

# Comparison of Hair Copper, Zinc, Aluminum and Lead in Patients with Elevated and Normal Urine Pyrrole Levels

James A. Jackson, MT(ASCP)CLS, Ph.D., BCLD;<sup>1,2</sup> Hugh D. Riordan, M.D.;<sup>2</sup>  
Sharon S. Neathery, MT(AMT);<sup>2</sup> Jerry Tiemeyer, B.S., MT(ASCP)<sup>2</sup>

The authors have previously published information on the diagnostic value of urine pyrrole levels in patients with various types of physiological and psychological stress.<sup>1,2</sup> It has been reported that due to the chemical structure of the pyrrole molecule, certain patients excreting high levels of pyrroles may also excrete excess amounts of zinc and vitamin B<sub>6</sub> in their urine.<sup>3</sup>

In one of our research projects, we measured the hair levels of copper, zinc, aluminum, lead and urine pyrroles in 261 patients. The patients were divided into two groups, one with elevated urine pyrroles (n=127) and one with normal urine pyrroles (n=134). The data were examined to see if there were any significant differences in the hair minerals, especially zinc, between the high pyrrole group and the normal group.

Copper was examined as it has been reported to be antagonistic to zinc.<sup>4</sup> Hair aluminum and lead were examined to determine if elevated levels of these potentially toxic minerals affected urine pyrrole levels. Hair analysis was performed using Inductively Coupled Plasma Spectroscopy (ICP). A hair sample of two inches is taken from the nape of the neck, proximal to the skin, between the ears. A sample weight of 1.0 gram of hair is need for an accurate analysis. Two inches of hair reflects about three months of dietary intake. The results are reported in parts per million (ppm). Urine pyrroles were performed as described previously.<sup>1</sup> The results are shown in Table 1. (p.140).

As it can be seen from the data in Table 1, there is no significant difference between any of the measured parameters. However, since hair is an excretory tissue, it may not always reflect a corresponding systemic elevation or deficiency. It would also appear that the potential toxic minerals, aluminum and lead, at these levels, has no effect on urinary pyrroles.

The authors are gathering data comparing red blood cell zinc, blood vitamin B<sub>6</sub>, and urine specific gravity with elevated urine pyrroles. In a preliminary examination of 12 patient's records, two patients met all the criteria described above and their results are shown in Table 2. (p.140).

In both patients, B<sub>6</sub> and zinc were normal. Of course, these data are too small to draw any conclusions. Dr. Constantine A. Kostsanis<sup>5</sup> has worked with autistic children since 1992. He reports that based on a review of food selections in autistic children compared with the RDA, there was a reduced intake (% of subjects) of the following nutrients: vitamin B<sub>6</sub>=33%, zinc=100%, vitamin A=50%

He also reported that of autistic children tested 100% were reactive to food dyes, 67-100% were reactive to foods and 67-100% were reactive to molds.

Dr. Bernard Rimland<sup>6</sup> in private correspondence to one of the authors (HDR) commented that 18 studies over a 31-year period demonstrated that treatment with 17mg/kg of vitamin B<sub>6</sub> combined with 8mg/kg of magnesium "helped" over 50 percent of all autistic children and adults treated. All this would reinforce the authors' theory: those that excrete elevated levels of pyrroles have an increased metabolic need for vita-

1.Professor of Medical Technology, Department of Medical Technology, Wichita State University, Wichita, KS 67260-0043

2.The Center for the Improvement of Human Functioning International, Inc, 3100 N. Hillside, Wichita, KS 67219

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**Table 1.** Comparison of hair copper, zinc, aluminum and lead with elevated and normal urine pyrroles in 261 patients.

	Elevated Pyrroles (n=127)		Normal Pyrroles (n=134)	
	Range	Mean	Range	Mean
Pyrroles (ug/dL)	20-213	31.9	0-19	12.1
Copper (ppm)	7-76	14.8	4-93	13.1
Zinc (ppm)	77-438	184	12-485	189.6
Aluminum (ppm)	0.8-31.3	5.7	0.8-30.	76.5
Lead (ppm)	0.2-26	3.9	0.3-25	3.8

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**Table 2.** Urine pyrroles, specific gravity, vitamin B6 and red blood cell zinc in two patients.

Patient	Urine Specific Gravity	Urine Pyrroles	Blood Vitamin B6	RBC Zinc
# 1	1.009	49*	Normal	Normal
# 2	1.018	126*	Normal	Normal

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\* Repeat urine pyrroles performed later showed patient #1 with a pyrrole of 10 (normal) and patient #2, a pyrrole of 30 (high)

min B<sub>6</sub> and, possibly, zinc.

At The Center, we find that many autistic children excrete high levels of pyrroles in their urine. We have also confirmed the findings of food antigen sensitivities in children with autism and ADHD (unpublished data).

## References

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