

## STUDIES OF HIGH DOSAGE VITAMIN B6 (AND OFTEN WITH MAGNESIUM) IN AUTISTIC CHILDREN AND ADULTS

1965 - 2003

**(Twenty-one of twenty-two studies\* yielded positive results; even minor adverse effects rarely seen)**

AUTHOR/YEAR	SUBJECT/DOSAGE	DESIGN/OUTCOME
1. Heeley & Roberts (1965)	16 autistic children 30 mg, B6 one time (one child continued)	Tryptophan load test. 11 of 16 children normalized urine. (Child who continued showed “remarkable” progress.)
2. Bonisch (1968)	16 autistic children 100 mg - 600 mg B6 (mostly 300-400 mg)	Open trial 12 of 16 improved, 3 spoke for the first time
3. Rimland (1973)	190 autistic children 4 megavitamins; 150 mg to 450 mg B6	Computer cluster subgroups. 45% “definite improvement” (p<.02).
4. Rimland, Callaway, Dreyfus (1978)	16 autistic children 75 mg to 3,000 mg B6 (mostly 300-500 mg)	Double-blind placebo crossover, 11 of 15 better on B6 (p<.05).
5. Gualtieri et al. (1981)	15 autistic children 300 mg to 900 mg B6 plus other vitamins & minerals	Open trial 12 weeks, then no-treatment period. 6 Children showed “substantial” improvement. Basal serum prolactin levels (PRL) were lower in responders (p<.05).
6. Ellman (1981)	16 autistic adults and adolescents. 1 gram/day B6 500 mg/day magnesium	Double-blind placebo crossover. Four showed global improvement, five showed partial improvement.
7. Barthelemy et al. (1981)	52 autistic children 11 normal controls 30 mg/kg/day B6 (up to 1 gram) 10-15 mg/kg/day magnesium	Three double-blind crossovers, comparing B6 alone, magnesium alone, and B6 + magnesium with placebo. B6 + magnesium was best. Highly significant (p<.01-p<.001) decreases in autistic behaviors; significant (p<.02) in urinary HVA.
8. LeLord et al. (1981)	Study 1: 44 children With autistic symptoms. Study 2: 21 children	Study 1: open trial to identify responders. Study 2: double-blind placebo

	selected from above 44. 600 mg-1,125 mg/day B6 400 mg-500 mg/day magnesium	crossover comparing responders and non-responders. 15 of 44 improved. In 14 of 15, improvement disappeared 3 weeks after cessation of treatment. Double-blind study confirmed behavior improvement ( $p < .01$ ). HVA levels (n=37) also improved ( $p < .01$ ).
9. Martineau et al. (1982)	24 autistic children 30 mg/kg/day B6 15 mg/kg/day magnesium	Compared electrophysiological effects of magnesium given alone or with B6. In conditioning experiment, B6 + magnesium significantly improved brain response latencies and amplitudes ( $p < .05$ ).
10. Jonas et al. (1984)	8 autistic adults 1 gram/day B6 380 mg/day magnesium	Double-blind crossover. Behavior improved significantly; non-significant improvement in HVA excretion.
11. Martineau et al. (1985)	60 autistic children 30 mg/kg/day B6 (up to 1 gram/day) 10 mg-15 mg/kg/day magnesium	4 crossed-sequential double-blind trials, comparing B6 alone, magnesium alone, and B6 + magnesium with placebo. B6 + magnesium was best. Significant improvement in behavior, HVA excretion, and evoked potentials.
12. Martineau et al. (1986)	One 4-year-old child 30 mg/kg/day B6 15 mg/kg/day magnesium	Long term (8 mo.) study. Clear improvement in behavior, HVA levels, and evoked potentials over the 8 months; deterioration 6 weeks after cessation resulted in reinstating B6 + magnesium treatment.
13. Martineau et al. (1988)	11 autistic children 30 mg/kg/day B6 10 mg/kg/day magnesium	Controlled study; eight weeks of treatment followed by no- treatment period. B6 group showed significant behavioral improvement, normalization of evoked potentials, drop in dopamine levels. Behaviors returned to baseline when treatment was discontinued.

14. Martineau et al. (1989)	6 autistic children 30 mg/kg B6, 10 mg/kg magnesium 8 weeks, 6 autistic children given 1.5 mg/kg fenfluramine 12 weeks.	Comparisons made in electrophysiological (AER) effects of the two treatments. B6, but not fenfluramine, “resulted in the appearance of a conditioning phenomenon and the demonstration of auditory-visual and auditory-tactile cross-modal associations during treatment.”
15. Rossi et al. (1990)	Open trial on 30 autistic patients	40% of patients improved “in the most typical behavioral features of autism.” HVA, VMA and 5HIAA levels did not correlate with clinical improvement.
16. Moreno et al. (1992)	60 families with autistic children studied with battery of clinical and biochemical tests	“Three out of eight probands who received megadoses of pyridoxine (vitamin B6), subjectively gained in language abilities, affectivity, and response to conductal modification therapy.”
17. Menage et al. (1992)	10 autistic children 7 control children	5 boys on megadose B6/magnesium for 8 weeks: “overall improvement of their disorders .... Particularly, improvement was observed for certain autistic symptoms (lack of interest in people, abnormal eye contact, impairment in verbal and nonverbal communication).” Improved T-cell deficits.
*18. Findling et al. (1997) (See critique by Rimland, 1998)	10 autistic children 420-1,000 mg B6 140-350 mg magnesium	Double-blind placebo crossover, 4-week trials, no washout period, no test of compliance. Authors claim no benefit was seen, but were unable to produce data. *This is the only study purporting to find no improvement on B6/magnesium. The authors state they were unable to provide outcome data for the 10 children in their study due to the death of their statistician.
19. Hopkins (1999)	13 autistic children 14 mg/kg/day of B6 (maximum 1 gm/day) magnesium=1/2 dosage of B6	Double-blind placebo-controlled study. One-month washout period between B6-placebo phases. Eight of 13 subjects (61%) showed

		benefit, using behavioral and electrophysiological data (increased amplitude and decreased latency of P300 responses).
20. Audhya (2002)	184 autistic children on increasing doses of B6 and magnesium, not to exceed 20 mg/kg/day of B6	89 children (48%) improved significantly, 86 (47%) improved marginally, and 9 (5%) showed worse behavior. (Main thrust of research was to study laboratory indices of metabolic status of the children.)
21. Kuriyama (2002)	16 "PDD" children, ages 6-16, 200 mg/day B6 (far below usual megadose range, and no magnesium was used)	4-week randomized double-blind placebo-controlled study. Subjects on B6 showed 11.2 IQ point increase compared to 6 points for placebo group (statistically significant).
22. Rimland & Edelson (2003)	5284 autistic children and adults. B6 and magnesium dosages decided by parents and physicians	Parents rated 85 biomedical interventions as to safety and efficacy. B6 and magnesium were rated "Helpful" in 46%, "No effect" in 49%, and "Made worse" in 4%.

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