

佛萊堡研究

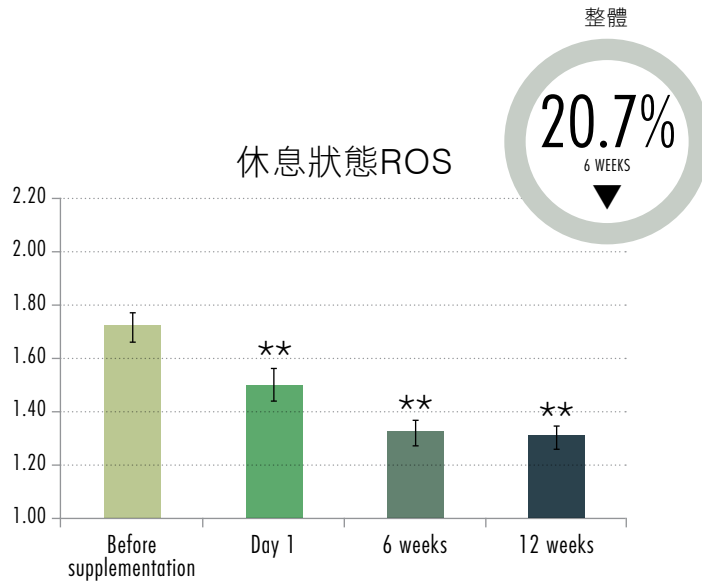
初步結果

- 自由基及活性氧(ROS)代謝
- 粒線體自由基
- 發炎反應(hs-CRP 高敏感性C反應蛋白)
- 血脂(膽固醇、三酸甘油脂)
- 血壓(收縮壓、舒張壓、一氧化氮)
- 能量利用(心跳)
- 醣類代謝(血糖、糖化血色素、胰島素抗性)

自由基及活性氧(ROS)代謝: 休息狀態 vs. 運動狀態

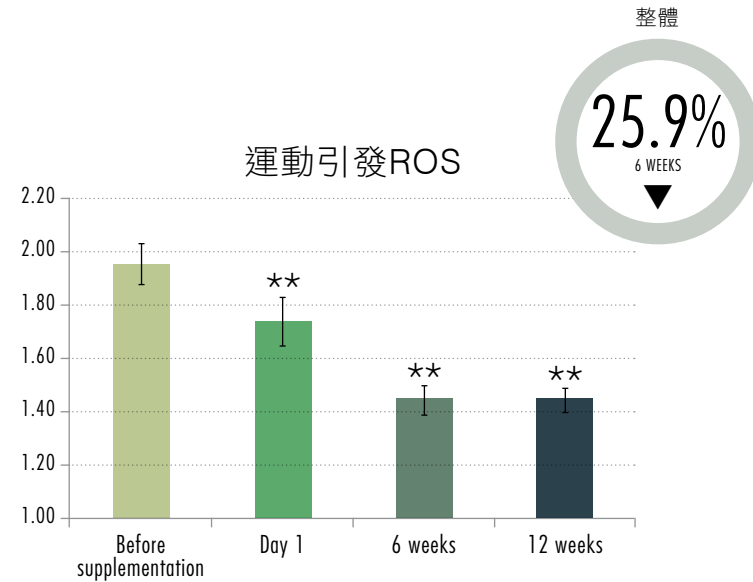
研究中，自由基是透過活性氧(ROS)來評估。

食用營養輔助食品組合1小時後，受試者運動中活性氧平均降低10%。連續食用6周後，48位受試者休息狀態下活性氧(ROS)平均降低20.7%，運動狀態下活性氧(ROS)平均降低25.9%。



	RESTING ROS 1 HOUR			
Resting	Control	Day 1	6 weeks	12 weeks
Average	1.71	1.51	1.35	1.33
t-test		< 0.001	< 0.001	< 0.001
% Change		-11.6%	-20.7%	-21.8%

Paired two samples for means

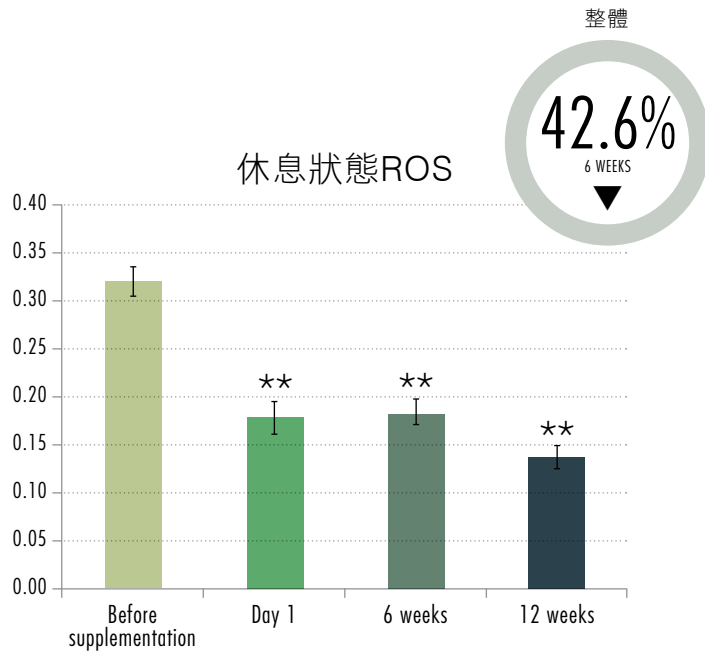


	ROS DURING EXERCISE 1 HOUR			
Exercise	Control	Day 1	6 weeks	12 weeks
Average	1.94	1.74	1.44	1.43
t-test		< 0.001	< 0.001	< 0.001
% Change		-10.2%	-25.9%	-26.3%

Paired two samples for means

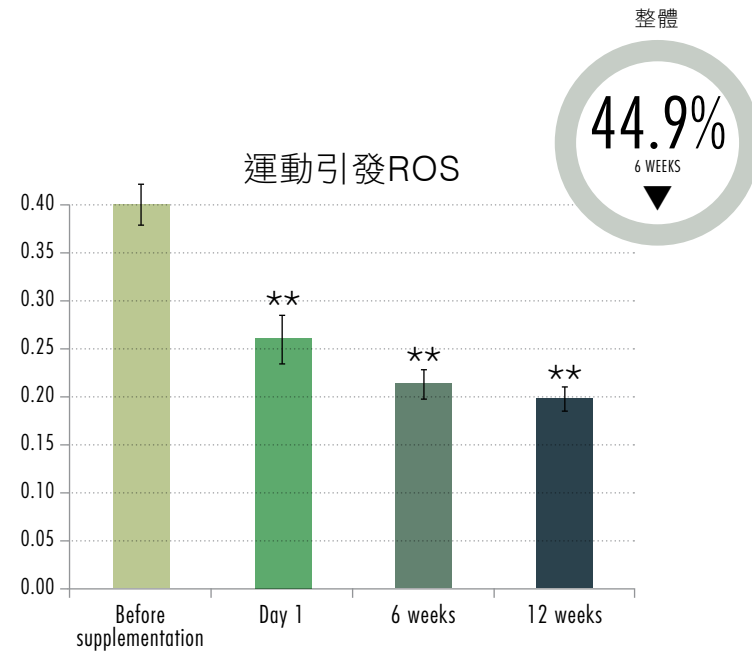
粒線體自由基: 休息狀態 vs. 運動前後

粒線體是細胞的能量工廠，而自由基會妨礙粒線體功能。
粒線體中的自由基降低，代表能量的生產效率提高。



Resting	Control	Day 1	6 weeks	12 weeks
Average	0.32	0.18	0.18	0.14
t-test		< 0.001	< 0.001	< 0.001
% Change		-45.2%	-42.6%	-55.9%

Paired two samples for means

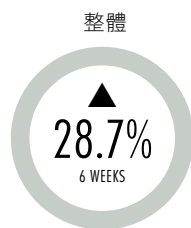


Exercise	Control	Day 1	6 weeks	12 weeks
Average	0.40	0.26	0.22	0.20
t-test		< 0.001	< 0.001	< 0.001
% Change		-36.1%	-44.9%	-50.4%

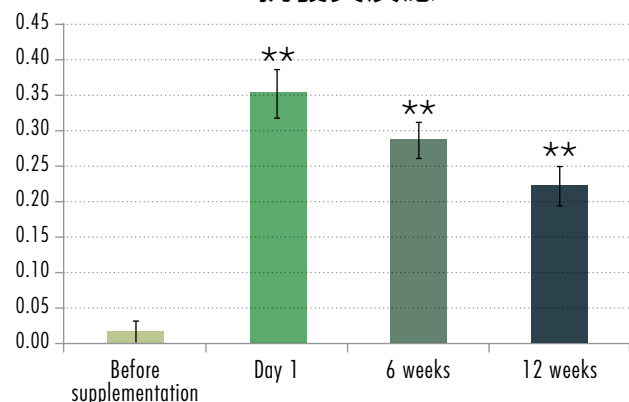
Paired two samples for means

發炎反應:

在第一天食用營養輔助食品組合後僅一小時，
抗發炎反應平均改善**35.8%**。



抗發炎反應



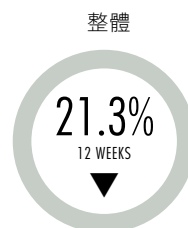
RESISTANCE TO INDUCED INFLAMMATION

Resistance	Control	Day 1	6 weeks	12 weeks
Average	0.02	0.03	0.03	0.03
t-test		< 0.001	< 0.001	< 0.001
% Change		35.8%	28.7%	22.1%

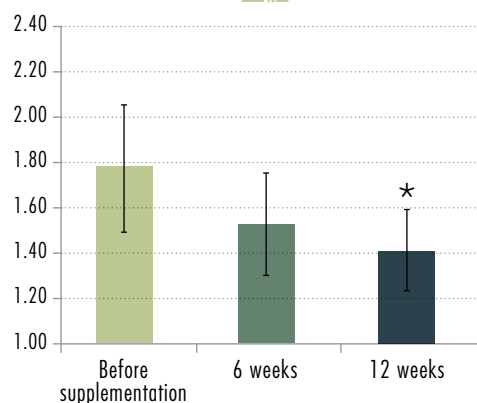
Paired two samples for means

發炎反應: hs-CRP (高敏感性C反應蛋白)

連續食用營養輔助食品組合**12周**後，對發炎反應的降低效果更顯著。
那些原本**hs-CRP**正常偏高的受試者，顯著下降**34.1%**。



hs-CRP 整體

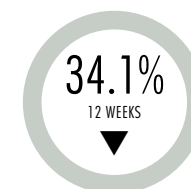


hs-CRP

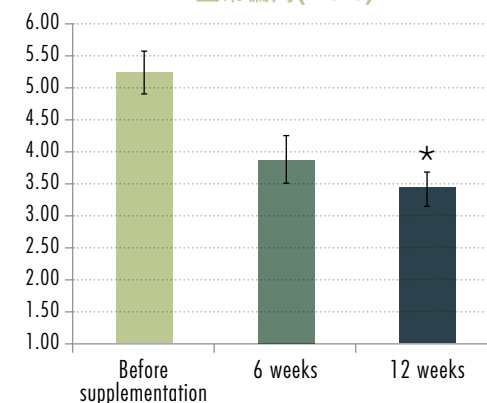
Everyone	Control	6 weeks	12 weeks
Average	1.79	1.53	1.41
t-test		ns	0.024
% Change		-14.6%	-21.3%

Paired two samples for means

正常偏高



hs-CRP 正常偏高(>3.0)



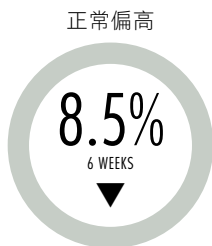
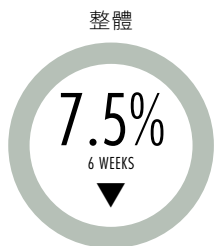
hs-CRP

Elevated >3.0	Control	6 weeks	12 weeks
Average	5.25	3.82	3.46
t-test		ns	0.002
% Change		-27.2%	-34.1%

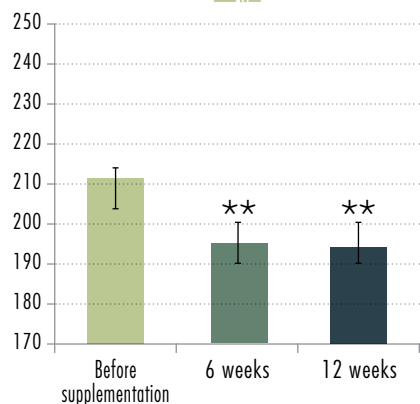
Paired two samples for means

血脂: 總膽固醇

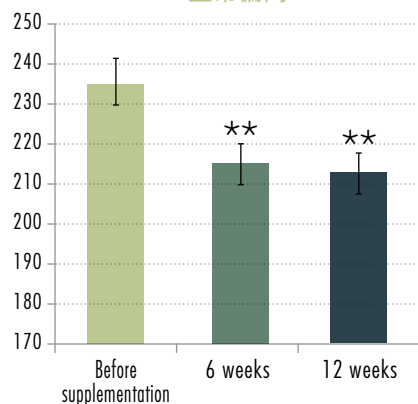
48位受試者，血液中總膽固醇平均降低**7.5%**，整體平均值接近理想範圍。
總膽固醇原本就偏高的受試者，其總膽固醇平均更大幅減少**8.5%**。



TOTAL CHOLESTEROL
整體



TOTAL CHOLESTEROL
正常偏高



TOTAL CHOLESTEROL			
Everyone	Control	6 weeks	12 weeks
Average	211.3	195.5	195.3
t-test		< 0.001	< 0.001
% Change		-7.5%	-7.6%

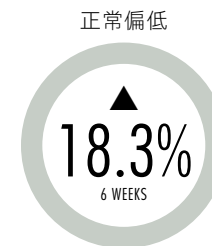
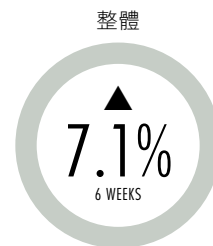
Paired two samples for means

TOTAL CHOLESTEROL			
Elevated	Control	6 weeks	12 weeks
Average	235.2	215.2	213.4
t-test		< 0.001	< 0.001
% Change		-8.5%	-9.3%

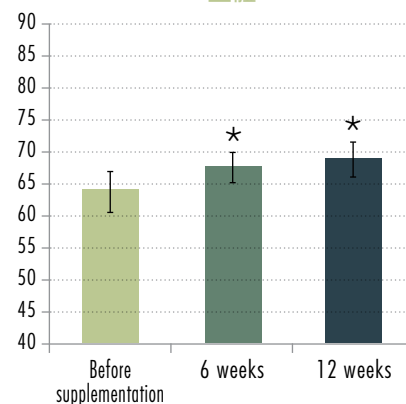
Paired two samples for means

血脂: HDL 高密度脂蛋白

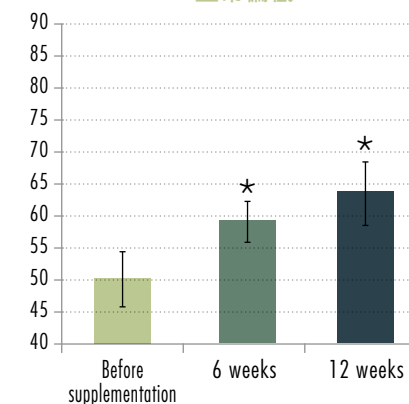
所有受試者，其**HDL(或好的膽固醇)**都顯示增加。原本**HDL**膽固醇偏低的受試者更顯著提升，平均增加**18.3%**。



HDL CHOLESTEROL
整體



HDL CHOLESTEROL
正常偏低



HDL CHOLESTEROL			
Everyone	Control	6 weeks	12 weeks
Average	63.1	67.6	68.8
t-test		0.0027	0.0026
% Change		7.1%	9.1%

Paired two samples for means

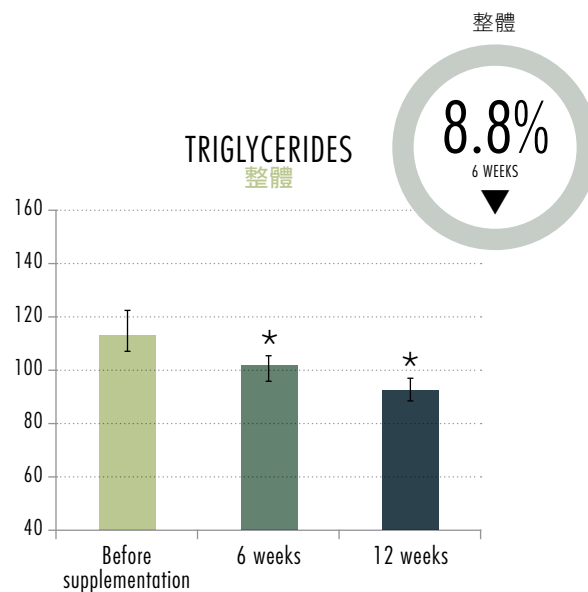
HDL CHOLESTEROL			
Low	Control	6 weeks	12 weeks
Average	50.3	59.5	63.1
t-test		0.0027	0.0026
% Change		18.3%	25.6%

Paired two samples for means

血脂: 三酸甘油脂

48位受試者在連續食用6周後，其三酸甘油脂平均降低**8.8%**。

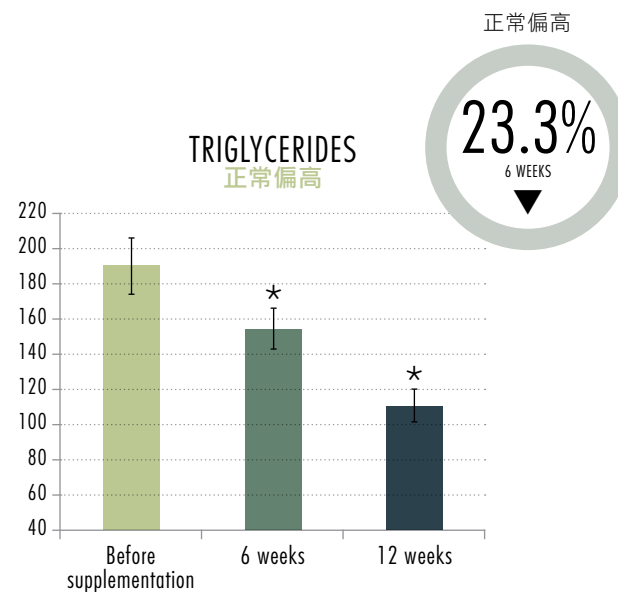
但對那些三酸甘油脂原先較高的人來說，有更明顯的降幅，平均降低**23.3%**。



TRIGLYCERIDES

Everyone	Control	6 weeks	12 weeks
Average	113.3	103.3	92.3
t-test		0.0266	0.0045
% Change		-8.8%	-18.5%

Paired two samples for means



TRIGLYCERIDES

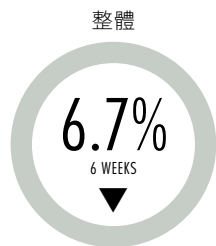
Elevated	Control	6 weeks	12 weeks
Average	202.5	155.3	116.2
t-test		0.001	0.002
% Change		-23.3%	-42.6%

Paired two samples for means

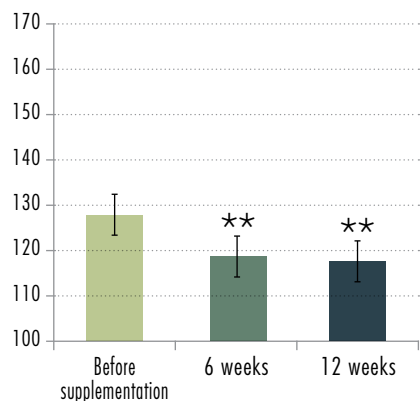
血脂: LDL低密度脂蛋白

48位受試者，LDL (又稱壞的膽固醇)平均降低**6.7%**。

LDL原本就偏高的受試者，其LDL平均更大幅降低**11.3%**。



LDL CHOLESTEROL
整體

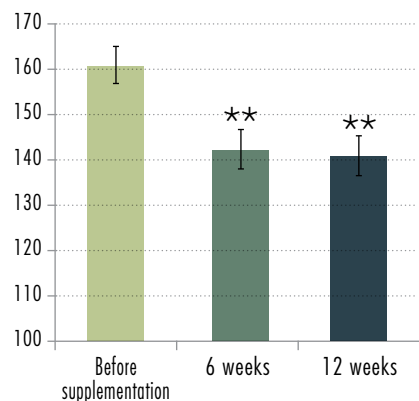


LDL CHOLESTEROL			
Everyone	Control	6 weeks	12 weeks
Average	128.2	119.6	117.8
t-test		< 0.001	< 0.001
% Change		-6.7%	-8.1%

Paired two samples for means



LDL CHOLESTEROL
正常偏高

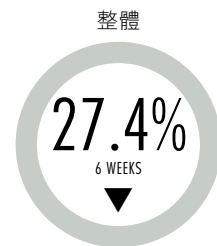


LDL CHOLESTEROL			
Elevated	Control	6 weeks	12 weeks
Average	160.3	142.2	141.5
t-test		< 0.001	< 0.001
% Change		-11.3%	-11.8%

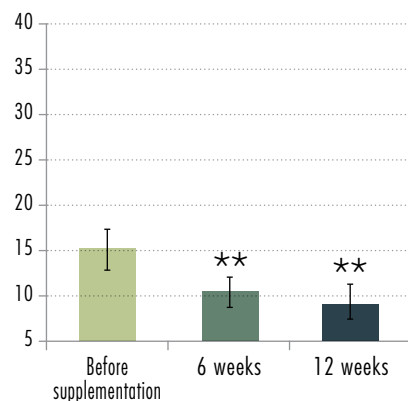
Paired two samples for means

血脂: VLDL 極低密度脂蛋白

佛萊堡研究亦評估VLDL (極低密度脂蛋白)。VLDL中含大量的三酸甘油脂，當血液中VLDL過高是心血管不健康的一項指標。受試者VLDL數值皆有顯著下降，尤其食用一段時間後更明顯。

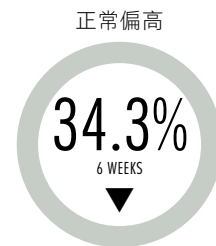


VLDL CHOLESTEROL
整體

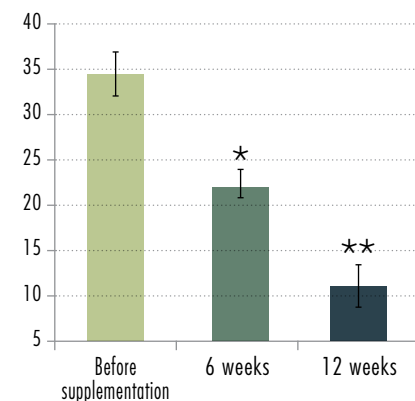


VLDL CHOLESTEROL			
Everyone	Control	6 weeks	12 weeks
Average	15.1	10.9	8.8
t-test		< 0.001	< 0.001
% Change		-27.4%	-41.6%

Paired two samples for means



VLDL CHOLESTEROL
正常偏高

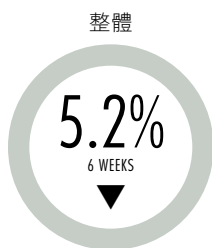


VLDL CHOLESTEROL			
Elevated	Control	6 weeks	12 weeks
Average	34.1	22.4	11.9
t-test		0.005	< 0.001
% Change		-34.3%	-65.3%

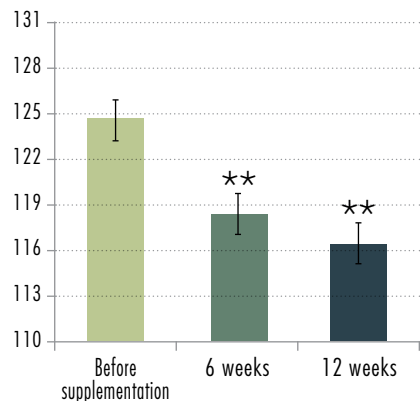
Paired two samples for means

血壓：收縮壓

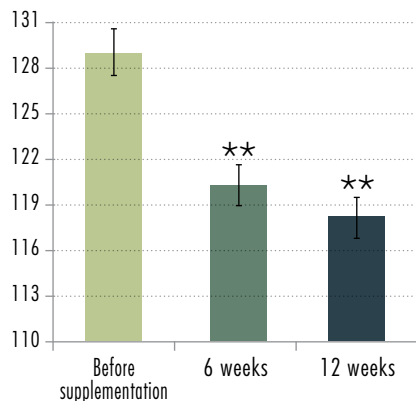
48位受試者在連續食用營養輔助食品組合6週後，收縮壓平均降低5.2%。
更重要的是，原先血壓在正常範圍內偏高的受試者，收縮壓平均下降5.9%。



SYSTOLIC BLOOD PRESSURE
整體



SYSTOLIC BLOOD PRESSURE
正常偏高



SYSTOLIC BLOOD PRESSURE

Everyone	Control	6 weeks	12 weeks
Average	124.5	118.0	116.6
t-test		< 0.001	< 0.001
% Change		-5.2%	-6.3%

Paired two samples for means

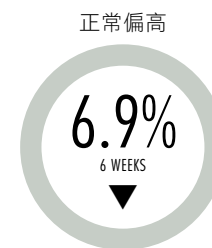
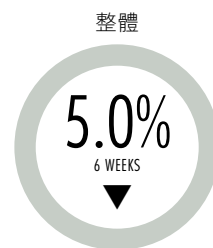
SYSTOLIC BLOOD PRESSURE

Elevated	Control	6 weeks	12 weeks
Average	129.3	121.6	118.8
t-test		< 0.001	< 0.001
% Change		-5.9%	-8.1%

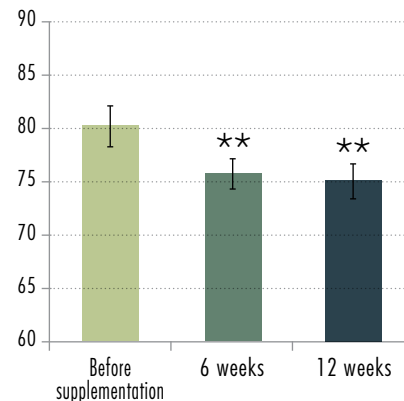
Paired two samples for means

血壓：舒張壓

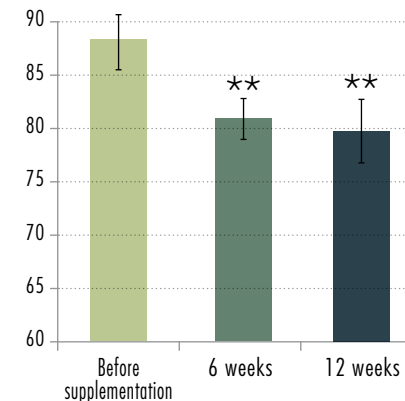
研究受試者的舒張壓也發現顯著的改善。48位受試者在連續食用營養輔助食品組合6週後，舒張壓平均降低5.0%，且原先血壓在正常範圍內偏高的受試者，舒張壓平均下降6.9%。



DIASTOLIC BLOOD PRESSURE
整體



DIASTOLIC BLOOD PRESSURE
正常偏高



DIASTOLIC BLOOD PRESSURE

Everyone	Control	6 weeks	12 weeks
Average	80.2	76.2	75.4
t-test		< 0.001	< 0.001
% Change		-5.0%	-6.0%

Paired two samples for means

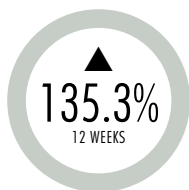
DIASTOLIC BLOOD PRESSURE

Elevated	Control	6 weeks	12 weeks
Average	87.3	81.3	79.7
t-test		< 0.001	0.001
% Change		-6.9%	-8.6%

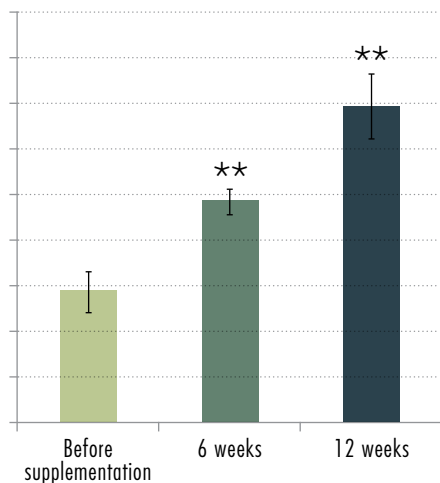
Paired two samples for means

血壓：一氧化氮

代謝產生的一氧化氮能使血管細胞放鬆，有助維持健康血壓。48位受試者在連續食用營養輔助食品組合12週後，血液中一氧化氮含量增加1倍以上。



一氧化氮



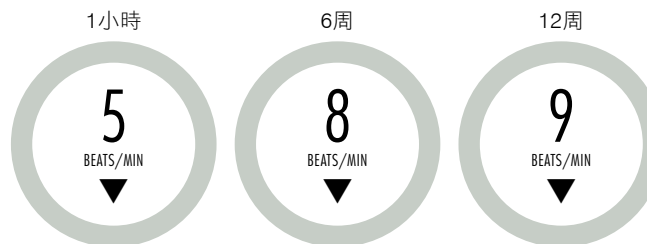
NITRIC OXIDE

Everyone	Control	6 weeks	12 weeks
Average	59.1	98.3	139.0
SEM	6.6	6.6	12.7
t-test		< 0.001	< 0.001
% Change		66.4%	135.3%

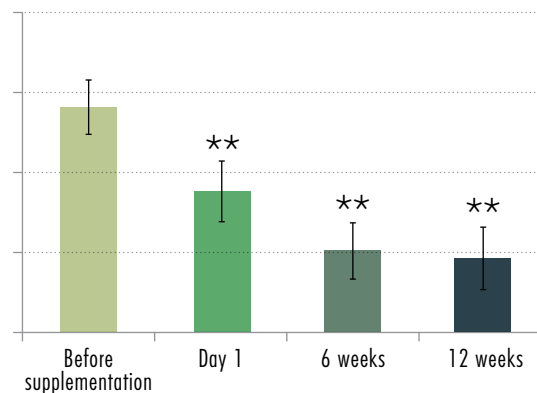
Paired two samples for means

能量利用：心跳

只要食用營養輔助食品組合1小時後，在特定運動後觀察，運動心跳平均每分鐘減少5下。連續食用6周後，相同運動48位受試者每分鐘心跳平均減少8下，連續食用12週後，相同運動每分鐘心跳平均減少9下。



HEART RATE AFTER 1 HOUR



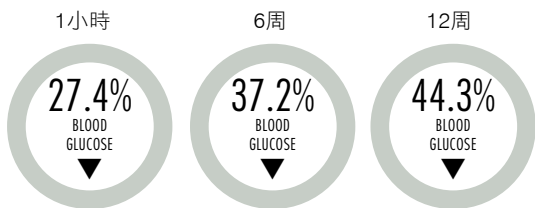
HEART RATE AFTER 1 HOUR

Everyone	Control	Day 1	6 weeks	12 weeks
Average	128.5	123.7	120.8	119.2
t-test		< 0.001	< 0.001	< 0.001
Beats/min		-4.8	-7.8	-9.4

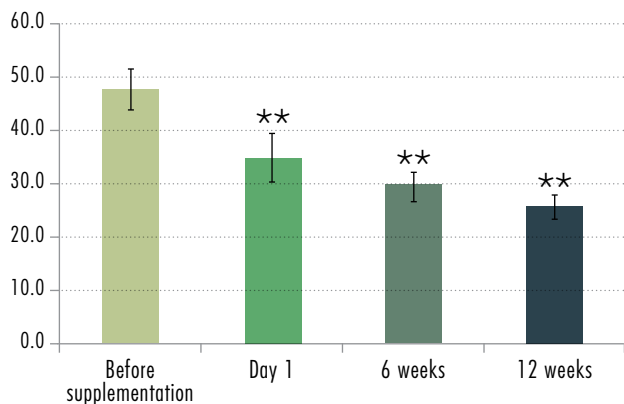
Paired two samples for means

血糖代謝: 血糖

只要食用營養輔助食品組合1小時後，飯後血糖升高程度就降低**27.4%**，連續食用營養輔助食品組合效果更顯著，**6週後降低37.2%**，**12週後降低44.3%**。



POST-MEAL BLOOD SUGAR SPIKE IN 1 HOUR
EVERYONE AFTER TAKING SUPPLEMENT



POST-MEAL BLOOD SUGAR SPIKE

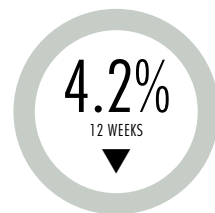
Exercise	Control	Day 1	6 weeks	12 weeks
Average	47.8	34.7	30.0	26.6
t-test		< 0.001	< 0.001	< 0.001
% Change		-27.4%	-37.2%	-44.3%

Paired two samples for means

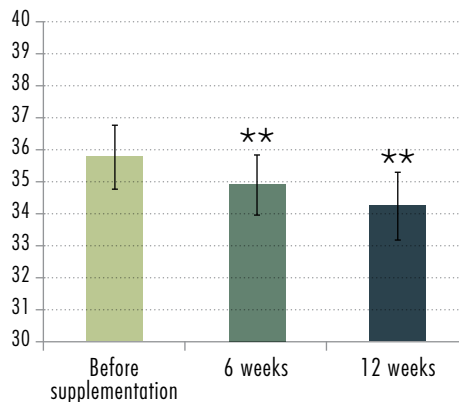
血糖代謝: HbA1c 糖化血色素

HbA1c可反應最近**90天**的平均血糖控制狀況，研究中亦發現明顯的改善。

整體



HbA1c
整體

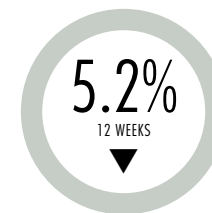


HbA1c

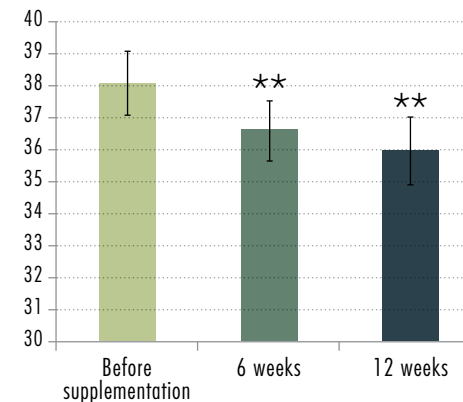
Everyone	Control	6 weeks	12 weeks
Average	35.8	34.9	34.3
t-test		< 0.001	< 0.001
% Change		-2.4%	-4.2%

Paired two samples for means

正常偏高



HbA1c
正常偏高



HbA1c

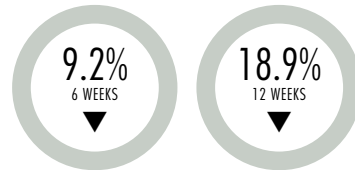
Elevated	Control	6 weeks	12 weeks
Average	38.0	36.7	36.0
t-test		< 0.001	< 0.001
% Change		-3.3	-5.2

Paired two samples for means

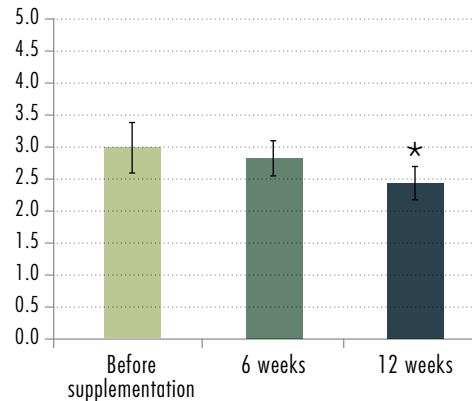
血糖代謝: HOMA胰島素抗性

12週後，觀察到胰島素抗性(HOMA)下降28%，HOMA是評估胰島素敏感度的指標。

胰島素敏感度指標



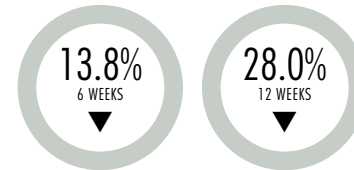
HOMA (INSULIN SENSITIVITY)
整體



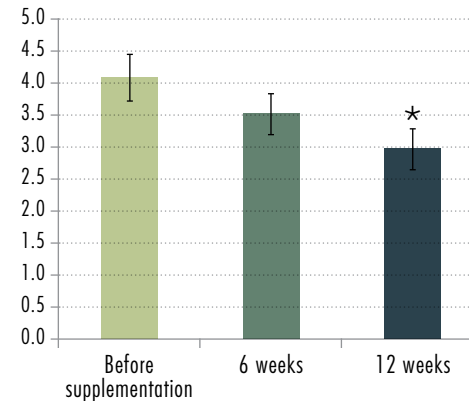
Everyone	HOMA		
	Control	6 weeks	12 weeks
Average	3.0	2.7	2.4
t-test		ns	0.02
% Change		-9.2%	-18.9%

Paired two samples for means

胰島素敏感度指標



HOMA (INSULIN SENSITIVITY)
正常偏高



Elevated	HOMA		
	Control	6 weeks	12 weeks
Average	4.1	3.5	3.0
t-test		ns	0.01
% Change		-13.8%	-28.0%

Paired two samples for means