ly, hiding in this way his emotions. Introversion is a general characteristic.

Constriction of the chest, accompanied by fear, is a common complaint of the spasmophilic patient. These attacks can be very annoying for him and are caused by spasms of the smooth musculature of the upper gastro-intestinal tract. Lower in the system spasms in the gall ducts result in nausea and tendency to vomit. In the lower intestinal region, spasmophilia gives constipation, alternated with diarrhea. Women may have functional menstruation complaints, like haemorrhagia, fluorand pain. Finally, as part of the spasmophilic syndrome, there must be mentioned allergies, asthma, and exzema. Here might be the connection with hypoglycemia, which is also accompanied by allergic reactions.

Therapeutical approach to spasmophilia

Over-excitability of the musculature is the main point in spasmophilia. Underlying it is an imbalance in the mineral reserve especially of magnesium and calcium. Also potassium is involved in this imbalance. This can of course be checked by hair analysis. Thus magnesium supplementation is a major part of the therapy, along with calcium and potassium. Vitamin B_6 (100 mg) supports serotonin metabolism, and the absorption and the cellular uptake of magnesium. L-tryptophane (3 grams daily) is indicated in case of acute stress. A proper diet is of course necessary. Next to this nutritional program, physical exercise, massage to relax the muscles and some kind of psychotherapy is very helpful. This discussion of the spasmophilia syndrome may give the practising physician new clues in treating diseases which are connected to the General Adaptation Syndrome, like hypoglycemia, allergies and also Candida albicans. Interesting is that very recently in Germany a book has been published with the title *Das Magne-siummangel Syndrom* (Prof. dr. H. J. Holtmeier, Hippocrates Verlag, 1988) — the magnesium deficiency syndrome. In this book the author discusses the same disease, which French doctors have been diagnosing and treating for years: spasmophilic

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New Light on Chronic Fatigue Syndrome

Robert A. Buist, Ph.D.[1]

As in many countries around the world, Australia and New Zealand are presently starting to notice an increasing incidence of Chronic Fatigue Syndrome, otherwise known as Post Viral Syndrome or Myalgic Encephalomyelitis (M.E.).

It is presently estimated that Australia may have up to 10,000 sufferers of this debilitating disease which has been, until recently, completely dismissed by the medical profession as a disease for malingerers.

The typical signs and symptoms of patients in Australia include chronic fatigue with bouts of extreme muscle tiredness often with dizziness and a fear of falling. Even simple forms of exercise can render a person too weak to lift his arms or legs. Some people find it difficult to hold a cup or clean their teeth. It is quite common for patients to make the comment that

1. Editorial Office, International Clinical Nutrition Review, P.O. Box 370, Manly, New South Wales 2095, Australia.

they feel there is nothing really wrong with their muscles except that they just feel weak. Nausea frequently accompanies the tiredness and abnormal periods of weight gain or weight loss is quite common. Confused thinking, lack of concentration, memory loss and mood swings are common. Irritability and insomnia is also frequent. Changes in perception, blurred vision, noise intolerance are common. Muscle pains are a prominent feature in some cases together with muscle twitching, headaches and neuralgic pains, particularly to the head and neck, which could be localized in any part of the body.

Patients can alternate between periods of constipation and diarrhea and frequently suffer from edema and areas of paresthesia in specific parts of the body. Swollen lymph glands are also reported along with sensitivities to food and drugs. The typical patient has attacks of shortness of breath which are not like an asthma attack, but feel more like air hunger and sometimes a feeling of suffocation. These symptoms may also be accompanied by palpitations.

In the past, it has been thought that the cause of this disorder has been related to exposure to pathogens such as the Cox-sackie B Virus, Epstein-Barr Virus, Ross River Virus and more recently, Human B Lymphotropic Virus (HBLV). One research team in Sydney working under the direction of Dr. Andrew Lloyd and John Dwyer have been treating patients with concentrated infusions of intravenous gammaglobulin, but at this stage the results of their studies are awaiting decoding. However, the most intriguing development in this continuing saga has come from Dr. Tapen Mukherjee, Head of the Electron Microscopy Unit at the Adelaide Institute of Medical and Veterinary Science, who recently found that when some M.E. patients are in a state of relapse, their red blood cells undergo changes in shape. The deformations include sphero-cytes, stomatocytes and some unusual forms best described as dimpled sphero-cytes. The membrane surface on most of the aberrant forms has a rough granular appearance focally or all over. The membranes of these deformated red cells are rigid and herein may lie the explanation of the chronic muscle fatigue experienced by the M.E. patient.

Dr. Mukherjee explains it thus; "Blood, we know is an essential organ responsible for the optimum supply of nutrient materials and exchange of waste products from all the cells of the body. To carry out this function we start at the heart which pumps the blood and its components through arteries, arterioles and then capillaries. The waste products are collected by venous capillaries which flow into the venules, then the veins and finally returned to the heart to be pumped once again to the lung for the exchange of waste carbon monoxide with fresh oxygen to return once again to the heart to carry this oxygenated blood to the "remotest parts" of the body. It is in these "remotest parts" of the body that the blood circulates through very small capil-laries which are about 3 microns in diameter compared to the 8 micron diameter of the red blood cell. This is where the biconcave shape of the red blood cell becomes very important for it is this shape and the normal elastic properties of the red blood cell membrane and its cytoskele-ton, which together permits the squeezing of the red blood cell through the small diameter of the capillaries. Normally this is the way how oxygen and nutrients are supplied to the remotest parts of our body. If however the shape of the red blood cell changes as it happens in our experience with the blood samples of M.E. patients the red cell looses not only its shape but its elasticity as well and thus fails to proceed along these minute capillaries or blood vessels.

If this microcirculation is disrupted by the method as described, the cells of the brain, i.e. neurons, or the muscles or any other part of the body wherever this happens, suddenly suffers from a lack of fresh oxygen and lack of chemical exchange of waste products leading on to localized lactic acidosis. The severity of the response to such regional microcirculatory defects can be extensive or momentary depending on the duration and extent of such occlusion. Indeed we already know that, in well known diseases such as sickle cell anaemia, focal occlusions do occur. If therefore such microcirculatory defects occur and affects a group of muscle cells we get muscle

fatigue or pain or both. Similarly since microcirculation is the ultimate method by which the body maintains its physiological balance any disturbance would show up in any part of the body be it in the heart or lung or anywhere else and produce perhaps the plethora of symptoms associated with M.E. Syndrome."

These observations also support the findings of Dr. Arnold and colleagues from the University of Oxford who showed that an M.E. patient exhibited abnormally early intracellular acidosis after moderate exercise. They also support the findings of Behan and coworkers from Glasgow University who examined 50 patients with post-viral fatigue syndrome. On clinical examination no muscle weakness could be demonstrated in any of the muscle groups of patients but after exercise (squeezing the rubber ball of an erognometer for 1 minute) the resultant weakness in the arm muscle lasted for up to 1 hour. Similarly, after walking up 40 steps, ten patients developed symmetrical proximal weakness of the legs which lasted for up to 3 hours. Muscle biopsies were abnormal in all 20 patients examined. Many muscle fibres were necrotic and the mitochondria were conspicuously increased. Abnormal muscle metabolism was evident and abnormally early intracellular acidosis during exercise (consistent with increased lactic acid formation) was demonstrated.

The question should immediately be asked, "What is the feature or features that give rise to these unique changes in the cell membranes of the red blood cells of patients undergoing an acute fatigue attack?"

I have recently sent out a preliminary questionnaire through the M.E. Association in Adelaide enquiring about the possible exposure of members to chemicals. While it is still too early to make a sweeping statement it does appear that a great majority of M.E. patients contacted, have been exposed or are being exposed to environmental chemicals or pollution. Some have worked in chemical factories, others are found in orchard, grain and cotton growing regions which are periodically subjected to aerial spraying of herbicides and pesticides. Many have noticed a deterioration in their condition directly following such contact.

I am presently of the opinion that while a virus or pathogen may *trigger* an attack or herald the initial onset of M.E. symptoms, some other environmental chemicals such as the organochlorines are having the major impact on susceptible individuals by weakening their immune system, blocking nervous transmission and reducing the blood circulation to muscle tissue by inducing reversible red cell deformation.

It is well known that biological membranes including those of the erythrocytes and lymphocytes contain lipids in which the fat soluble organochlorines and other chemicals can accumulate and in their activated "free radical" form consequently interfere with the membrane structure and function which may explain the membrane changes in the red blood cells and the resulting rigidity which prevents the red blood cells from squeezing through the small diameter of the capillaries. In other words, certain fat soluble chemicals are entering the body and causing damage to biological membranes with some disastrous consequences. Hence it may be imperative to identify and remove the offending chemical or chemicals or start a well controlled detoxification programme and to optimize the body status of anti-oxidant nutrients in affected patients.

In view of the fact that many patients are suffering from gastric intestinal problems and malabsorption syndromes, it is quite possible that they are deficient in tissue levels of the body's major fat soluble anti-oxidant nutrient, the free radical chain terminating vitamin E, whose job it is to protect membranes from free radical attack. To this end, several practitioners in Australia are now administering the new micellised form of vitamin E (Bioglan Laboratories Australia) to ensure saturation of tissues together with increased supplementation of vitamin C, beta carotene, vitamin A, zinc, manganese, copper, selenium and an adequate dietary supply of the high sulphur amino acids (cysteine, methionine) which play an important role in detoxifying zenobiotics, such as aroma-tics and organochlorines in general.

It is quite possible that with M.E. we are seeing yet another health related consequence of the massive proliferation of

chemicals upon our planet. As yet only a small section of our community (which cannot adapt quickly enough to the increased chemical load upon the body) are affected. Each year, however, the toll is becoming greater as the environmental chemical load increases. Such susceptibilities in a population may reflect an inadequate ability of the liver and kidney to induce certain detoxifying enzymes in the face of an inadequate body status of antioxidant nutrients present in the body.

With all animals in Antarctica now contaminated with D.D.T., as well as bird life in areas as remote as the South Pacific Islands, there is no real way that we can *completely* eliminate all these chemicals from our more industrialized environment. Even by living in an artificial unpolluted "dome", if we were to be exposed from time to time we would have lost tolerance to the low background levels of chemicals and then react violently. Such individuals are called "allergic to the 20th century". They have lost tolerance.

With the present knowledge of chemically sensitive patients including those with Chronic Fatigue Syndrome, they should reduce their total chemical load as much as possible including suspect foods and chemicals, drugs, atmospheric pollutants, etc., but not *completely* while ensuring that the body has optimal intake of the antioxidant nutrients (especially vitamins E and C — the major antioxidant vitamins) which are so fundamental to chemical detoxification and tissue protection in the body.

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