

# **BODY FAT DISTRIBUTION AND ANDROGENIC ACTIVITY IN OBESE MEN**

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# Introduction

- **Central fat distribution and especially intra-peritoneal fat is related to cardiovascular diseases.**
- **It has been suggested that low testosterone levels in men is related to increased content of visceral fat.**
- **The aim is to study the fat distribution and androgenic activity in a population of Greek obese men.**



# Subjects

- 198 men
- >30 years old
- BMI >27
- Normal carbohydrate metabolism and thyroid function.
- None was taken corticosteroides, spironolactone, anti-androgenes, thyroid hormones or thiazide diuretics.



# Methods

- Measurements: weight, height, Waist and Hip girths, saggital abdominal diameter, the 4 skinfolds and we calculated the % fat mass according to Durnin's equation, BMI and WHR as waist/hip girths.
- Determinations: total Testosterone (TT), SHBG, glucose, insulin, T4, T3, TSH
- Calculations: **Free androgen index** (FAI) as:  $100 \times \text{TT (nmol/l)} / \text{SHBG (nmol/l)}$  and **insulin sensitivity index** (ISI) as Glucose/insulin.



# Results (mean±SD)

- age: 45±9 years
- BMI= 35.9±4.4 kgr/m<sup>2</sup>
- WHR= 1.088±0.085
- Saggital abdominal diameter (SAD)= 27.7±3.0 cm
- Waist Girth (WG)= 117.9±11.3 cm
- Fat Mass (FM)= 32.7±5.6%
- Total Testosterone (TT)= 401.8±134.3 ng/dl
- SHBG= 40.7±22 nmol/l
- insulin= 17.2±8.4 μU/ml
- glucose= 96.8±12 mg/dl
- T4= 8.08±1.5 μg/dl, T3= 128.4±23.5 ng/dl, TSH= 1.5±0.84 μU/ml
- **Free Androgen Index (FAI)= 44±24.5**
- **Insulin sensitivity Index (ISI)= 6.96±3.37.**

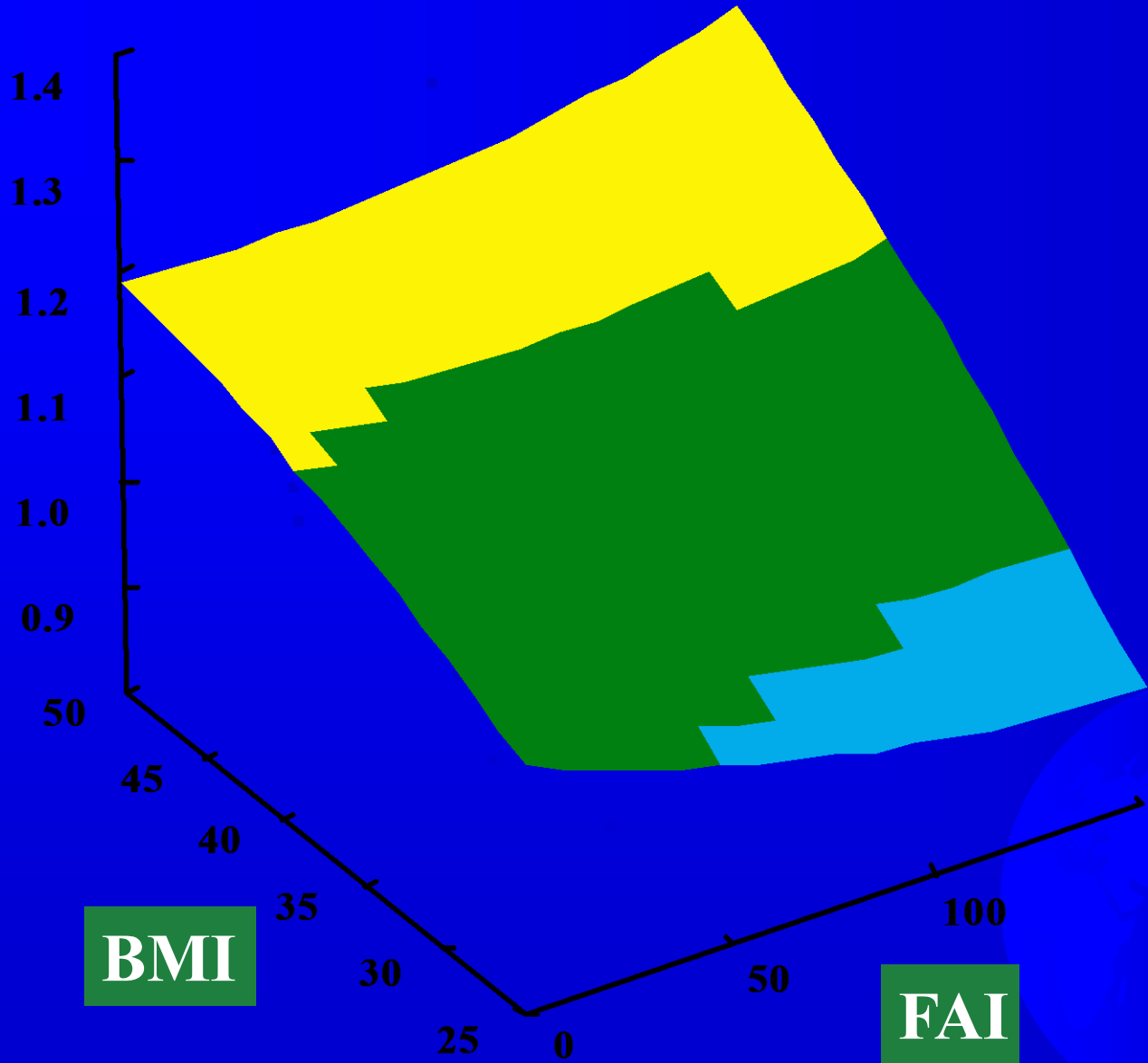


# Pearson's Correlation Matrix

	Testosterone	SHBG	FAI
BMI	r= -0.122, NS	r= -0.140, p= 0.05	r= 0.116, NS
WHR	r= -0.183, p= 0.01	r= -0.017, NS	r= -0.069, NS
Saggital abdom. diameter	r= -0.226, p= 0.001	r= -0.104, NS	r= 0.037, NS
% Body Fat	r= -0.210, p= 0.003	r= -0.105, NS	r= -0.015, NS
Age	r= -0.128, NS	r= 0.089, NS	r= -0.200, p= 0.005
Insulin	r= -0.148, p= 0.039	r= -0.194, p= 0.006	r= 0.025, NS
Insulin Sensitivity index	r= 0.177, p= 0.013	r= 0.164, p= 0.021	r= -0.033, NS



**WHR**



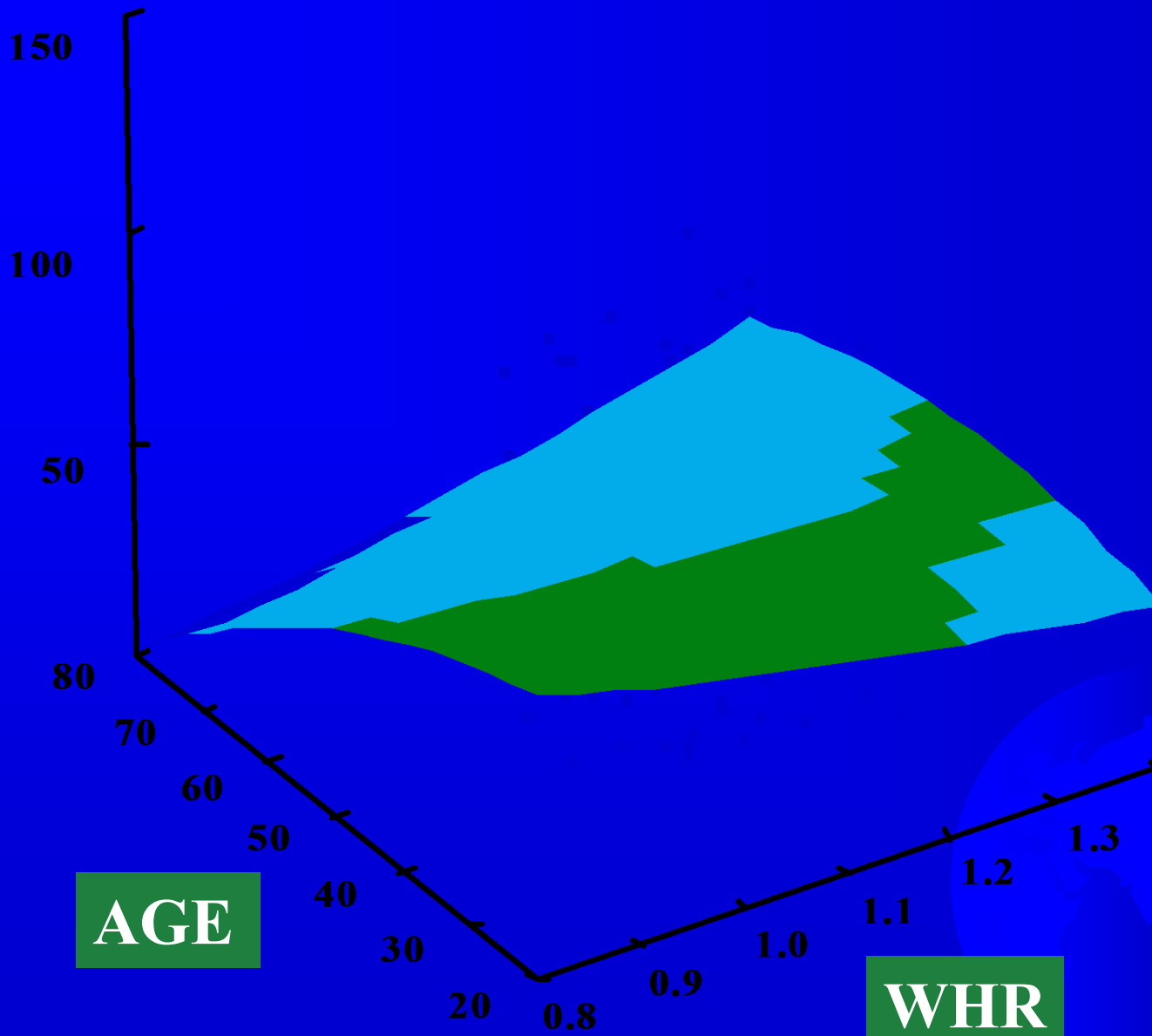
**BMI**

**FAI**





**FAI**



**AGE**

**WHR**



# Multiple regression analysis

**DEP VAR:TESTOSTERONE** N:198, MULTIPLE R:0.264, SQUARED MULTIPLE R:0.070  
ADJUSTED SQUARED MULTIPLE R: 0.055      STANDARD ERROR OF ESTIMATE: 130.582

VARIABLE	COEFFICIENT	STD ERROR	STD COEF	TOLERANCE	T	P
CONSTANT	745.221	97.230	0.000	.	7.664	0.000
Age	-1.831	1.021	-0.125	0.991	-1.793	0.075
Sagg.Diam	-8.349	3.182	-0.187	0.943	-2.624	0.009
INSULIN	-1.714	1.145	-0.107	0.936	-1.497	0.136

**DEP VAR: FAI** N: 197      MULTIPLE R: 0.256      SQUARED MULTIPLE R: 0.066  
ADJUSTED SQUARED MULTIPLE R: 0.056      STANDARD ERROR OF ESTIMATE: 23.824

VARIABLE	COEFFICIENT	STD ERROR	STD COEF	TOLERANCE	T	P
CONSTANT	47.001	13.528	0.000	.	3.474	0.001
age	-0.507	0.187	-0.189	0.982	-2.702	0.007
T3	0.156	0.073	0.149	0.982	2.135	0.034



# Conclusions

- ✓ in obese men
- ✓ Central fat distribution, and more specifically visceral fat, reflected by the saggital abdominal diameter, is related to low blood testosterone levels.
- ✓ However, FAI, a more representative androgenic activity index, has no correlation with body weight and body fat distribution and is influenced only by age.

