

Evaluation of the nutrition state

1 Physiology department

Adipose tissue

- White (for storing dietary energy as TAGs)
- Brown (for ability to convert chemical energy into heat)
- Beige = harbored



Fat tissue functions

- Thermogenesis
- Lactation
- Immune responses
- Fuel for metabolism

Structure of adipose tissue

- Adipocytes
- Non-fat cells:
 - inflammatory cells (macrophages)
 - immune cells
 - preadipocytes
 - fibroblasts
- Connective tissue matrix
- Vascular tissue
- Neural tissue

Abdominal fat

The abdominal fat is present in two main depots:

- Subcutaneous (80% of all body fat)
- Intra-abdominal (10–20% of total fat in men and 5–8% in women)

 $M \vdash D$



- New smaller adipocytes act as a buffers. They are more insulinsensitive and have high avidity for FFAs and TGs uptake, preventing their deposition in non-adipose tissue (SCAT)
- Large adipocytes are insulinresistant, hyperlipolytic and resistant to anti-lipolytic effect of insulin (VAT)

Clinical and prognostic differences

- Metabolic risks
- Metabolic syndrome
- Vascular risk and cardiovascular events
- Prediction of mortality

Anthropometric indexes of abdominal adipose tissue mass

- -WHR
- Waist circumference
- Abdominal sagittal diameter*



Waist circumference (cm)				
Category	Men	Women		
Normal value	≤ 94	≤ 80		
Necessity to decrease body mass	95–102	81–90		
Medical assistance with decreasing of body mass necessary	> 102	> 90		

WHR: for women	< 0.80
for men	< 1.00

 $M \vdash D$

Imaging techniques

- Computed tomography (CT)



Computed tomography showing cross-sectional abdominal areas at umbilicus level in two patients demonstrating variation in fat distribution. A, Visceral type (49-yr-old female, 23.1 of BMI, visceral fat area: 146 cm²; subcutaneous fat area, 115 cm²; V/S ratio, 1.27). B, Subcutaneous type (40-yr-old female, 24.0 of BMI, visceral fat area: 60 cm²; subcutaneous fat area, 190 cm²; V/S ratio, 0.31).

Abdominal sagittal diameter*

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Imaging techniques

- Computed tomography (CT)
- Magnetic resonance imaging (MRI)
- Ultrasound (US)*

Bioimpedance measuring

- Bioimpedance spectroscopy (BIS)
- Bioelectrical impedance analysis (BIA)





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ID Jane Doe	Hei 15	ght 6.9cm	Age 51	Gender Female		ate & Ti .05.04	me . 09 : 46	TEL:02-50	-3939	FAX:02-501	1-271
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Indexes calculated from anthropometric parameters

- Broca's index (ideal body mass):

- \bigcirc : height in cm 100 or (height in m)² × 23
- \bigcirc : (height in cm 100) 10 % or (height in m)² × 21

Obesity degree	% ideal body mass
mild	115–129
moderate	130–149
severe	150–199
morbid	> 200

– Quetelet's index or body mass index (BMI):

 $-BMI = \frac{body \, weight \, (kg)}{height \, (m)^2}$

BMI (kg.m ⁻²)				
Category	Men	Women		
Underweight	< 20	< 19		
Healthy	20–24,9	19–23,9		
Overweight	25–29,9	24–28,9		
Obesity	30–39,9	29–38,9		
Morbid obesity	> 40	> 39		

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