

Chapter 1 : Alemtuzumab - Wikipedia

The hypothesis, based on animal experimental and clinical observations made by the author over the past 12 years, and on observations reported in the literature, is that an important contributing factor to, if not the cause of, the lesions of multiple sclerosis is the consumption of excessive fat in the diet.

There are a number of new treatments that are in the research stage or are in clinical trials. Some of these are very promising indeed and the current mood in MS research is very optimistic - we can look forward to more effective treatments in the near future. However I will deal with these in a later section - in this section I will concentrate on the so-called "ABC" treatments and steroids. These are not the only treatments for MS - there are many treatments for the specific symptoms such as spasticity , vertigo , fatigue or depression and I will deal with them in the next section. Here I want to look at treatments that affect the process of demyelination and control of relapses. ABC Treatments Perhaps the most effective treatments currently available today deal with the autoimmune component of multiple sclerosis and work by regulating aspects of the immune system. Avonex and Betaseron are both varieties of beta interferon. A third drug, Rebif , is also beta interferon. ABCR would be a more accurate acronym though clearly less appealing to those of us with a crossword-solving mentality. Copaxone is a completely different drug altogether - the active ingredient being glatiramer acetate, Co-polymer-1 or COP A fifth drug, Novantrone, has recently become available. This is a chemotherapeutic agent which I shall deal with in a later section. Beta interferon IFN-b is a naturally occurring biochemical in the human body and belongs to a group of biochemicals known as interferons IFNs which regulate the functioning of the immune system. The mechanism by which IFN-b functions is complex and not fully understood. I shall explore this more fully in a later section but for now we can summarise it as: It reduces the levels of another interferon, called interferon gamma IFN-g , which is known to be associated with the disease process in multiple sclerosis. It appears to block certain white blood cells from attacking the insulating sheaths of the nerves - the myelin sheaths. It appears to stop a type of white blood cell, called a T Cell, from releasing immune system signalling molecules cytokines that would otherwise encourage inflammation. It appears to interfere with the process of summoning new immune system cells to the site of inflammation. How effective is IFN-beta? A lot of studies have now been done on the efficacy of beta interferons in both relapsing-remitting and secondary progressive MS. The bottom line of this research is that the drug is effective at reducing relapses and burden of disease under MRI in both types of MS. Most studies imply that the drugs also affect long-term progression though the evidence for this is less clear. Most studies also imply that IFN-b is dose dependent - that is, the higher the dose used, the greater the efficacy [Durelli et al , ; Coyle, ; Ref]. However, one study contradicts these findings [Ref,]. People who are using beta interferon or Copaxone, for that matter sometimes believe that the drug is not working for them because their disease continues to progress. Others say that the drug only works for one third of users. The first of these statements is probably incorrect and the second is almost definitely wrong. In the first place, we know that MS is a very unpredictable disease and none of us know where, nor on what time scale it is heading. In fact, this is the implication of the studies. This is because no one has any idea of what would have happened to any particular person. Probably, the best advice is to switch medication from one to another or to Novantrone if your disease seems to be running out of control. What IFN-b is not, is a cure for some people and no good at all for others. But how effective is beta interferon? It is believed that the minority of lesions detectable on MRI scans produce clinically measurable symptoms, but the benefits of these massive reductions may pay dividends years later after onset of a secondary progressive phase. One recent hotly-disputed study [Coyle,] has showed that interferon beta 1a administered according to the Rebif regime is more effective than the same compound administered according to the Avonex regime. Another study [Durelli et al,] has shown that interferon beta 1b administered according to the Betaseron regime is more effective than interferon beta 1a administered according to the Avonex regime. In one study, IFN-b, was shown to reduce the relapse rate in secondary progressive multiple sclerosis by a statistically significant amount. However, two other similar studies failed to show statistically significant effects. It is known that relapse rate falls off during the course of the disease

and that inflammatory activity is correlated with relapses. It is also believed that the mechanism of disease activity changes from an inflammatory one to a neuro-degenerative one during the secondary progressive phase of the disease. Based on these and other results, it seems likely that IFN- β is only effective at preventing inflammation and thus relapses and not effective at preventing neuro-degeneration. Long term studies show that, for most people, beta interferons continue to be effective with continued use during the relapsing-remitting phase of the disease. However, a sizeable minority of patients develop neutralising antibodies to the drugs which may reduce their efficacy. Are there any side-effects of beta interferon? Five year studies of beta interferon use have turned up no serious side-effects. This has always struck me as strange. However, some people genetically lack the ability to produce any gamma interferon at all and this apparently has no effect on their life-expectancy presumably none of them get MS or at least not very badly. Avonex appears to give fewer side effects than Betaseron or Rebif, perhaps due to its lower dose - injections are once a week as opposed to every other day or three times per week. These can be very unpleasant but often subside after a few months and respond well to ibuprofen. Liver toxicity has been noted in some patients particularly at higher doses though this symptom is usually mild. Be sure to notify your doctor if you are experiencing new symptoms whether or not they appear to be attributable to multiple sclerosis. Depression is another potential side-effect. Injection site reactions can also be a problem and it is advisable to rotate the injection site to mitigate against these. Numbing the skin at the injection site with ice, getting the drug up to room temperature before injecting and taking antihistamines before injecting all help. One of the difficulties many people have is the problem of having to inject themselves. Autoinjectors are available or you can get someone else to help you with this. Most people get over this barrier eventually. As with beta interferon, its method of action is complex and is not fully understood. One theory goes that, by flooding the body with the antigens similar to those in proteins found in the myelin sheath, the drug acts as a decoy and draws some of the attack away from the CNS. Glatiramer acetate arose from studies done on mice. They were first infected with EAE, an experimentally induced disease that resembles multiple sclerosis. The mice were then injected with the drug and responded well to the treatment. Glatiramer acetate is manufactured under the brand name Copaxone by Teva Marion Partners. It was known as copolymer during its development phase which became copolymer-1 COP-1 when copolymer-2 started to be developed. How effective is Copaxone? Copaxone is about as effective as beta interferons. The wide discrepancy between the two studies is probably explained by the widely fluctuating results derivable from the relatively small population bases that make up such trials. The first single-centre trial was done with 25 patients receiving glatiramer acetate and 25 receiving a placebo. The second multi-centre one had receiving the drug and the placebo. The initial trials also indicated a reduction in EDSS progression in multiple sclerosis. More recent evidence has shown Copaxone to significantly reduce the rate of brain atrophy. The results of a controversial and disputed comparative trial between Avonex, Betaseron and Copaxone were released in These indicated that Copaxone was as effective as Betaseron and more so than Avonex. There have been few studies on dosage and all patients are given 20mg sub-cutaneously irrespective of body mass. It is my feeling that, since it is believed that Copaxone acts as a decoy for the immune system, higher doses would increase its efficacy. Additionally it seems bizarre to me that all patients receive the same dose when their body weights vary so dramatically. There is currently a trial under way using Copaxone in conjunction with Avonex. Since the two drugs work in different ways there seems to be every chance that their combined effect will be additive. What are the side-effects of Copaxone? However no serious side-effects have been reported thus far. Copaxone is injected sub-cutaneously on a daily basis. The most common problem that users have are injection site reactions which include itching and inflammation. These reactions can be mitigated against by revolving the injection site, preparing it with ice and ensuring that the drug is at room temperature before injecting. Some users experience flushing, chest and joint pains, weakness, nausea, anxiety and muscle stiffness. These tend to resolve after about a quarter of an hour without special treatment. Given the high prevalence of multiple sclerosis in Europe and North America, the cost of supplying these treatments has significant financial implications to the health budgets of these countries. During the last two years the position on availability has changed greatly. This position has now changed and all four ABCR drugs are now available. In mainland Europe, Copaxone was largely unavailable

due to doubts about its purity. This position has also changed and, to the best of my knowledge, Copaxone is generally available in most EU countries. The notable exception is the UK. In Britain, few people use private health insurance and, anyway, few private policies cover medications for chronic conditions. Instead, everyone is a member of the National Health Service which is free at the point of delivery for all nationals. However, the cost of these drugs became a significant issue for many UK health authorities and a situation developed whereby some health authorities were allowing them to be prescribed whereas others were not. In response to these inequalities, the government created a body called the National Institute for Clinical Excellence NICE to determine whether expensive drug treatments were cost-effective and, based, on their conclusions, these treatments would either be available to everybody or nobody. The basis of their position essentially hinged on the lack of evidence for the long-term efficacy of the treatments against disease progression. In fact, there is little evidence one way or the other and arguments can be made either way. However, most neurologists would tend to think that they are likely to prevent or at least delay progression.

Chapter 2 : A Biochemical Basis of Multiple Sclerosis | JAMA | JAMA Network

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Because of its reliance on ancient doctrine and experience, TCM holds that the causes of most diseases as stemming from spiritual, emotional, behavioral, dietary, and climatic factors, in contrast to the biological and biochemical basis seen by practitioners of modern Western medicine. Chinese medical treatment is aimed at adjusting the environmental and human influences through lifestyle adjustments, the use of medicinal herbs, and physical therapies. Since modern Western medicine—“with its reliance on the latest research findings and technologies—“depicts the causes of most diseases as stemming from genetic, structural, pathogenic infective or toxic , nutritional, and behavioral factors, treatments are bioengineering, surgery, chemotherapy, dietary restriction, nutritional supplements, and behavior modification. Given that TCM and modern Western medicine have some overlap—“in that they both recognize the roles that diet and behavior play in disease etiology—“a detailed exploration is warranted. With regard to diet, Chinese medical doctrine holds that all ingested substances, whether classified as food, herb, or drug, have an influence on physiological function. The influence of an ordinary apple, for example, is said to be cooling and astringent, benefiting the digestive system and lungs. On the other hand, mutton is warming and moisturizing, benefiting the digestive and endocrine systems. By cooking foods through different methods, or adding seasonings during cooking, the nature of the food can be altered. Depending upon the selection of foods and their specific method of preparation, a person may maintain the balance that exists, restore balance, or, with the incorrect choices, become unbalanced. The role of the traditional-style medical doctor is to direct the individual to eat foods and consume herbs that will restore and maintain the balance that has been lost. A well-known saying in the Orient is: Western medical theory holds that foods are comprised of chemicals, that the body reduces the complex foods to a mixture of these basic chemical components through the digestive process, and that the body takes only those components it needs and eliminates the rest. The dietary chemical components that are currently deemed essential to health have been determined to be important mainly by the process of individually eliminating them from the diet of test animals and observing whether or not an abnormality arises, then restoring the substance to see if the abnormality is corrected. Based on these observations and analysis of human dietary intakes, a list of recommended daily amounts of nutrients has been developed, and individuals are asked to be sure that all these recommendations are met, regardless of their source. However, because recent experience has shown that high-fat diets can increase risks of cancer and heart disease, an upper limit is placed on the ingestion of total fats, and of the subgroup saturated fats. In a similar manner, an upper limit is recommended for total intake of cholesterol, salt, simple sugar, and total calories to help minimize the occurrence, and severity of certain diseases, such as atherosclerosis, hypertension, and diabetes. TCM practitioners recommend the use of foods on the basis of the inherent qualities of the whole, prepared, food, while modern Western-medicine practitioners recommend the use of foods based on the quantities of certain constituents, source and method of preparation notwithstanding. Since in the Orient, herbs are regarded as having a similar use as foods and similar origin as drugs, they are likewise used according to their inherent qualities to help achieve bodily balance. In the West, herbs are not deemed essential they are generally low in nutrients and their need in human health has not been firmly established , so they are simply not recommended. Further, because of lack of experience using herbs instead of poisonous plants serving as the source of powerful drugs e. Regarding the influence of behavior on health, Chinese medical doctrine suggests that certain behavioral patterns associated with emotional experiences may lead to disease. Probably the most important causative factor identified in this medical system is the failure to resolve emotional distress by appropriate familial and societal interactions. It is understood that unrelieved emotional stresses cause alterations in the functions of the internal organs, ultimately leading to their malfunction and the initiation of disease processes. For example, a large portion of the cases of cancer, autoimmune diseases, and gynecological disorders are thought, by the Chinese physicians, to be induced by or promoted by anger,

depression, and anxiety. This concern is basically for spiritual health, in the sense that one can, and should, strive to resolve spiritual emptiness—a potential basis for disease and failure to handle emotional situations—by communication with spiritual leaders in the community and by following the teachings of revered historical figures. Western medical theory expresses the idea that various human behaviors entail certain risks associated with disease or debility. Cigarette smoking, excessive drinking of alcohol, over-eating, illicit drug use, and participation in activities that have a high accident rate e. Continuation of these behaviors may lead to diseases, injury, or death. To alter the behaviors, education is offered to clarify the nature of the risk, and interested individuals may participate in programs to assist behavior changes e. While it has been recognized recently that emotional stress and depression can have an adverse impact on immune function, there is rarely any further elucidation of the link between emotion, high-risk behavior, and the onset of disease. In fact, recent research findings suggesting that there are genetic factors behind the undertaking of high-risk behaviors has focused attention on the biological side of the problem, rather than the emotional. Participation in such support groups has been shown to alleviate depression and double the life span of patients with terminal breast cancer. In China, the extended family and members of the local community are supposed to be in place at all times as a support group, but this is often not the case in America where high divorce rates and relocation of family members have been dominant features of the social landscape for generations. It can be seen that, even in these two areas diet and behavior of overlapping ideas about disease etiology, there are considerable differences between the TCM and modern Western viewpoints. As a result, the diseases are described in different terms and treated by different means. In those areas where there is even less overlap in ideas about cause of disease, there are greater differences in the therapeutic approaches taken, and it becomes quite a complex task to describe the Chinese theory in terms that would be comprehensible to someone trained in the modern Western medical way of thinking. Without spiritual relaxation, there is ongoing agitation, and destruction of bodily harmony. Western medicine is still pursuing the precise description of MS, but currently it is believed that a combination of genetic predisposing factors and an episode of a common viral disease initiates an autoimmune process which leads to the symptoms of the disorder inhibition of nerve transmission to the muscles , exacerbated by subsequent infections or other stimulants to the autoreactive immune system. In other words, the disease has nothing to do with either personal experiences other than having an infection or general bodily balance, but rather is attributed to an inherited coil of DNA and another slice of DNA provided by the virus. Therefore, TCM diverges from Western medicine by placing human experience above inheritance and biology as a cause. TCM practitioners would not deny that the specific disease manifestation—multiple sclerosis, rather than another chronic disease causing similar symptoms—might be based on heredity, but they would focus on other experiences to explain why the disease arises and persists. Therefore, the Oriental and Western views can be partially reconciled by saying that a genetic propensity for the disease needs to be present in order for one to experience MS, but that life experiences other than the viral infection might also be necessary cofactors to initiate and maintain the full disease process. MS is a relatively rare disease in China, and this is believed by modern researchers to reflect a genetic difference between the Oriental population and the others—mainly Caucasian—that have a higher incidence of the disease. Further, MS is more common in individuals who grew up in northern areas rather than southern areas, suggesting either exposure to a pathogen or food product that is more common in the cold climates. Among those with the necessary genetic and environmental factors, the reason why some are afflicted with MS and others are not, or why the disease follows such different courses in different individuals, remains an open question for which TCM theory may provide some insights. Although the Chinese see anxiety, depression, fright, and fear as contributors to the disease process helping to initiate and aggravate the condition , Western doctors observe these emotional patterns in patients diagnosed with the disease and attribute the emotional conditions largely to a reaction to the diagnosis. That is, once a person is informed that they have a disease which may be progressive and debilitating, they become anxious, depressed, and fearful. Western doctors observe demyelination of the nerve fibers and its eventual scarring sclerosis as the characteristic pattern of MS. Demyelination—a loss of fatty substance surrounding the nerve fibers—roughly corresponds to a description, by Chinese doctors, of the loss of a vital fluid essence jing. The

autoimmune process, with stimulated production of antibodies that attack the body instead of attacking a pathological organism, corresponds roughly to the Oriental description of dysfunction and disharmony of the internal organs. Where the Western physician imagines the microscopic changes revealed from isolated tissues, the Chinese physician imagines broad processes that correspond to things experienced in daily life. Another is to apply a peptide cytokine, a small protein, such as interferon that regulates immune responses and controls initiating viruses, thus reducing the number of MS attacks. There are numerous other methods being investigated, in which something is introduced into the body to interfere with the autoimmune process. The Chinese medical approach is also to introduce something into the body, with the aim of replenishing body essence and to rehabilitate internal organ functions, through diet and herbs, rather than products of advanced technology. Acupuncture is applied in an effort to rectify the circulatory disturbances that arise from the disharmony of organ functions; the improved circulation helps the organs and tissues return to a normal, healthy condition. Further, steps to resolve underlying spiritual and emotional distresses are undertaken on the basis of discussions and recommendations. The latter is to be established by asking questions and conducting some traditional diagnostic procedures, such as analyzing the appearance of the tongue and feeling of the pulse at the wrist. Not only do the symptoms of MS vary from individual to individual, but also the health histories such as coexisting diseases or syndromes are different, and these factors must be accounted for in determining suitable prescriptions. Acupuncture treatments are likewise selected on the basis of previous experience with other patients, such as those who experience paralysis due to stroke, and on the basis of unique characteristics of the individual currently under treatment. Thus, there is not a single remedy for MS that can be offered through the traditional Chinese medical approach, but rather a composite treatment based on individual needs. According to a published clinical trial and a small number of individual case reports from China, MS symptoms can be effectively controlled in many patients by consistent use of Chinese herb formulas. The duration of therapy for MS patients reported in Chinese studies ranges from two months to over two years; herbs used to prevent exacerbations might be taken for several more years. If the herbs are discontinued after the initial treatment period, some patients may remain free of symptoms for many years. In some cases, there can be a relapse, but prompt resumption of herb use will help the individual regain freedom from disease symptoms for a period of time. Despite the long duration of therapy necessary in some cases, it is not uncommon in China for improvements to be noted within the first two months. In a Chinese study [1] with 35 patients, four different herb formulas were developed. People were treated according to the diagnosis that would place each into one of the four broad diagnostic categories that matched the herb therapeutics. The complex herb formulas were prepared as decoctions tea made by boiling the herbs for about 45 minutes using 8 to 15 grams of each ingredient a total of about grams per day, consumed as a cooling drink rather than hot, as many MS patients have an aversion to heat. Anti-inflammatory Western drugs were given during acute active periods of the disease. Except for three patients that discontinued treatment within the first ten days, some improvement was found in all who tried this method. Two cases were deemed basically cured after taking just 45 and 68 doses; 15 were markedly improved, and another 15 somewhat improved—most of them taking 20 to 40 doses. Eleven of the patients had tried corticosteroids unsuccessfully before switching to the traditional herb combinations; of these, 7 were markedly improved, 3 improved, and only 1 failed to respond. The same researchers then conducted a study [2] of prevention of exacerbations. Each herb was used in a dosage of 8–15 grams except two auxiliary herbs used in low dosage, with a total daily dosage of about 40 grams of herbs in decoction. The herbs were taken in two to three divided doses each day. The patients took these herbs for a period of 3 to 13 years average of 6 years and during this period, only two mild exacerbations occurred in the group. By contrast, a control group of 15 MS patients had an exacerbation rate of 1–4 times per year. Two case studies of MS treatments were reported [3] from the work of Dr. Domei Yakazu in Japan. Good therapeutic results were described from the regular ingestion of an herb formula over a period of two and a half years in a man aged 48, and marked improvement was noted in a woman, aged 34, who consumed two traditional formulas for a period of approximately two months. According to a translated report from China [4], a female patient, aged 38, was treated with herb decoctions for about 15 weeks and was then given herb pills to take regularly for one year. The clinicians reported that she was cured as a result of the treatment.

A general survey of Chinese journals shows that there are a small number of other similar reports, each article describing one or two patients treated with obvious benefit. The dosages of herbs used in Chinese clinical studies that have demonstrated successful resolution of MS, and other chronic diseases, tend to be quite high. Longer-term therapy with lower dosage, as used in Japan, has been reported to produce good results, but no claims of cures, as yet. Because Americans are not used to relying on herb remedies, the dosage applied in China may seem exceptionally high when compared with ingestion of drugs, vitamins, or even herb remedies that are administered for less serious disorders. Chinese herbs may be provided in bulk form to make a strong decoction, or by spoonfuls of powdered herb or extracts. If the herbs are taken in pill or tablet form, the number of them to be ingested might be quite high. While the herb compounds used in treating MS are nontoxic, it is possible to experience some reactions. The most likely adverse response is a gastro-intestinal reaction that might include indigestion, loss of appetite, nausea, vomiting, diarrhea, flatulence and bloating. Such reactions can usually, but not always, be eliminated by changing the time of taking the herbs in relation to meals, by providing a digestion-promoting formula or a simple ginger tea to be taken at the same time, or by using a different prescription. In a very small number of cases, an allergy-like reaction may arise, and this usually manifests early in the treatment with a rash which will be alleviated when the use of those particular herbs ceases, but will quickly reappear if the same herbs are taken again. If herb therapy is the primary method of treatment and if there are no special difficulties encountered. If acupuncture is pursued as an additional therapy, treatments might be undertaken at the rate of three to four times per month more frequently following an exacerbation of MS. An acupuncture procedure known as scalp acupuncture appears to provide the best results. He has written a book about his techniques [5], which is available from the Center, and has personally trained many American acupuncturists in its use practitioners can also learn many of the techniques from his book. In addition to the traditional Chinese techniques, nutritional interventions may be suggested; these are based on Western research, but have been adopted as part of natural medicine in modern China. For example, studies have shown that some individuals with MS have low blood levels of vitamin B12, a nutrient which is essential to myelin sheath repair it may be necessary to give this nutrient by injection, since poor intestinal absorption may be the reason for low blood levels. Calcium supplements can be especially important to women suffering from MS, since any reduced mobility from the disorder can lead to increased risk of osteoporosis.

Chapter 3 : Morphological and biochemical findings in jejunal biopsies from patients with multiple sclerosis.

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This is an open access article distributed under the Creative Commons Attribution License , which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. In addition to the widely known effect of vitamin D3 vitD3 on the skeleton, its role in the regulation of the immune response was also confirmed. The assessment of biochemical and densitometric markers of calcium-phosphate metabolism in the groups of patients with relapsing-remitting multiple sclerosis RRMS selected due to the serum level of vitamin D3. The concentrations of biochemical markers and indices of lumbar spine bone densitometry DXA were determined in 82 patients divided into vitamin D3 deficiency VitDd , insufficiency VitDi , and normal vitamin D3 level VitDn subgroups. The highest level of the parathyroid hormone PTH and the highest prevalence of hypophosphatemia and osteopenia were demonstrated in VitDd group compared to VitDi and VitDn. The subgroups were significantly different with respect to the EDSS scores and the frequency of complaints related to walking according to the EQ-5D. It is necessary to assess calcium-phosphate metabolism and supplementation of vitamin D3 in RRMS patients. The higher the clinical stage of the disease assessed with the EDSS, the lower the level of vitamin D3 in blood serum. Introduction Progressive disability is one of the major clinical problems in multiple sclerosis MS patients [1]. Neurological deficits develop due to inflammatory demyelinating lesions in the central nervous system CNS and are the result of damage to the myelin sheath and nerve cell axons [2 – 4]. This disorder contributes to the increase in functional impairment and the deterioration of the quality of life of young people. The complex role of immune, genetic and environmental factors is stressed in the formation of demyelinating lesions and in the course of the disease [5 , 6]. Reduced exposure to ultraviolet UVB radiation and, as a result, vitaminD3 vitD3 deficiency plays a key role in the etiopathogenesis of MS [7 – 9]. Low level of vitD3 is an early predictor of the both disease progression [10] and relapses [11]. The contribution of vitD3 to the regulation of calcium-phosphate metabolism is well known [12]. Its most important extracalcemic activity is limiting of autoimmune progression in MS, mainly due to increased anti-inflammatory response [12 – 14]. At the same time, through its anabolic activity, PTH stimulates bone formation greater than resorption. Concomitantly, PTH increases phosphaturia and decreases P in blood serum [15]. Vitamin D3 also facilitates bone mineralization and its deficiency contributes to the disturbance in remodeling processes with a simultaneous delay in bone growth [16]. Inadequate dietary intake of calcium contributes to increased bone turnover due to vitD3 and PTH [17]. In cases of impaired calcium-phosphate metabolism, the loss of bone tissue is observed, which contributes to the development of osteoporosis OS. Osteoporosis is much more prevalent in MS patients compared to the general population, constituting an important risk factor for fractures associated with increased morbidity and mortality [18]. Disseminated demyelinating lesions of the CNS result in problems with vision, balance, and coordination, which is inextricably linked to an increased susceptibility to falls and fractures in MS. The potential causes of the increasing risk of OS in MS patients include MS-related weakness and disability, decreased exposure to UVB, chronic inflammatory process, and glucocorticosteroid GC therapy during relapses [19]. The aim of the study was to assess biochemical parameters of calcium-phosphate metabolism, densitometric indices, and the style and quality of life in relapsing-remitting multiple sclerosis RRMS patients with deficiency, insufficiency, and normal levels of vitD3. Material and Methods 2. The study was done from December to March All patients enrolled in the study were divided depending on serum levels of vitD3: Inclusion and Exclusion Criteria The inclusion criteria were as follows: The exclusion criteria were as follows: Study Protocol The diagnostic procedures were conducted during the morning medical visit and included the following: Lumbar vertebral bone mass was assessed anterior-posterior L2-L4. Osteoporosis was diagnosed based on the current WHO diagnostic criteria , i. Laboratory Assays Fasting serum samples, collected between 7am and 8am, were used for biochemical tests. The range of reference values was as follows: For the purposes of this study, the

abbreviation 25 OH D was synonymous with vitD3 and was used interchangeably. The following levels were considered normal serum PTH: P Phosphate inorganic ver. Alkaline Phosphatase Alkaline Phosphatase acc. Epidemiological Survey The survey questionnaire was prepared according to the concept and experience of the authors. It consisted of 62 obligatory items, while 6 items were the components of the quality of life scale according to the Euro Quality of Life-5 Dimension EQ-5D. The first part of the questions was related to basic personal data and social and economic information. The second part was related to the onset of the underlying disease. Further questions were related to the current MS status number of relapses hospitalizations, rehabilitation, current and previous use of DMT, and oral and i. The last part of the questionnaire included questions connected with past fractures and the lifestyle. Statistical Analysis Descriptive statistics parameters for continuous variables were presented as the arithmetic mean and the standard deviation. Qualitative variables were presented as percentage values. The Student t-test was used to compare 2 subgroups. The post hoc analysis was performed using the Tukey test with the Bonferroni correction if significant differences were found in the markers of calcium-phosphate metabolism and the EDSS. The frequencies between the subgroups were compared using the contingency tables and the chi-square test. Statistica 10 PL software StatSoft was used for statistical calculations. The mean age of patients was The mean age at diagnosis of MS was The neurological status of all patients assessed by the EDSS [score] was determined at 2. The number of cycles of iv. Patients on DMT at the time of the study constituted The family history of MS was confirmed in 6. The assessment of the clinical status and treatment was presented in Table 2. In the subgroup of VitDn all patients were treated with DMT; however, no significant differences were observed in the selected subgroups. Basic characteristics in the subgroups of patients with deficiency, insufficiency, and normal level of hydroxycholecalciferol. The assessment of the clinical status and immunomodulatory treatment in the subgroups of patients with deficiency, insufficiency, and normal level of hydroxycholecalciferol. However, hypocalcemia was reported in the whole MS group. Simultaneously, differences in the mean PTH level were confirmed. The prevalence of OS in all MS patients was estimated at No significant difference was observed in the following: These subgroups, however, were different with respect to the prevalence of OP Table 4. Comparison of biochemical markers of calcium-phosphate metabolism in the subgroups of patients with deficiency, insufficiency, and normal level of hydroxycholecalciferol. Comparison of densitometric markers of calcium-phosphate metabolism in the subgroups of patients with deficiency, insufficiency, and normal level of hydroxycholecalciferol. Significant differences were noted with respect to problems in walking in the above subgroups. However, there were no differences in the other components of the EQ-5D scale Figure 2. Comparison of the EQ-5D quality of life in the subgroups of patients with deficiency, insufficiency, and normal level of hydroxycholecalciferol. The analyzed subgroups were not different in terms of particular aspects of lifestyle, i. No differences were observed in the mean levels of other biochemical parameters. Significant differences in the prevalence of hypophosphatemia were due to the fact that patients from VitDi and VitDn did not present with hypophosphatemia. Under physiological conditions, vitD3 enhances the absorption of P in the gastrointestinal tract. Therefore, it can be assumed that hypophosphatemia appears only in the case of deficiency of vitD3. Additional inclusion of phosphaturic activity of the fibroblast growth factor FGF and the determination of its coreceptor Klotho protein in RRMS patients would have had an impact on the conclusions [20]. In turn, the determination of levels of albumins and total protein which has an impact on the active fraction of total calcium could have modified the results. A similar significant correlation between the level of vitD3 and PTH was confirmed by Tulay et al [23]. To some extent, the above relationship results from the physiology of the endocrine system, which under optimal conditions provides normal calcium-phosphate metabolism. This finding suggests that hypersecretion of PTH appears with a delay compared to the decrease in the level of vitD3 in MS patients. However, the final impact of this treatment on the above hormone requires careful and detailed research. These results are consistent with the broad analysis of Gibson et al. No significant differences were confirmed in the assessment of the percentage of the prevalence of OS in VitDd, VitDi, and VitDn subgroups, which would probably have occurred in a comparative analysis with the control group. A much higher prevalence of OS is observed in MS patients with respect to the general population [19 , 24]. At the same time, the highest percentage Not only does its

deficiency result in the disorders of calcium-phosphate metabolism but it is also a risk factor of OP and, consequently, OS. However, according to the WHO recommendations, consideration of T-score in the diagnosis of the disease is only acceptable for postmenopausal women and for men over the age of 50. Based on the assumptions that MS mainly affects young people and as an autoimmune disease it is a risk factor for secondary OS, the diagnosis of the disease with the Z-score seems to be more precise. However, the T-score was considered in the diagnosis of OS in many studies on bone status assessment in MS patients [23 , 27 – 29]. Due to the superior function of vitD3 in the maintenance of the balance of calcium-phosphate metabolism in MS patients, a potential risk of decreased BMD value is observed [30 , 31]. However, many studies did not prove the relationship between deficiency of vitamin D3 and reduced BMD [24 , 32 – 35], as opposed to other reports [23 , 36]. In the past, lower BMD values were observed in MS patients as compared to the control group [23 , 27 , 37]. It was confirmed that one of the determinants of BMD is disease duration [28] and iv. GCs [32]. The relationship between BMD and iv. GCs in MS patients was confirmed by Tyblova et al. In terms of the etiopathogenesis of MS, we analyzed the factors related to the lifestyle, i. The problem of tobacco smoking, diet, and alcohol consumption were included in the present study in the context of vitD3 level, which makes this issue even more complex and difficult to interpret unambiguously.

Chapter 4 : Biochemical and Molecular Basis of Pediatric Disease, 4th Edition - calendrierdelascience.com

A Biochemical Basis Of Multiple Sclerosis Multiple sclerosis acupuncture, around , people in the uk have multiple sclerosis (ms) (ms society), an autoimmune disorder of the central nervous.

Chapter 5 : MS treatments: ABC drugs

*A biochemical basis of multiple sclerosis (American lecture series, publication no. A monograph in American lectures in living chemistry) [Roy L Swank] on calendrierdelascience.com *FREE* shipping on qualifying offers.*

Chapter 6 : Traditional Chinese Medicine and Multiple Sclerosis

As stated by the author in his preface, the primary goal of this monograph is to develop a unified hypothesis capable of explaining the known facts about multiple sclerosis. The hypothesis, based.

Chapter 7 : A biochemical basis of multiple sclerosis.

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Book: A biochemical basis of multiple sclerosis. calendrierdelascience.com + 88 pp. Abstract: For just over a decade Nutrition Abstracts and Reviews has carried references to the fundamental work by Dr. Swank on the role of nutrition in the aetiology of multiple sclerosis.