

# Mineral Imbalances in Pregnant Mothers and Their Newborn

E. Blaurock-Busch, Ph.D.<sup>1</sup>

The importance of proper mineral balance is still underestimated, even though diligent research demonstrates that mineral deficiencies, excesses or malabsorption contribute, even cause diseases such as cardiac conditions, learning disabilities, schizophrenia, immune and hormonal dysfunctions and a host of other maladies.<sup>1 6</sup>

Unlike nutrients such as carbohydrates and protein, minerals do not supply fuel or energy to the body, but assist in the production of energy and in many vital chemical reactions of life. Certain essential macro and micro minerals are, for instance, constituents of, or interact with, enzymes. Without proper enzyme functions health and immunity suffers.<sup>1 4 6</sup>

Magnesium is known to be part of many different enzyme systems and is involved in controlling various metabolic functions. Zinc is a necessary part of hormone systems, and a deficiency of this vital trace element can lead to impaired growth, sexual problems, even diabetes.<sup>2 6</sup>

Excesses of certain elements can be equally threatening. Only a slight excess of sodium at the cellular level disturbs cellular balance. Iron is necessary for life, but if too much or not enough iron is stored, health is seriously impaired. Hemochromatosis is characterized by extensive iron deposits in the liver, heart, pancreas and the spleen, and certain anemias are known to be caused by iron or copper deficiencies.<sup>2 3</sup> Excessive copper, however, is a cause of emotional instability as found in hyperactive children, and can lead to depression of so-called "unknown causes".<sup>3 5 6</sup> Dr. Carl C. Pfeiffer reported years ago that excessive copper and iron and/or zinc and manganese deficiencies are primary factors in one type of schizophrenia called 'histapenia' or

'low blood histamine'. His research substantiated that young schizophrenic women commonly display high copper levels. Pregnant women or females on the contraceptive pill often display elevated copper levels, and an extreme elevation of copper is not uncommon during the latter part of pregnancy, leading to postpartum depression and psychosis. Afflicted young mothers are known to experience great difficulties in adjusting to motherhood, and similar emotional disturbances are seen in females using birth control pills. These mineral-induced problems are frequently not diagnosed, and the symptoms are commonly labelled "neurosis of unknown cause".<sup>5 6</sup>

Until recently, copper was hardly understood. While this trace element is known to be essential to life, copper deficiencies and excesses were largely ignored. Beside Pfeiffer's studies and publications which mostly focus on copper overload, medical research indicates that copper deficiency can lead to a variety of abnormalities, including anemia, skeletal defects, degeneration of the nervous system, reproductive failure, heart ailments, elevated cholesterol levels, impaired immunity, and defects in hair growth. Since blood tests are easily influenced by dietary and other means and only show mineral or trace element deficiency or excesses when homeostasis is threatened, blood mineral analysis may not show abnormalities until a severe disease process is present, especially when test values are compared to the usual two standard deviation reference range.<sup>11</sup>

Blood tests allow us to view circulating nutrient levels, while urine analysis measures the body's capacity to excrete. Hair mineral analysis reflects deposits at the cellular level. The researchers Huel, Boudene and Ibrahim state that "specific toxic metallic trace elements are bioconcentrated in mammalian hair".

1. Trace Minerals International, Inc., 2618 Valmont, Boulder, CO 80302.

Collected without injury to the host, easily preserved, and readily analyzed, hair has often been used to estimate the degree of exposure to specific toxic and nutrient elements. "For measurements of past or continuous exposure," the medical scientists state, "hair appears to be more adequate and an even better source than blood and urine." Hair mineral analysis is a perfectly suited test for evaluating the mineral balance of infants.<sup>7</sup> Used in conjunction with blood and urine mineral assays, hair mineral analysis can detect imbalances due to chronic exposure and malabsorption syndromes. Either problem can lead to tissue storage problems (insufficiency or overload) and often remains undiagnosed and untreated until classical deficiency or toxicity symptoms are apparent. Since environmental problems are a legitimate concern, utilizing the combination of blood, hair and urine mineral analyses enables conscientious physicians to diagnose and prevent problems before organic damage is serious, even irreversible. As Martin Laker in his 1982 *Lancet* article points out, macro and micro elements may be measured in various human specimens, but to concentrate on one parameter only is ignoring the complexity of biochemical functions. "An example of this is the release by haemolysis of the zinc-containing enzyme carbonic anhydrase from the erythrocytes (where it normally accounts for 75-85% of total blood zinc) into the plasma, so that both exhibit spurious zinc levels."<sup>8,9</sup>

Dr. Huel, Boudene and Ibrahim are concerned with the effects of the environment on both young mothers and their newborn. Cadmium is a known environmental pollutant, also found in cigarette smoke. It is known to be deposited in the kidney, and thus excessive cadmium exposure can lead to kidney disease and high blood pressure. Ellis et al demonstrate that organic cadmium levels of smokers were significantly higher than those of non-smokers.<sup>12</sup> The researchers demonstrated that high cadmium levels are indeed common in hypertensive mothers, and moreover, the offsprings of these mothers also showed high cadmium levels. There is increasing evidence, the researchers say, that cadmium levels are readily passed on to the

unborn of pregnant women. The sad fact is that babies of hypertensive mothers showed hair cadmium levels 3 times higher than their hypertensive mothers, and it is suspected that the cause is a possible change in the permeability of the placenta during pregnancy.<sup>7</sup>

Lead is less readily passed on to the fetus; however Huel et al report that an inverse relationship was found between the lead content in mothers' hair and the babies gestational age.<sup>7</sup>

Lead is easily absorbed in bone and brain tissues, and studies substantiate that children with high lead levels display emotional disturbances and are subject to learning disabilities, even mental retardation.<sup>1 3 4 6 10</sup> Bone biopsies of infants have shown that even minute lead exposure results in bone tissue storage at an early age, especially when calcium is under-supplied as is often the case in the milk-intolerant infant.

Calcium deficiency also increases cellular aluminum retention, and our studies of hyperactive/hyperkinetic children<sup>5</sup> clearly indicate that low calcium tissue levels frequently accompany high aluminum tissue levels. In our studies, calcium supplementation has proven effective in blocking aluminum retention. This seems to substantiate Bjorksten's theory that calcium can inhibit aluminum absorption and crosslinking of molecules, thereby preventing aluminum concentration in bone, aortic and brain tissue.<sup>14</sup>

Animal studies indicate that oral ingestion of aluminum can result in increased deposition of aluminum in the brain, and cause related changes in memory and learning ability.<sup>13</sup> Infants with impaired kidney function are very susceptible to aluminum toxicity, and while a 1983 study, concerned with an uprise in progressive encephalopathy in children with uremia, could not locate any known exposure to aluminum, the source was later identified as infant milk formulas.<sup>16</sup>

Yokel reports that increased aluminum was found in hair of several 12 to 18 year old boys with severe emotional problems, and the hair of a two year old with severe emotional problems who resided near an aluminum processing plant was reported to have an increased aluminum

concentration.<sup>17 18</sup> Yokel states that routine analysis of hair for trace metal content, showed unexpectedly high concentrations of aluminum in patients with severe neurologic and other disorders. In many cases, dolomite was thought to be the aluminum source.<sup>17 19</sup> Trace Minerals International's studies on supplements confirm that dolomite generally contains considerable amounts of this aluminum and other toxins.

Guenay Saner et al of the Department of Pediatrics and the Department of Obstetrics and Gynecology, University of Istanbul, Turkey, found a definite relationship between hair manganese concentration of infants and congenital malformation. When compared with healthy, full-term infants, significantly lower hair manganese levels were found in infants with congenital malformations. Manganese is supplied to the fetus by a homeostatic mechanism, which is mainly dependent on the manganese status of the mother. According to Saner, prenatal manganese analysis of maternal hair may prove to be a reliable indicator for the risk of intrauterine malformations.<sup>15</sup>

While hair mineral analysis is not commonly accepted by orthodox medicine, the US government has declared hair analysis as a valuable testing method, and in a paper on biological monitoring of toxic trace minerals further stated that "if human hair samples are collected properly, cleaned and prepared for analysis correctly, and analyzed by the best analytical methods using standards and blanks as required, in a clean and reliable laboratory by experienced personnel, the data are reliable." It is yet another useful test in an age of growing environmental concerns.

Just a few years back, obstetrics and especially pediatrics did not have to be overly concerned with the mineral evaluation of pregnant women and newborns. As the growing body of international research indicates, the declining global health alone dictates a change.

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