

Case # 451
Follow up with Autistic Child

History

A 13 year old autistic male with follow up testing.

Description of Results

The data below is extracted laboratory profiles performed on the following dates:

February 12, 2003 (ION)

May 18, 2004 (ION)

July 13, 2005 (OAU)

The initial profile revealed multiple abnormalities in almost all nutrient categories. Subsequent test results show that many areas have significantly improved, demonstrating the effectiveness of interventions. Specifically, signs of trace element insufficiency (Figure 1), low vitamin A and β -carotene (Figure 2), PUFA imbalance (Figure 3), mitochondrial inefficiency (Figure 5), and ammonia spilling (Figure 5) have largely or completely cleared.

The May 18, 2004 specimen indicates that the patient went through a period of worsening carnitine (Figure 4) and concurrent worsening oxidative challenge (Figure 2) and glutathione demand status (Figure 7) around that time, but these situations have been corrected according to the July 13, 2005 data.

The patient has sustained very good status for vitamin B12, folic acid, and vitamins B1, B2, and B3, but he shows persistent indication of poor status for vitamin B6 and biotin (Figure 6.) These two members of the water-soluble family may need aggressive support. If these nutrients are already being supplemented then we might suspect specific genetic weaknesses in these areas, and such a finding would give a metabolic explanation of his difficulties. Such a weakness may be overcome when tissue levels of the nutrient-derived cofactors are raised even higher. The P5P cofactor form of B6 might be used for this purpose to assure that conversion is not an issue. There are several points of biotin metabolism where weaknesses may occur.

In the May, '04 data, we find a spiking of hepatic glutathione synthesis activity as indicated by the α -hydroxybutyrate (AHB) marker (Figure 7.) This is not surprising given the oxidative challenge state at that time. However, we now see AHB perfectly normal while sulfate is quite elevated. This could be explained by increased intake of dietary sulfate. If N-acetylcysteine (NAC) is being used aggressively, it might be best to shift to agents that stimulate other Phase II conjugations.

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Figure 1. Elemental Status

	<u>February 12, 2003</u>		<u>May 18, 2004</u>	
Calcium	5.0	<= 18.0	7.4	
Chromium	0.18 L	0.25 - 0.80	0.24 L	
Copper	0.52	0.52 - 2.00	0.61	
Magnesium	23 L	40 - 80	29 L	
Manganese	0.17 L	0.25 - 0.80	0.21 L	
Molybdenum	0.007 L	0.008 - 0.030	0.021 L	
Potassium	696 L	1,000 - 3,000	1,234	
Selenium	0.04 L	0.12 - 0.40	0.07 L	
Vanadium	0.05 L	0.10 - 0.28	0.11	
Zinc	4.0 L	6.0 - 11.0	6.4	

Figure 2. Antioxidant status

	<u>February 12, 2003</u>		<u>May 18, 2004</u>	
Coenzyme Q10	1.4	0.8 - 1.5	2.7 H	0.8 - 1.5
Vitamin E	15.2	12.0 - 50.0	13.7	12.0 - 50.0
Vitamin A	0.4 L	0.5 - 1.2	0.63 L	0.65 - 1.60
β-Carotene	< 0.2 L	0.4 - 3.5	0.28	0.25 - 2.40
Lipid Peroxides	0.6	<= 1.0	1.8 H	<= 1.4

Figure 3. PUFA Status

	<u>February 12, 2003</u>		<u>May 18, 2004</u>	
<u>Polyunsaturated Omega-3</u>				
1 Alpha Linolenic (18:3n3)	11 L	15 - 50	9 L	
2 Eicosapentaenoic (20:5n3)	135 H	20 - 80	12 L	
3 Docosapentaenoic (22:5n3)	31	15 - 35	23	
4 Docosahexaenoic (22:6n3)	122	70 - 150	55 L	
<u>Polyunsaturated Omega-6</u>				
5 Linoleic (18:2n6)	1,183 L	1,200 - 2,500	1,193 L	
6 Gamma Linolenic (18:3n6)	2 L	10 - 26	9 L	
7 Eicosadienoic (20:2n6)	6	6 - 16	5 L	
8 Dihomogamma Linolenic (20:3n6)	18 L	45 - 115	n6) 38 L	
9 Arachidonic (20:4n6)	253 L	300 - 700	682	
10 Docosadienoic (22:2n6)	5.2	<= 7.0	2.8	
11 Docosatetraenoic (22:4n6)	2.3 L	8.0 - 17.0	11.3	
36 LA/DGLA	66 H	12 - 35	31	
37 EPA/DGLA	7.60 H	0.20 - 1.00	0.32	
38 AA/EPA	2 L	5 - 35	56 H	
39 Triene/Tetraene	0.011	<= 0.012	0.006	

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Figure 4. Carnitine Status

	February 12, 2003		May 18, 2004		July 13, 2005	
Adipate	6.3	<= 8.4	18.2	H	2.4	H
Suberate	1.6	<= 2.7	3.6	H	9.0	H
Ethylmalonate	5.0	<= 12.0	12.9	H	5.3	

Figure 5. Ammonia and CoQ10 Status

	February 12, 2003		May 18, 2004		July 13, 2005	
Citrate	1,085	H 175 - 850	513		483	
Cis-Aconitate	105	H 50 - 118	155	H	65	
Isocitrate	72	H 40 - 100	182	H	90	
α-Ketoglutarate	11.3	H 2.0 - 30.0	73.6	H	21.6	
Succinate	51.0	H 2.0 - 21.0	13.7		7.6	
Fumarate	1.3	H <= 1.0	1.3	H	0.12	
Malate	2.5	H <= 1.4	1.6	H	1.2	
Hydroxymethylglutarate	8.4	H 2.0 - 8.2	10.5	H	6.1	

Figure 6. B-Vitamin Status

	February 12, 2003		May 18, 2004		July 13, 2005	
α-Ketoisovalerate	1.7	H <= 0.8	0.2		0.35	
α-Ketoisocaproate	0.1	H <= 0.5	0.2		0.16	
α-Keto-β-Methylvalerate	0.5	H <= 1.4	1.2		0.3	
Xanthurenate	1.5	H <= 1.0	0.6		0.9	H
β-Hydroxyisovalerate	14.2	H <= 11.0	15.9	H	10.0	H
Kynurenate	4.8	H <= 4.0	4.5	H	2.9	H
Methylmalonate	2.7	H <= 4.8	2.8		1.4	
Formiminoglutamate	0.07	H <= 0.16	0.09		< 0.03	

Figure 7. Glutathione and General Phase I & II Detoxification Status

	February 12, 2003		May 18, 2004		July 13, 2005	
α-Hydroxybutyrate	7.0	<= 11.0	11.3	H	0.8	
Pyroglutamate	11.0	<= 16.0	13.5		29	
Sulfate	324	=> 180	225		577	H
Glucarate	102	<= 149	52		< 0.6	