COMPLEX ANTIOXIDANT BLEND IMPROVES MEMORY IN COMMUNITY-DWELLING SENIORS.

William K. Summers[1], Roy L. Martin[1], Michael Cunningham[2], Velda L. DeBoynton[1], Gary M. Marsh[2]

1 Alzheimer's Corporation, Albuquerque, NM 87110, 2 Graduate School of Public Health, University of Pittsburgh, PA 15261

Introduction:

Thirty percent of healthy non-demented community-dwelling elderly have complaints of decline in memory function. Cognitive decline from baseline has been documented in 18.2% of older persons followed over three years. Although memory complaints can predict neuropathologic diseases, most elder memory complaints are not due to neurological disease

Products that improve memory in normal community dwelling elderly are not established. Numerous health supplements and herbal preparations claim memory improvement, but do not offer proof.

This study evaluated the effect on memory capacity of a potent complex antioxidant using non-demented community dwelling seniors over a four month period. The complex antioxidant blend used, contained 34 antioxidants representing five classes of antioxidants

Methods:

113 subjects were recruited from the general Albuquerque metropolitan area. Minimum exclusion criteria were applied. Subjects were to be non-demented and living independently in the community and between the age of fifty and seventy-five. Memory testing was in English. Subjects had to be English speaking. Exclusion criteria included living in a structured community, such as a nursing home or assisted living. Subjects could not be in a hospice program. Subjects could not be taking coumadin, anti-cancer drugs, antipsychotics, corticosteroids, or anti-dementia drugs. Subjects could not be on a continuous positive airway pressure (CPAP) device or have known obstructive sleep apnea syndrome. The subjects were not paid to participate, nor reimbursed for expenses.

The intake interview recorded demographic data, medical history, a complete listing of prescribed medications, over-the-counter medications, and health supplements. Baseline age, height, weight, waist size, gender, and race data were collected. A baseline battery of memory tests was administered. Subjects were randomly assigned to placebo or active treatment group.

The memory test battery included the Mini-Mental Status Examination (MMSE) a 20-word free-recall test ($_{20}$WRT) of short-term memory, a 50-item Names-Learning paired association test (NLT_{50}). These tests were administered in about 30 minutes. The MMSE ruled out presence of dementia. The $_{20}$WRT tested immediate recall, putatively testing hippocampal competence. The word list was different with each trial. The NLT_{50} addresses higher cognitive centers linking frontal lobe, occipital lobe, and hippocampus. The NLT_{50} putatively views superior temporal lobe function. Each NLT_{50} used was a different list of associated pairs to eliminate long-term memory effect.

Treatment was randomly assigned to ingest six gels of a 34-component antioxidant blend (Table) or six gels of placebo (lactose and bitter flavor) each day for four months. The subjects were seen at one month and four months after receiving their study drug. Interval medical history was taken and the memory test battery was administered.

A homocysteine sub-study was conducted in the first 50 subjects who volunteered for a blood draw at baseline and the 4-month visit. The serum was stored at -70◦C, then analyzed as a group, Tricore Reference Laboratories, Albuquerque

Composition of Complex Antioxidant Blend

COMPONENT	Daily Dose	% Daily Value	Classification
Alpha lipoic acid	90 mg		Lipid antioxidant
d-alpha tocopherol	240 IU	2,400%	Vitamin antioxidant
Ascorbic acid	300mg	500%	Vitamin antioxidant
A vitamin palmitate	4,500 IU	450%	Vitamin antioxidant
Beta carotene	9,000 IU	900%	Vitamin antioxidant
Bioflavonoid (lemon)	90 mg		Herbal antioxidant
Boron citrate	60 µg		Mineral antioxidant
Co-enzyme Q10	36 mg		Lipid antioxidant
Copper gluconate	75 µg	180%	Mineral antioxidant
DMAE	67.5 mg		Lipid antioxidant
Eleutherococcus senticosus	90 mg		Herbal antioxidant
Folic acid	720 µg	180%	Vitamin antioxidant
Gingko biloba	90 mg		Herbal antioxidant
Ginseng (10% ginsenosides)	90mg		Herbal antioxidant
l-glutathione	120 mg		Amino acid antioxidant
Gotu kola	120 mg		Herbal antioxidant
Grape seed extract	210 mg		Herbal antioxidant
l-lysine	180 mg		Amino acid antioxidant
Magnesium citrate	48 mg	14%	Mineral antioxidant
Manganese citrate	3 mg	67%	Mineral antioxidant
l-methionine	180 mg		Amino acid antioxidant
Methylcobalamin	720 µg	3,000%	Vitamin antioxidant
Nicotinamide	24 mg	150%	Vitamin antioxidant
Pantothenate, *d-calcium*	60 mg	1,200%	Vitamin antioxidant
Papain	9 mg		Herbal antioxidant
Phosphatidylcholine	480 mg		Lipid antioxidant
Phosphatidylserine	30 mg		Lipid antioxidant
Pyridoxine HCl	18 mg	1,059%	Vitamin antioxidant
Pyridoxal-5-phosphate	3.6 mg	212%	Vitamin antioxidant
Riboflavin-5-phosphate	6mg	462%	Vitamin antioxidant
l- selenomethionine	60 µg	100%	Mineral antioxidant
Taurine	90 mg		Amino acid antioxidant
Thiamine	24 mg	2,000%	Vitamin antioxidant
Tocotrienols, mixed	186 mg		Vitamin antioxidant
Zinc citrate	18 mg	120%	Mineral antioxidant

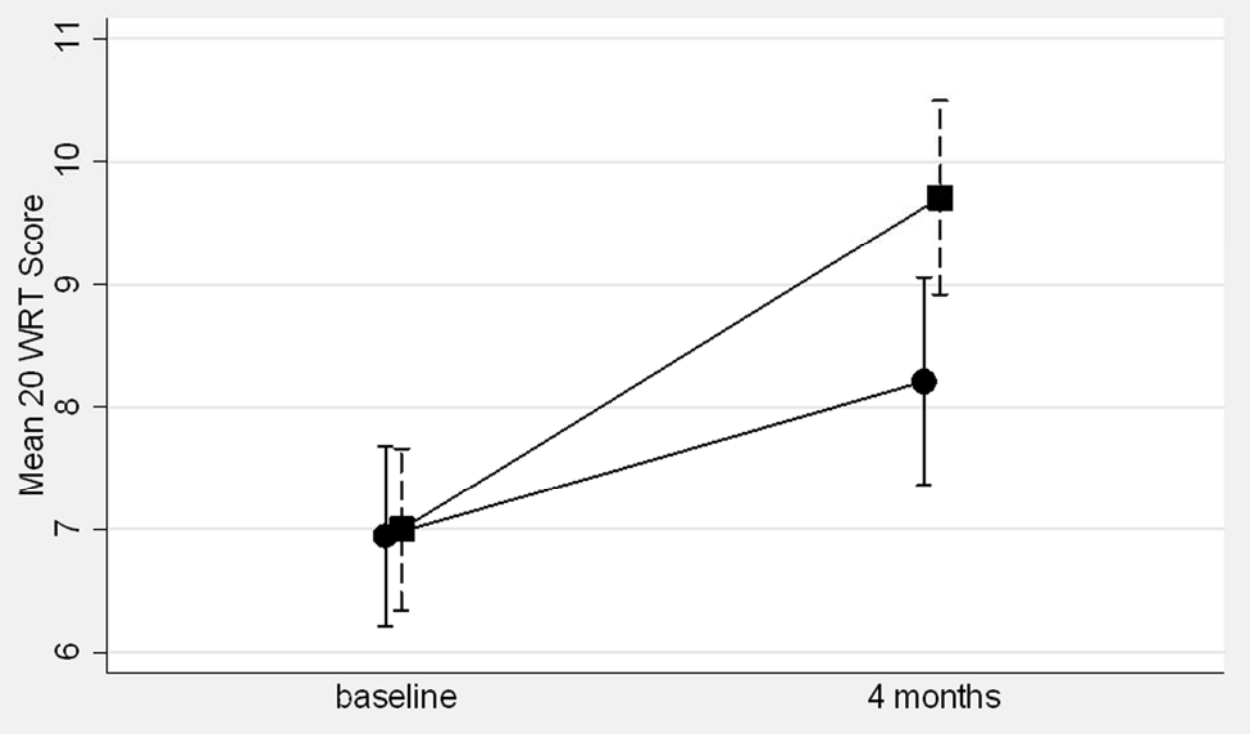
Characteristics of Subjects completing 4 months of study.

Characteristic	Placebo (n=38)		Active (n=48)		p-value[a.]
Age, mean (SD)	60.0	(7.0)	63.3	(6.9)	0.031
Height, mean (SD)	65.4	(5.9)	65.5	(5.8)	0.958
Weight, mean (SD)	166.5	(29.3)	169.3	(36.8)	0.704
Waist, mean (SD)	37.0	(4.4)	37.5[b.]	(4.7)	0.658
Gender, n (%)					
Female	24	(63.2)	26	(54.2)	0.401
Male	14	(36.8)	22	(45.8)	
Race, n (%)					
White	30	(79.0)	37	(77.1)	0.836
Nonwhite	8	(21.0)	11	(22.9)	
How participant heard of trial, n (%)					
Ads	27	(71.1)	32	(66.7)	0.876
Clinic	4	(10.5)	5	(10.4)	
Word of Mouth	7	(18.4)	11	(22.9)	
Prescription, n (%)					
No	38	(100.0)	48	(100.0)	1.000
Yes	0	(0.0)	0	(0.0)	

a. Comparison of placebo to active group (null hypothesis of equality between groups). Two-sample t test for continuous variables and chi-square test for categorical variables

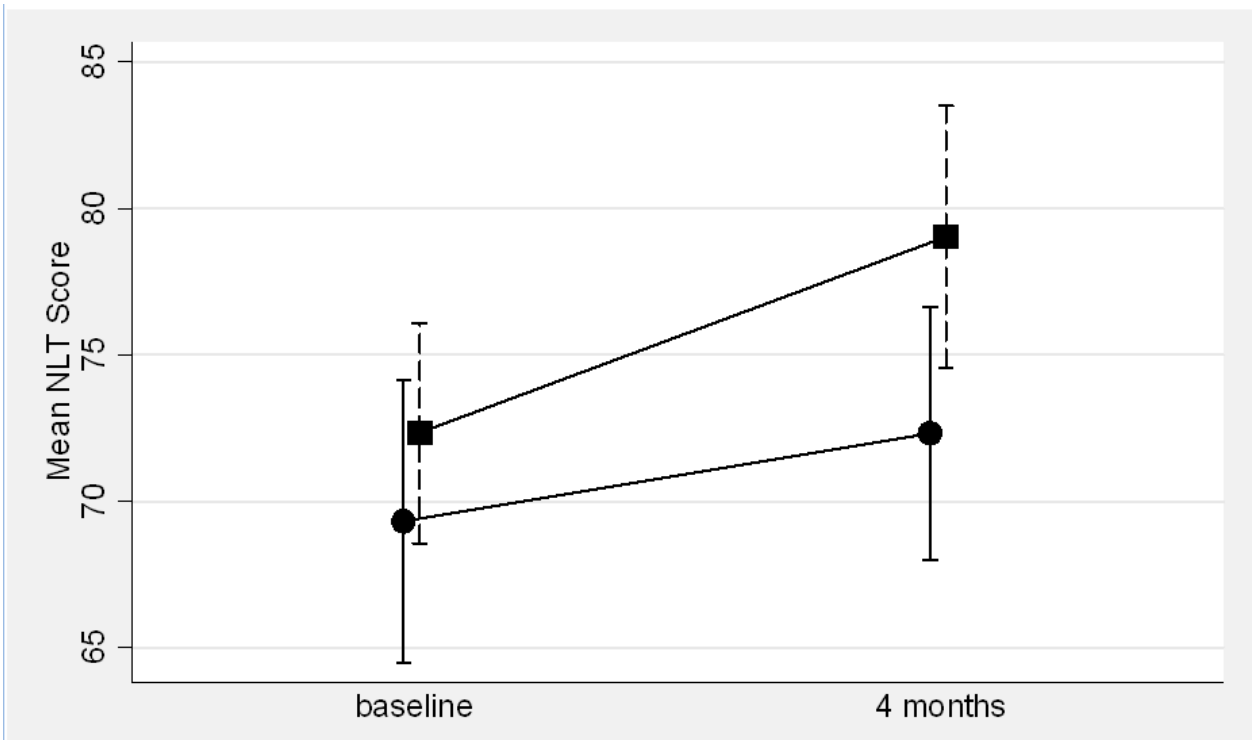
b. n=47

Mean $_{20}$WRT Scores At Baseline And 4-Months



Placebo (--●--), Active treatment (--■--) with 95% confidence levels.
With adjusted linear regression modeling, p=0.005.

Mean NLT_{50} Scores At Baseline And 4-Months



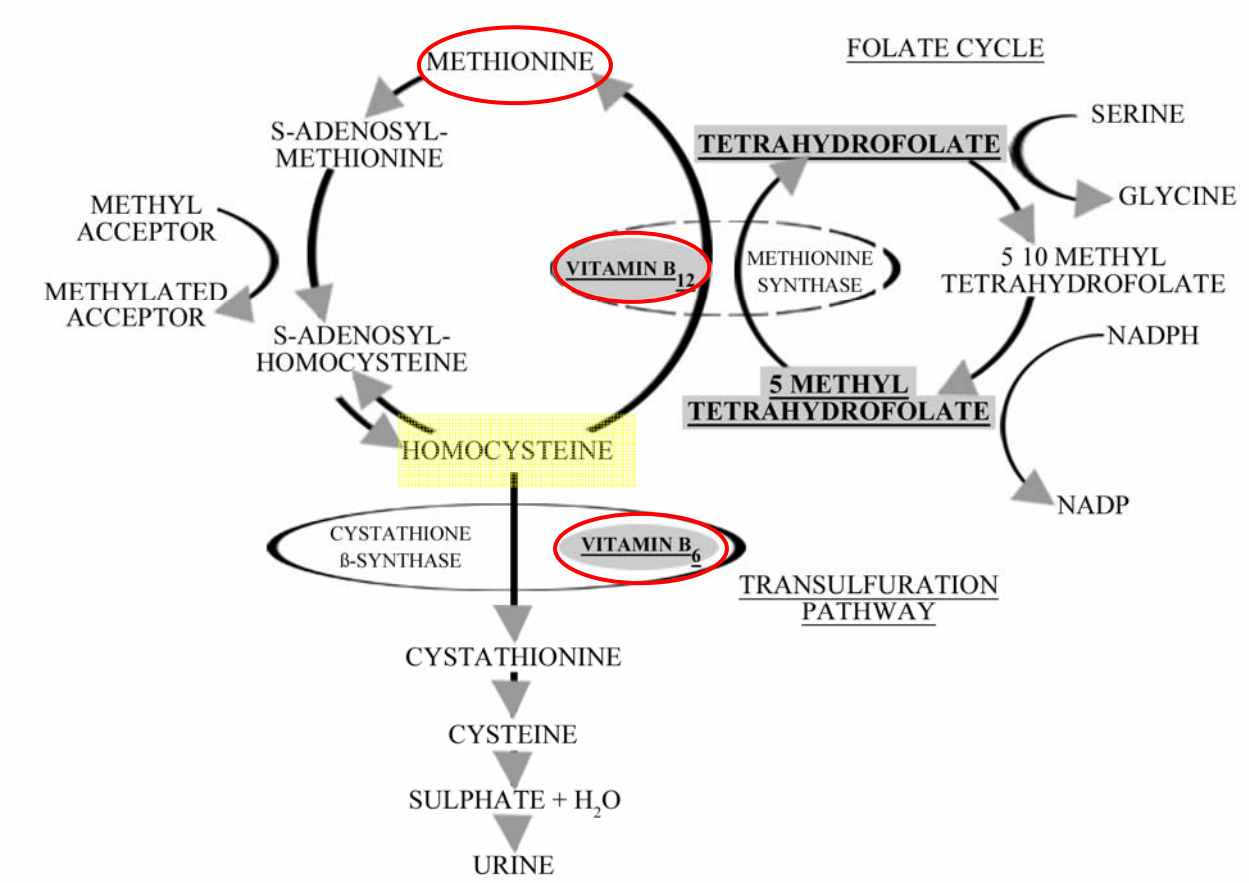
Placebo (--●--) Active treatment (--■--) with 95% confidence levels.
Adjusted linear regression modeling gives p=0.015.

Characteristics of Subjects Completing 4 Months of Homocysteine Sub-study

Characteristic	Active (n=25)		Placebo (n=17)		p-value[a.]
Age, mean (SD)	63.9	(5.7)	60.7	(7.2)	0.114
Height, mean (SD)	65.0	(6.8)	63.9	(7.6)	0.630
Weight, mean (SD)	178.6	(36.9)	162.1	(28.3)	0.129
Waist, mean (SD)	38.5	(5.0)	36.1	(4.2)	0.268
Gender, n (%)					
Female	14	(56.0)	11	(64.7)	0.573
Male	11	(44.0)	6	(35.3)	
Race, n (%)					
White	20	(80.0)	15	(88.2)	0.482
Other	5	(8.0)	2	(11.8)	
How Subject Heard of Trial, n (%)					
Ads	17	(68.0)	14	(82.4)	0.579
Clinic	3	(12.0)	1	(5.9)	
Word of Mouth	5	(20.0)	2	(11.8)	
Prescription, n (%)					
No	25	(100.0)	17	(100.0)	1.000
Yes	0	(0.0)	0	(4.2)	
Vitamin Taker, n (%)					
No	17	(68.0)	11	(64.7)	0.824
Yes	8	(32.0)	6	(35.3)	

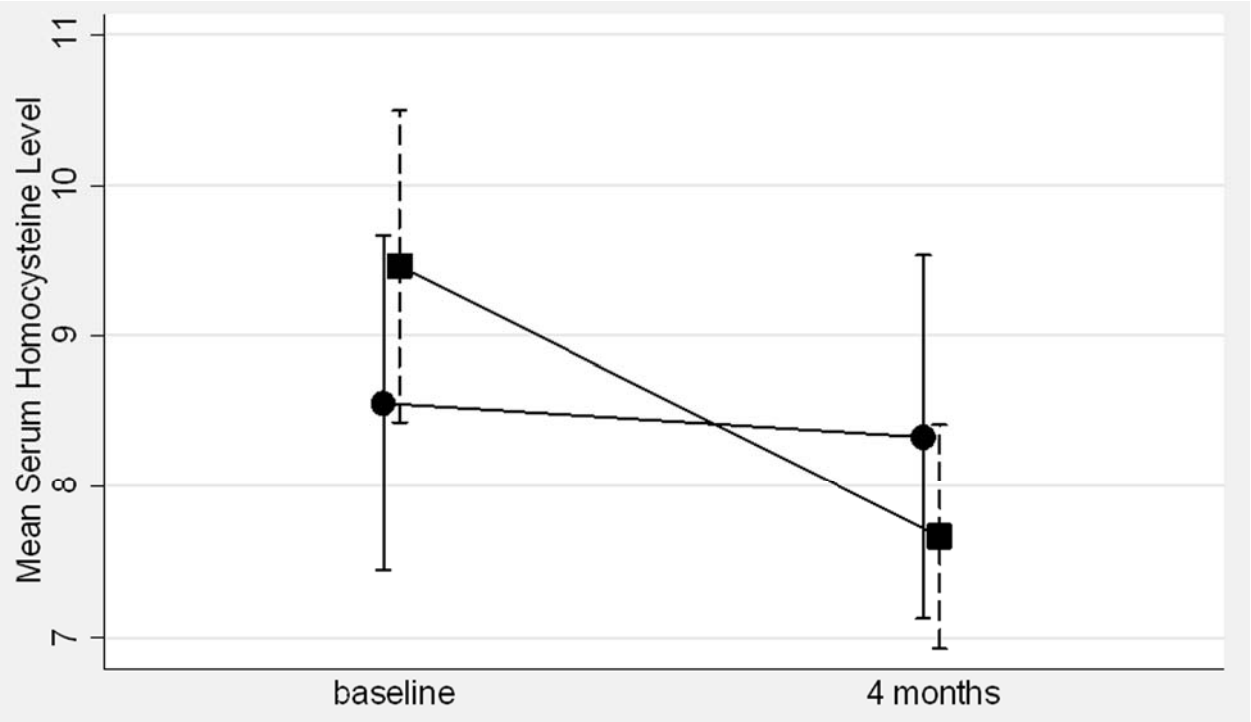
a. Comparison of placebo to active group (null hypothesis of equality between groups). Two-sample t test for continuous variables and chi-square test for categorical variables

Folate – Homocysteine Cycle



Homocysteine metabolism: Note the key role of B12 in the folate cycle regenerating homocysteine to methionine, and the role of B6 in converting homocysteine to cystathionine. L-methionine, a precursor to SAM, is another component of the test formulation.

Unadjusted Mean Serum Homocysteine Levels



Homocysteine levels in micromolar/liter. Placebo (--●--) and Active treatment (--■--) with 95% confidence levels. p=0.009.

Conclusions:

1. This potent blend of 34 antioxidants significantly improves immediate and working memory in 'normal' community dwelling seniors, aged 50 to 75 years.

2. This potent blend of antioxidants significantly reduces serum homocysteine in 'normal' community dwelling seniors, aged 50 to 75 years.

3. No significant adverse drug effects were reported during the course of this study.