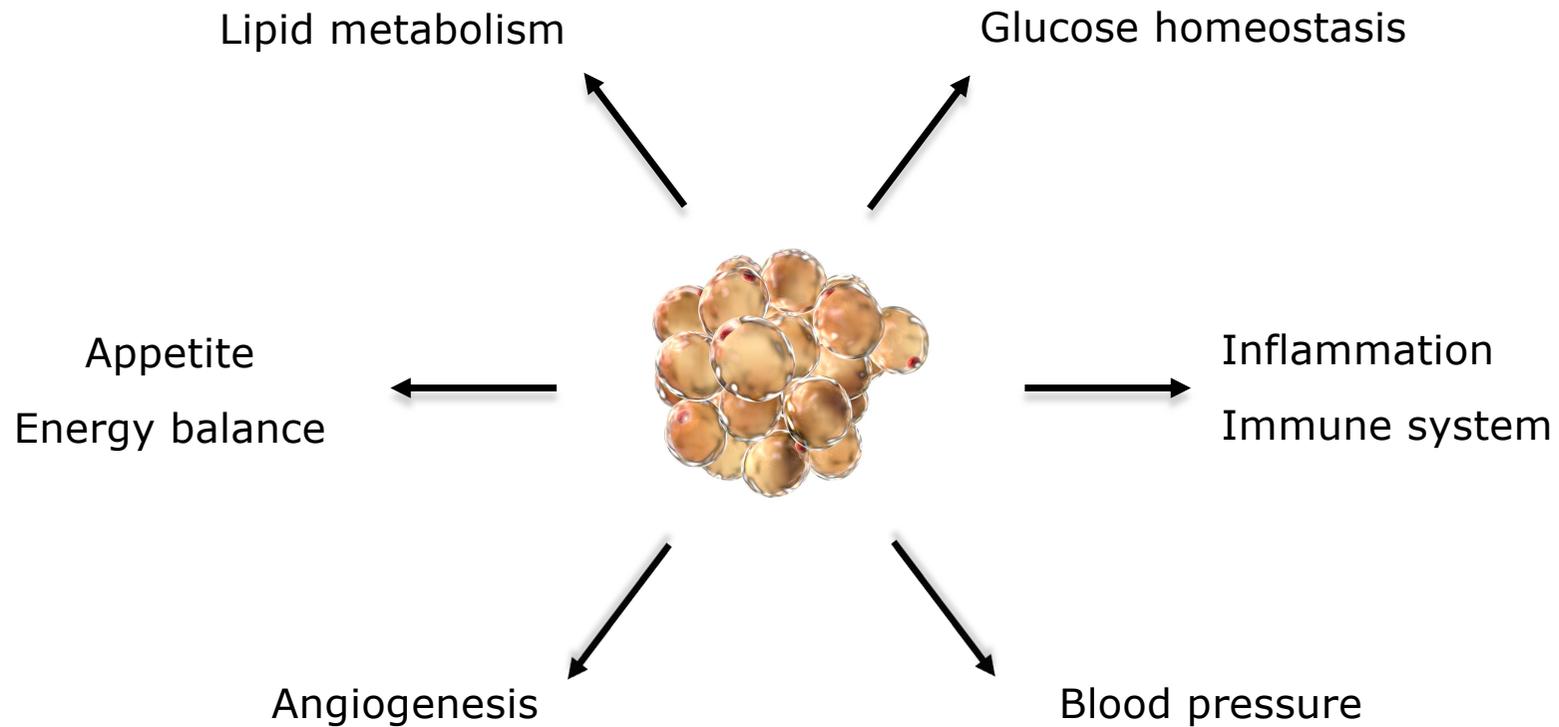
Adipose tissue dysfunction contributes to ectopic fat storage and related complications



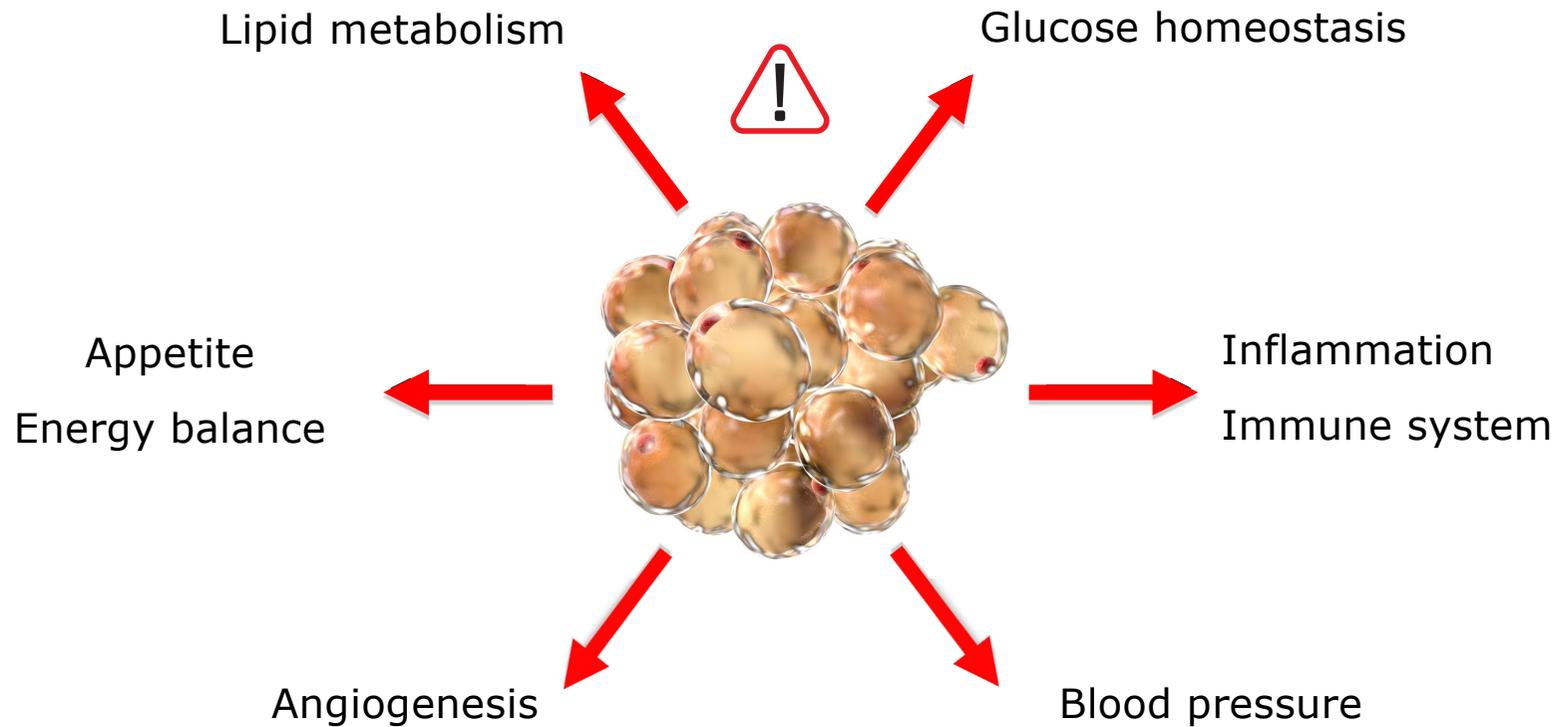
Adipose tissue: a key player in organ cross-talk



Adipose tissue: a key player in organ cross-talk

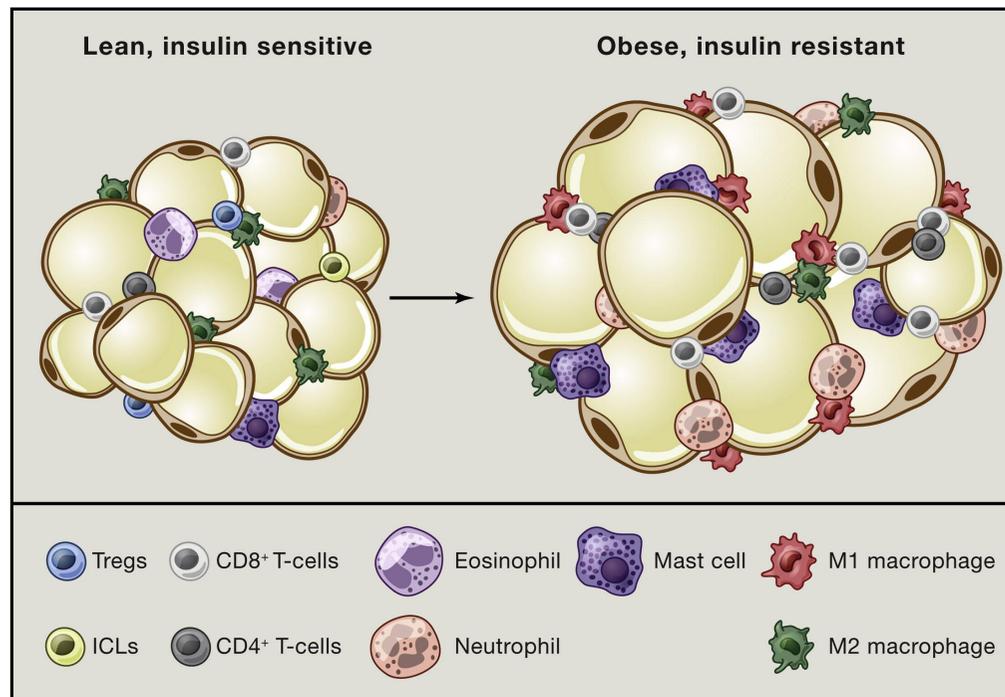


Endocrine dysfunction in obesity



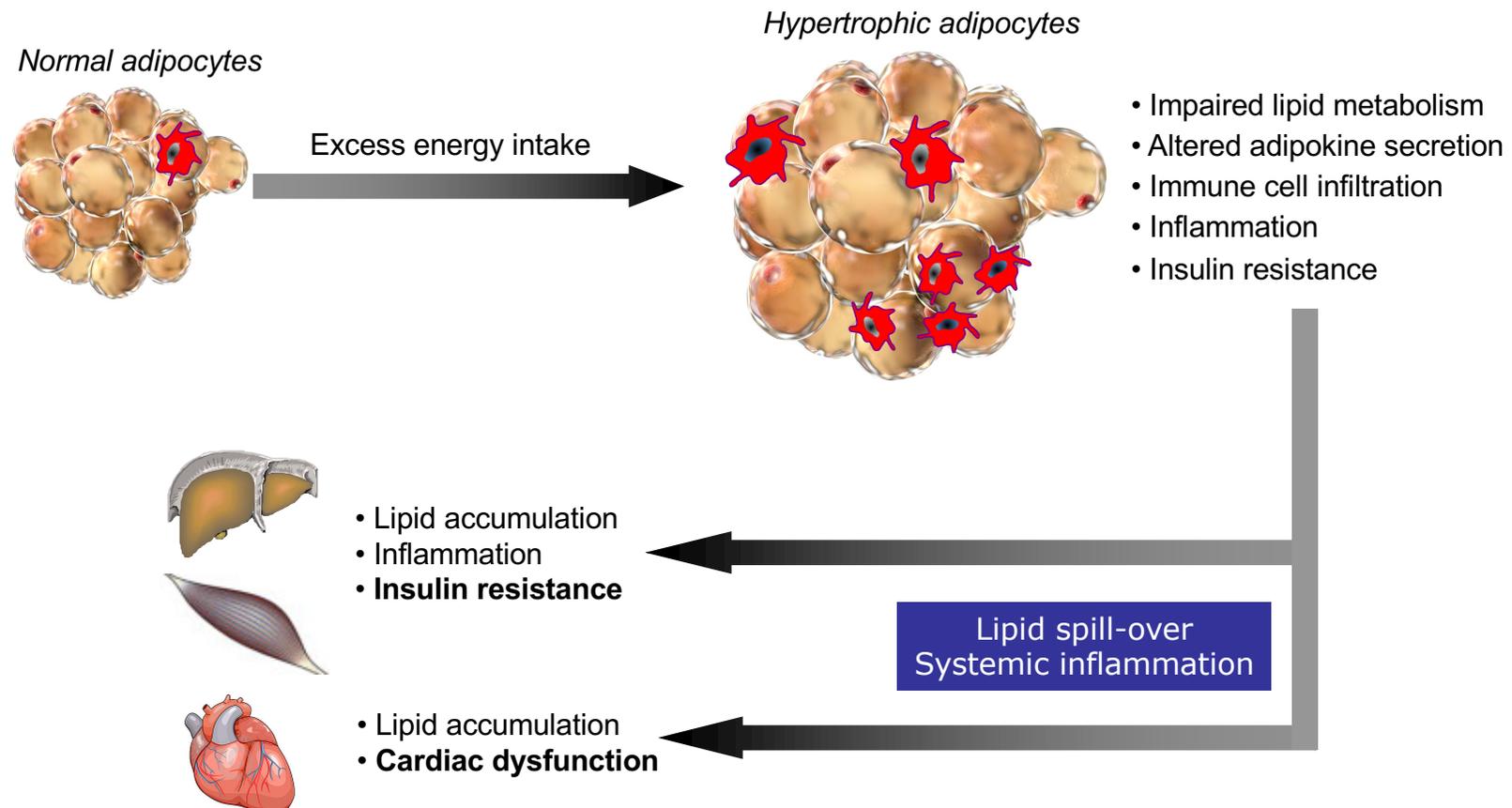
Dynamic changes in immune cell populations during the development of obesity

↑ *M2* macrophages
↑ *T*-regs
↑ *Eosinophils*



↑ *M1* macrophages
↑ *Mast* cells
↑ *Th1* cells
↑ *Neutrophils*
↑ *Dendritic* cells
↑ *NK* cells

Abdominal adipose tissue dysfunction in obesity is linked to insulin resistance and low-grade inflammation



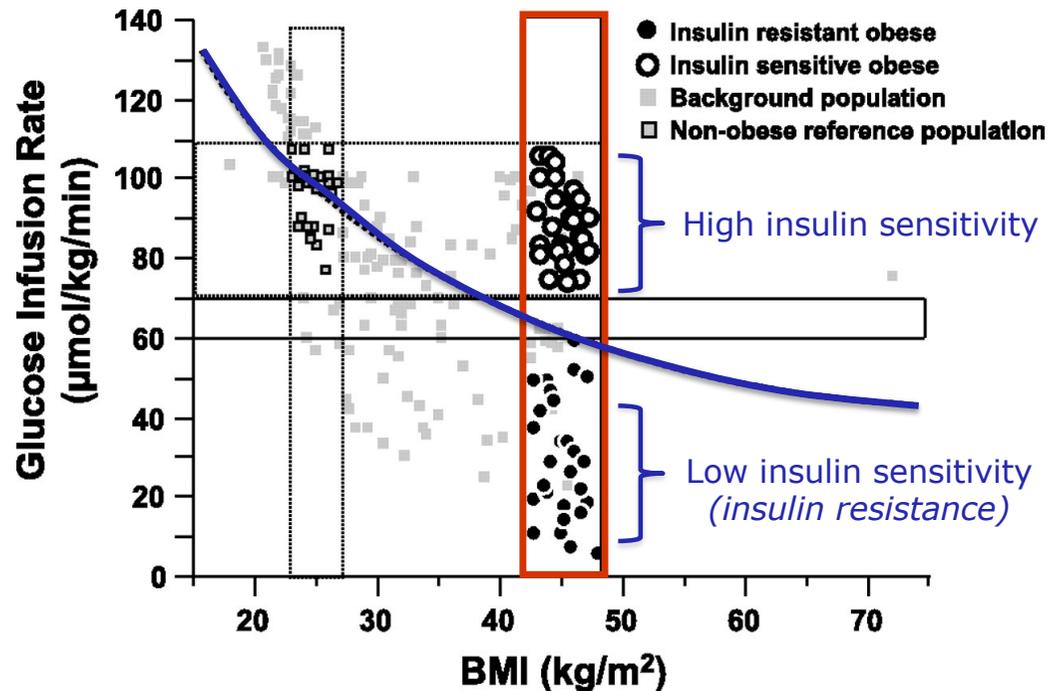
Inter-individual differences in the causes and cardiometabolic complications of obesity

~~Similar causes?~~



Similar consequences?

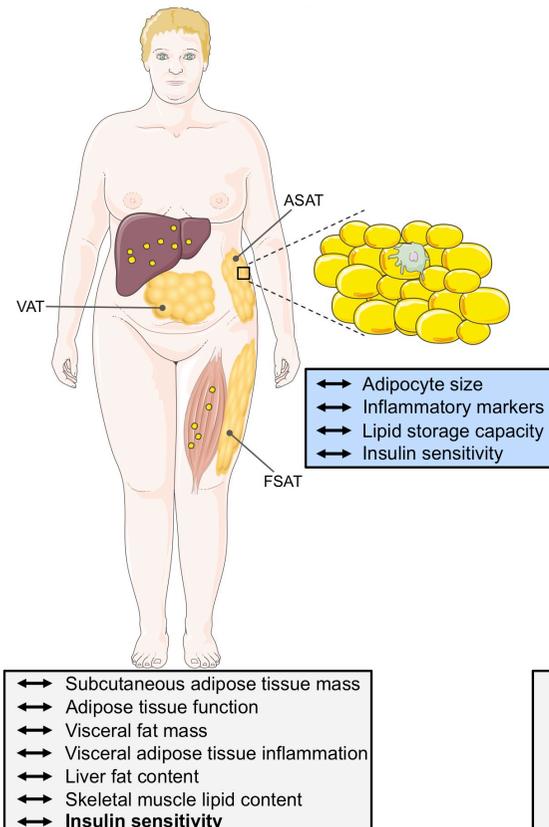
Large inter-individual variation in insulin sensitivity in people with obesity



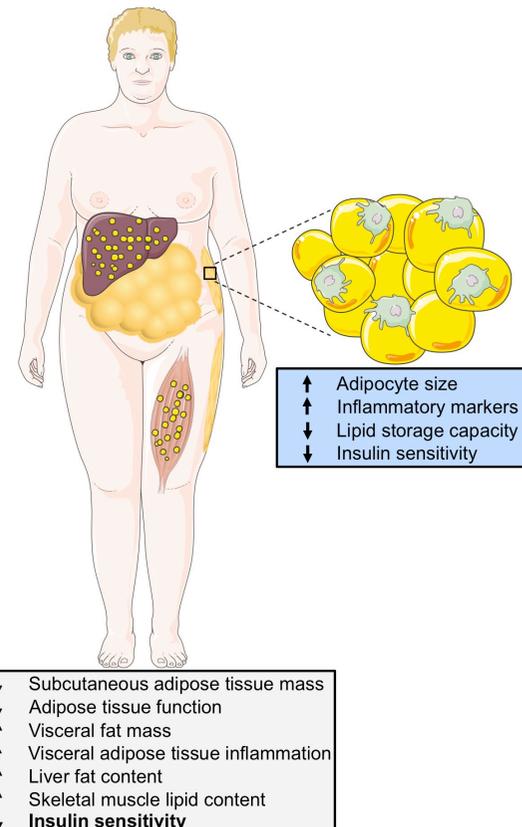
Differences in insulin sensitivity, independent of BMI, age and sex

Adipose tissue dysfunction is a key determinant of cardiometabolic health in people with obesity

**METABOLICALLY
'HEALTHY'
OBESITY**

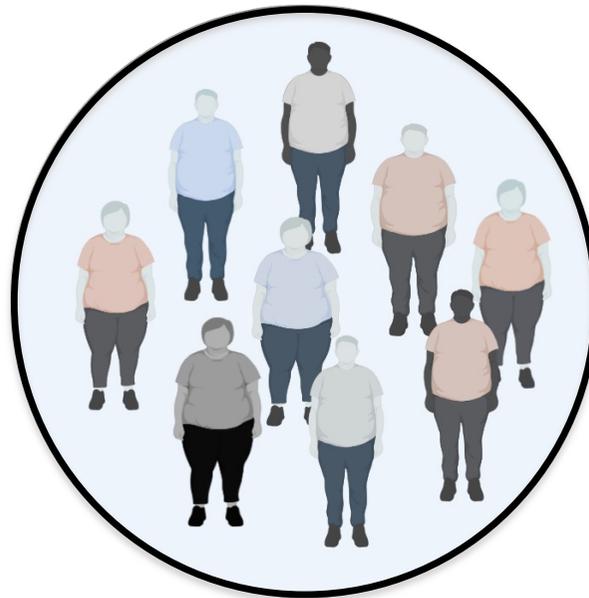


**METABOLICALLY
UNHEALTHY
OBESITY**



Inter-individual differences in the causes and cardiometabolic complications of obesity

~~Similar
causes?~~



~~Similar
consequences?~~