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Effect of a coenzyme Q10 and alpha lipoic acid supplementation on weight reduction

**A randomised, placebo-controlled,
hypothesis-generating pilot research study
On behalf of AQUANOVA GmbH, Darmstadt, Germany**





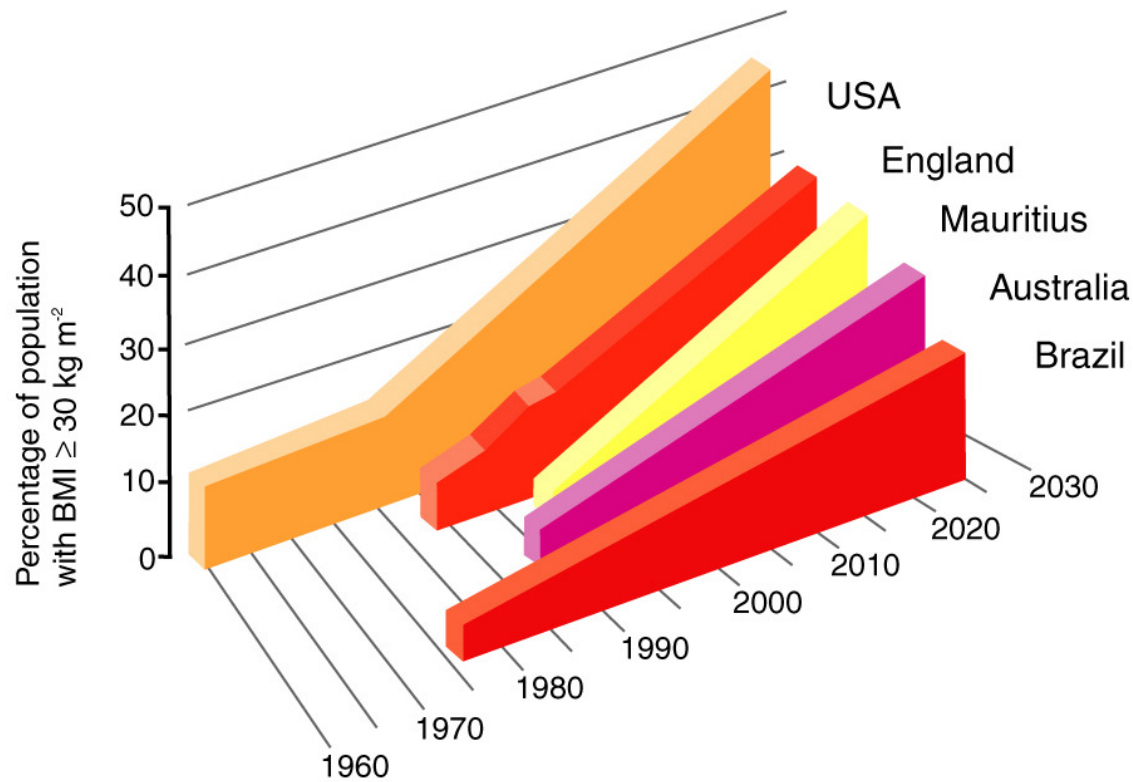
Part 1: Fundamental principles

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Proportion of population with BMI >30 kg/m²



Body Mass Index

$$\text{BMI} = \frac{\text{Body weight (kg)}}{(\text{Height (m)})^2}$$



Classification of adiposity

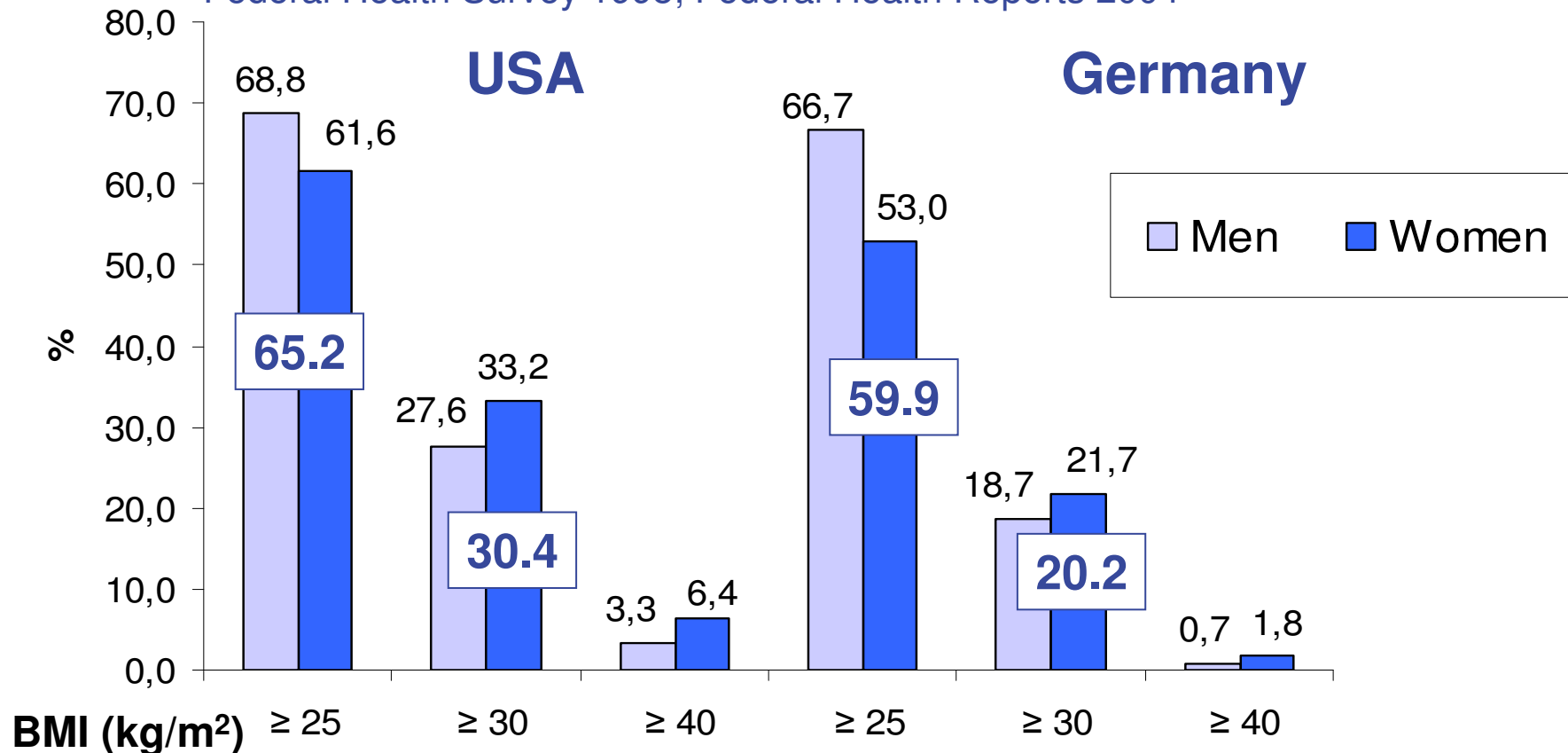
Classification	BMI (kg/m²)
Underweight	<18.5
Normal weight	18.5 – 25
Overweight	25 – 30
Adiposity	≥30
Level I	30 – 35
Level II	35 – 40
Level III	>40

Prevalence of overweight, adiposity and extreme adiposity in the USA and Germany



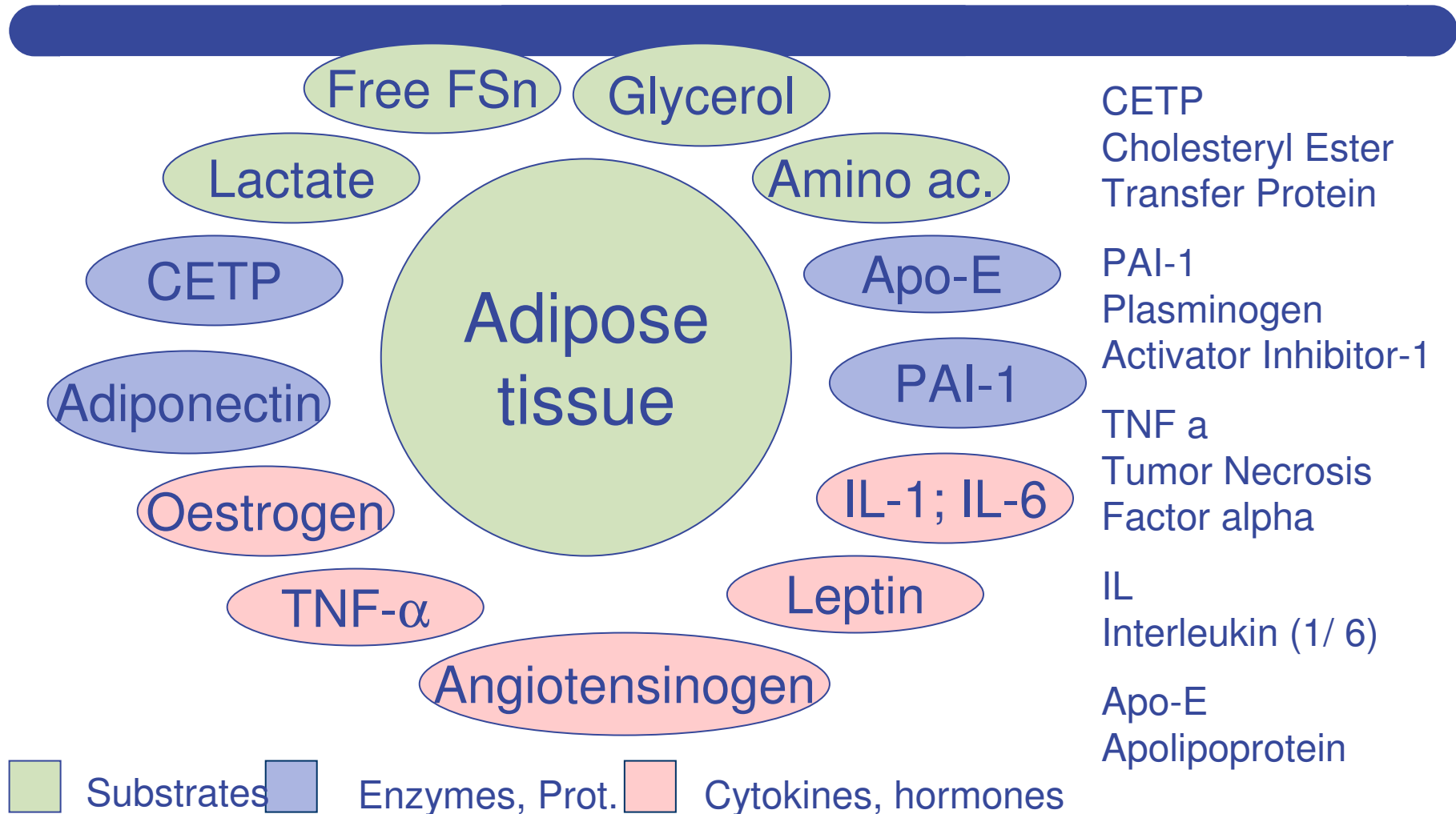
NHANES 1999-2002; Hedley A, et al.; JAMA; 2004; 291:2847

Federal Health Survey 1998; Federal Health Reports 2004



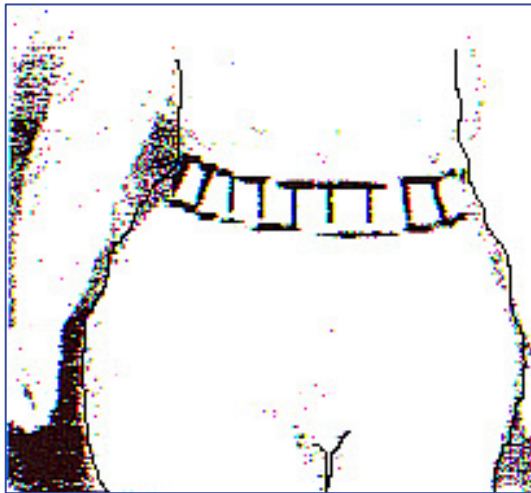


Adipose tissue: Production of substrates, cytokines, hormones





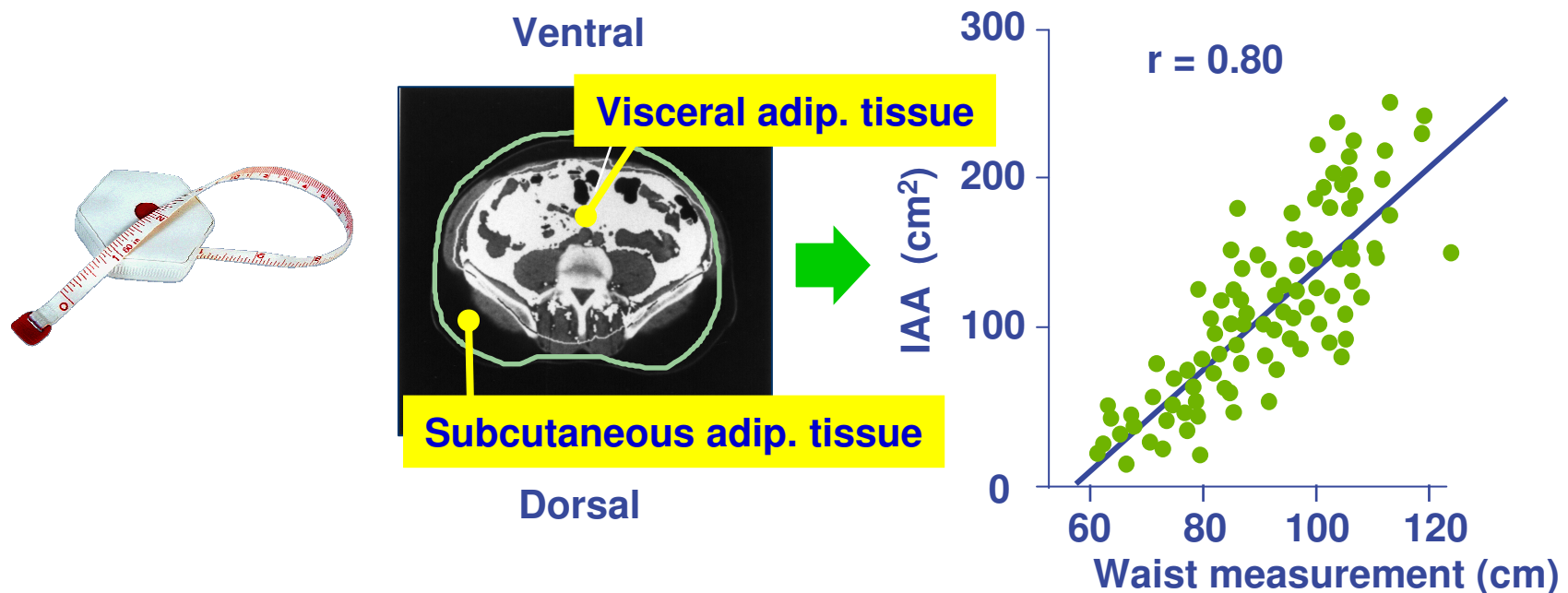
Girth measurement Waist Circumference (cm):



	Women	Men
Risk moderately increased	>80	>94
Risk significantly increased	>88	>102

The waist measurement strongly correlates with the IAA

Pouliot et al 1994; Després et al 2001



The simplest way of measuring the IAA is the waist measurement which correlates strongly with the direct measurement of the visceral adipose tissue using CT or MRT (under consideration as Gold Standard).



Abdominal adiposity and coronary heart disease in women

JAMA 1998;280:1843-8

The WHR and WC were strongly and independently associated with an increased risk of coronary heart disease among women with BMI of 25 or less...women with a WHR of 0.88 or higher had a relative risk of c.h.d. of 3.25, as compared to those with a ratio below 0.72.

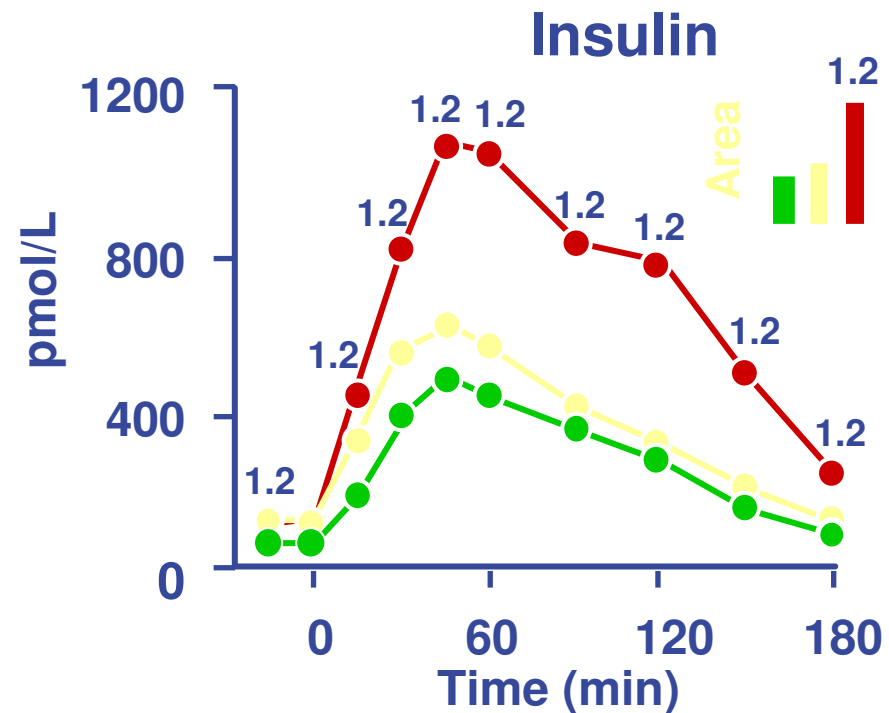
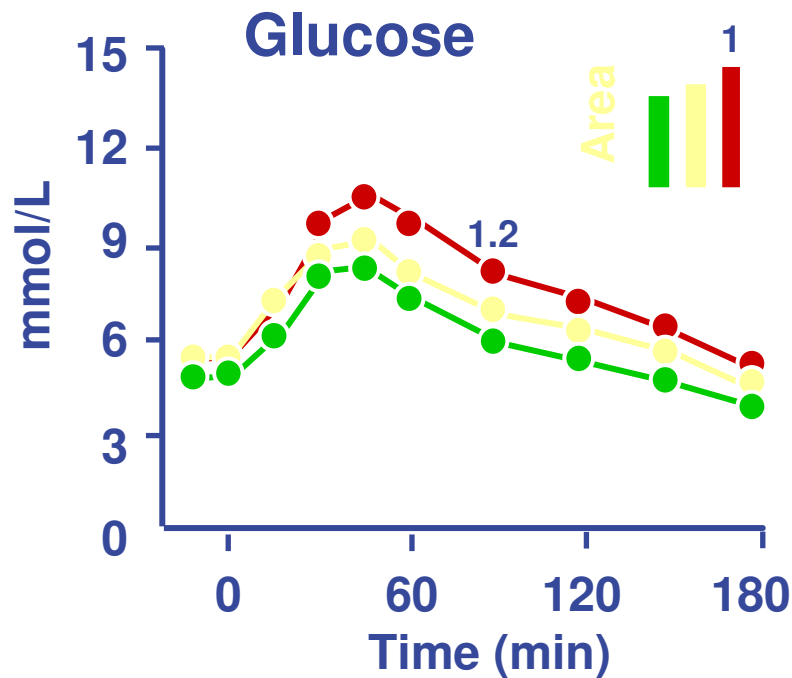


Characteristics of the metabolic syndrome (WHO, 2005)

- Abdominal adiposity (waist circumference)
 - Men > 102 cm
 - Women > 88 cm
- Increased triglycerides (> 150 mg/dl)
- Reduced HDL cholesterol
 - Men < 40 mg/dl
 - Women < 50 mg/dl
- Increased blood pressure (> 130/> 85 mm Hg)
- Increased fasting blood sugar (> 110 mg/dl)

Intra-Abdominal Adiposity (IAA) and glucose metab.

Pouliot et al 1992



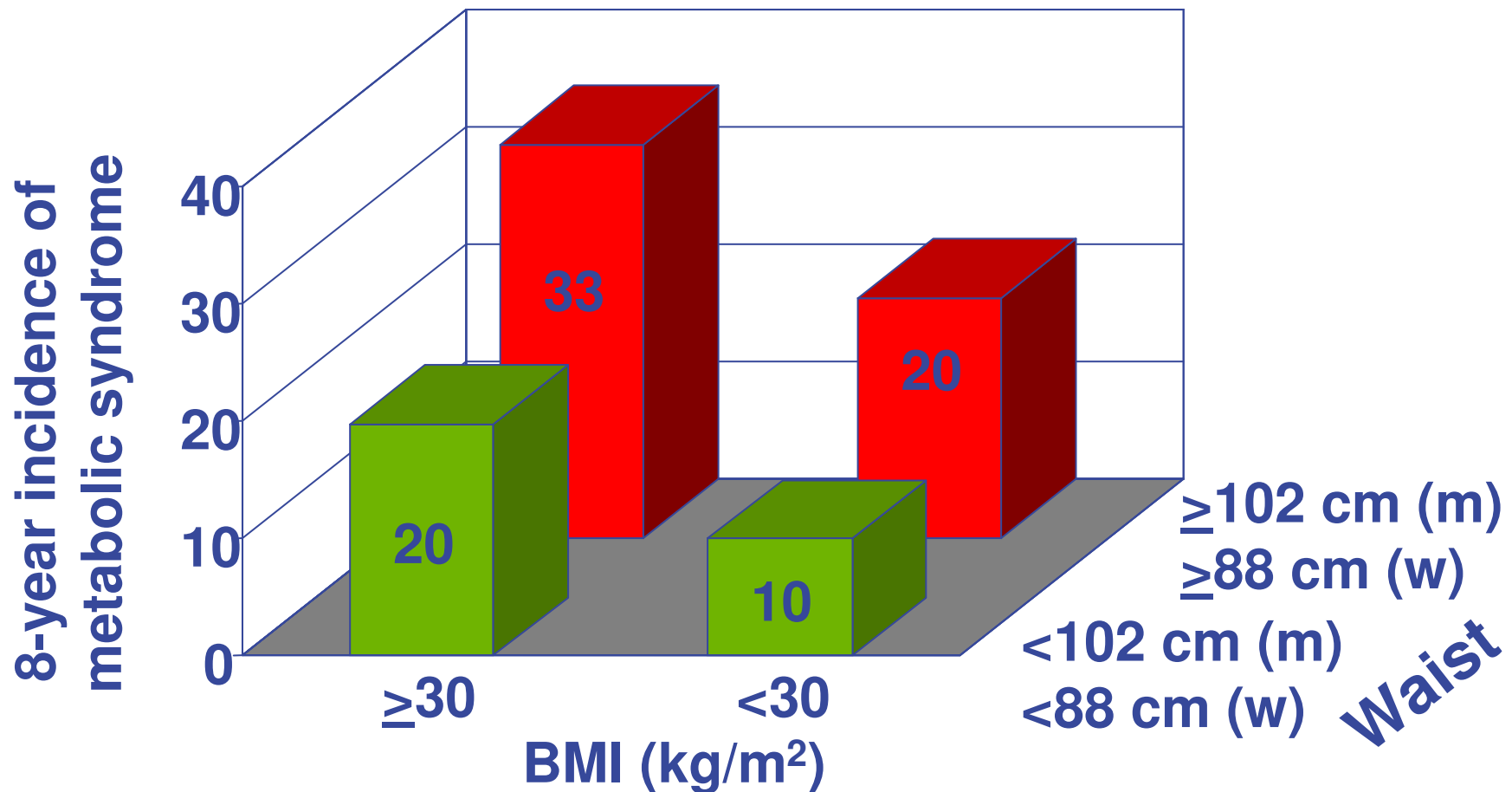
● Normal wt. ● Adipose slight IAA ● Adipose high IAA

Significant increase in adipose patients with high IAA



Abdominal adiposity - a predictor for metabolic syndrome

Han et al 2002





Part 2: Research results

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CoQ10/alpha-lipoic acid study, 2005

Research objective:

To test the effects of supplementation with coenzyme Q10 and alpha-lipoic acid in adiposity therapy.



Rationale of the Q10/ALA study I

Coenzyme Q10 increases fat-burning and should therefore lead to a stronger fat reduction during adiposity therapy in comparison to a non-supplementation group.



Rationale of the Q10/ALA study II

In the brain alpha-lipoic acid affects satiety in a physiological manner. Consequently, the application of alpha-lipoic acid should contribute to a sustainable improvement in the success of the therapy.



Design of the Q10/ALA study

In a randomized blinded study nine patients were treated with supplements (verum) and eight with placebo over a period of 16 weeks.

Research plan

Week	0	2	4	6	8	10	12	14	16
Initial examination	x								
Terminating examination									x
Haemogram	x								
BIA	x	x	x	x	x	x	x	x	x
Nutrition log	x	x	x	x	x	x	x	x	x
Satiety index	x	x	x	x	x	x	x	x	x
Buccal Mucosa	x								
Supplementation	x	x	x	x	x	x	x	x	x
Compatibility		x	x	x	x	x	x	x	x
Nutritional form	2 x Formula – 1 x MK					1 x Formula 2 x MK		3 x MK	

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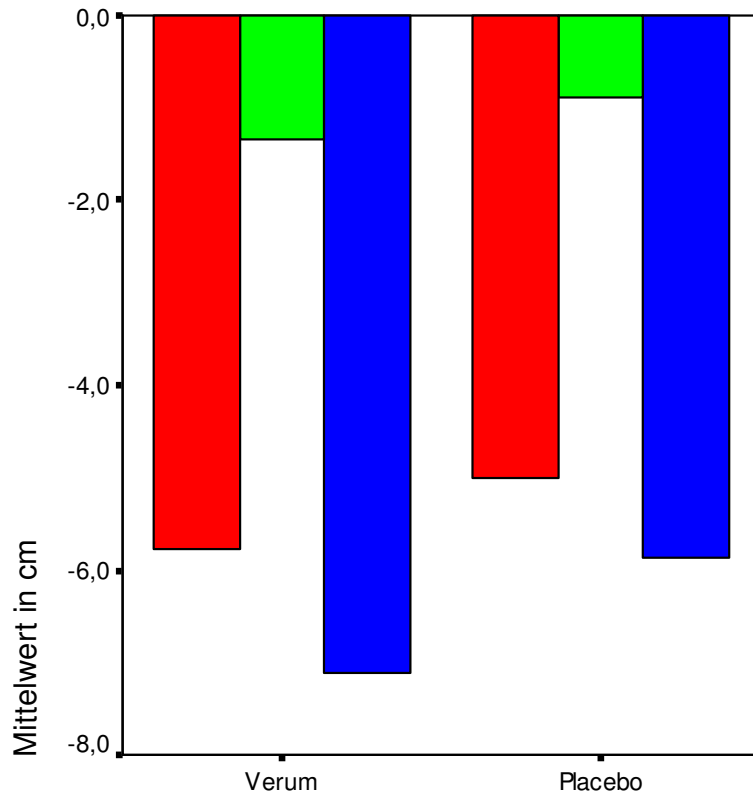


DR. GOLA

Results of the Q10/ALA study



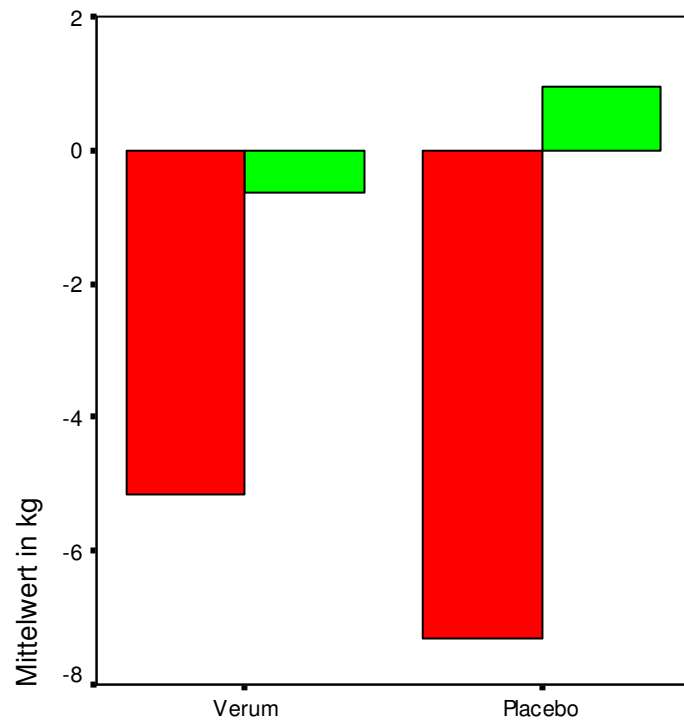
Waist



Verum: Larger reduction of the waist girth as measure of dangerous abdominal fat

Group		Waist difference week 0/8	Waist difference week 8/16	Waist difference week 0/16
Verum	N	9	9	9
	Mean	-5.778	-1.333	-7.111
Placebo	N	8	8	8
	Mean	-5.000	-0.875	-5.875

Adipose mass

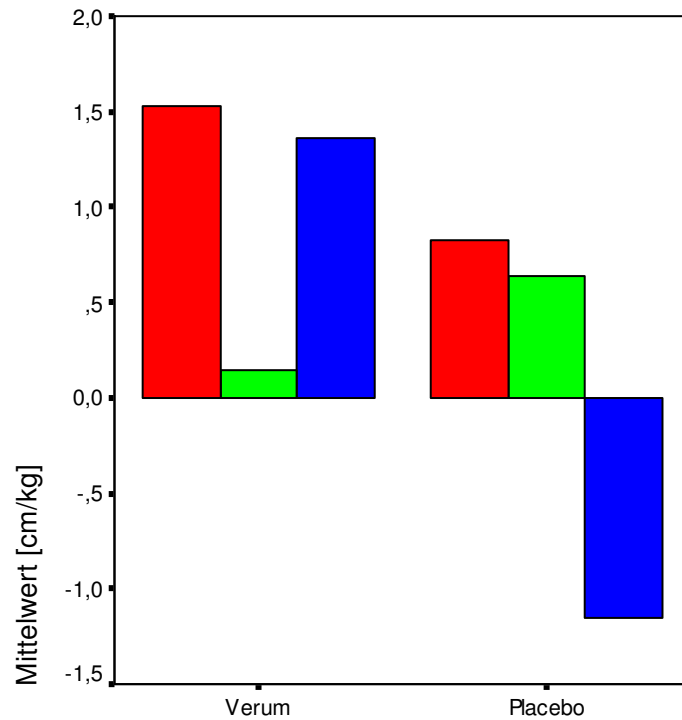


Verum: Loss of adipose mass maintained during retention phase.

Group		Difference adipose mass week 0/0	Difference adipose mass week 8/16
Verum	N	9	9
	Mean	-2.156	-6.22
Placebo	N	8	8
	Mean	-7.312	1.938

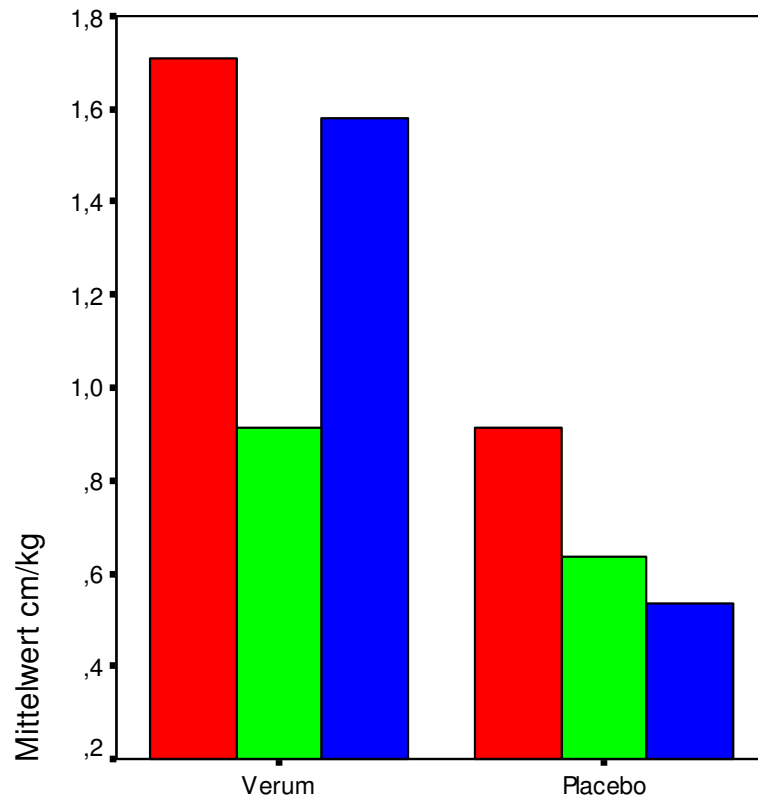
Quotient of waist/adipose mass

Verum: Greater loss of abdominal fat even with increased calorie intake



Group		Quotient waist/abd. fat Wk 0/8	Quotient waist/abd. fat Wk 8/16	Quotient waist/abd. fat Wk 0/16
Verum	N	9	9	9
	Mean	1.533	.144	1.356
Placebo	N	8	8	8
	Mean	.825	.638	-1.150

Quotient of waist/weight

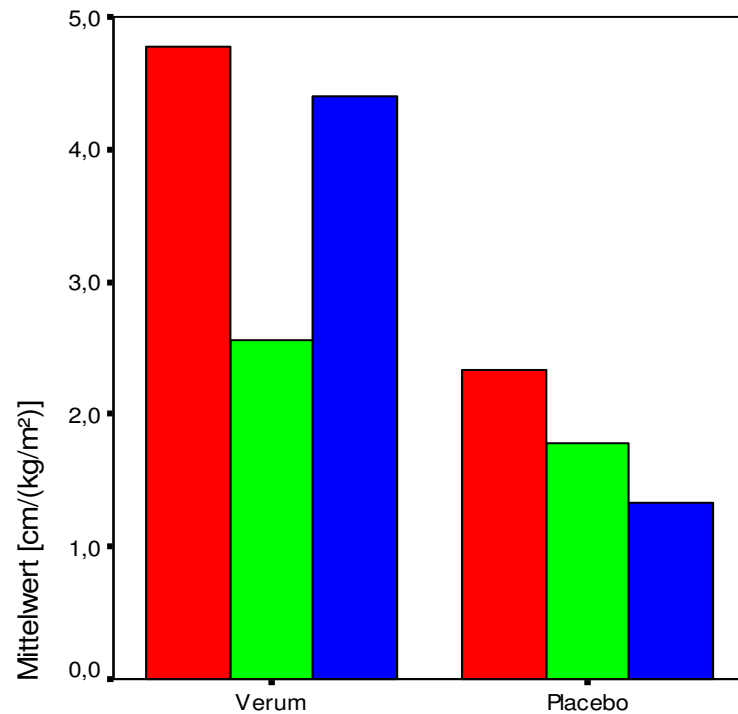


Verum: Loss of the decisive fat (visceral) greater

Group		Quotient waist/weight Week 0/8	Quotient waist/weight Week 8/16	Quotient waist/weight Week 0/16
Verum	N	9	8	9
	Mean	1.711	.913	1.578
Placebo	N	7	8	8
	Mean	.914	.638	.537

Quotient of waist/BMI

Verum: Clearly improved reduction of abdominal fat referred to BMI loss



Gruppe		Quotient waist/BMI Week 0/8	Quotient waist/BMI Week 8/16	Quotient waist/BMI Week 0/16
Verum	N	9	8	9
	Mean	4.778	2.563	4.400
Placebo	N	7	8	8
	Mean	2.329	1.775	1.325

Summary I

The reduction in the adipose mass and waist measurements were greater in the verum group despite the same changes in the BMI.

Summary II

Despite feeling hungrier overall, the verum group found it easier to maintain the calorie reduction over the research period.

The two meals during the day, at which the supplements were taken, were characterized by better satiety than the meal without any supplement.

Conclusion from the Q10/ALA study

Taking into account that the risk of developing an adiposity related disease, primarily depends on the mass of visceral fat (so-called abdominal fat), the substantially greater reduction in adipose mass and the clearly reduced waist measurement are the decisive results in the verum group.



Conclusion from the Q10/ALA study

Therefore, for the first time in the fields of weight management and weight maintenance there is a natural combination available which represents a successful and completely new approach.

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**Questions ?
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